# A VIABLE SOLUTION FOR THE COMPUTER TECHNOLOGY CURRICULUM DILEMMA

by

Kelley Shaffer

A dissertation submitted to the Faculty of The Robert Morris University in partial fulfillment of the requirements for the degree of Doctor of Philosophy with a major in Instructional Management and Leadership

Spring 2008

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by

Kelley Shaffer

Approved: ______________________________
George W. Semich, Ed.D.
Director, IML Doctoral Program and Associate Professor of Education

Approved: ______________________________
John E. Graham, Ed.D.
Dean, School of Education and Social Sciences and Professor of Education

Approved: ______________________________
David L. Jamison, J.D.
Provost and Senior Vice President for Academic Affairs

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**CURRICULUM DILEMMA**

by

Kelley Shaffer

I certify that I have read this dissertation and that in my opinion it meets the academic and professional standard required by the University as a dissertation for the degree of Doctor of Philosophy.

Signed: ______________________________________________

Donna L. Cellante, Ed.D.
Professor in charge of dissertation

Signed: ______________________________________________

John E. Graham, Ed.D.
Member of dissertation committee

Signed: ______________________________________________

Jon A. Shank, Ed.D.
Member of dissertation committee

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Table 2-1. ICT Literacy Framework of the Partnership for 21st Century Skills.
Partnership for 21st Century Skills. (n.d.). *Learning for the 21st Century: A Report and Mile Guide for 21st Century Skills.* Washington, DC: Author. Retrieved October 7, 2006, from www.21stcenturyskills.org/images/stories/otherdocs/p21_report.pdf

Table 2-2. Keyboarding Scope and Sequence.
Bartholome, L.W. (n.d.) *Typewriting/Keyboarding Instruction in Elementary Schools*. Retrieved August 31, 2006, from http://www.usoe.k12.ut.us/ate/keyboarding/Articles/Bartholome.htm
Permission granted posthumously by Utah State University.

Table 4-2. West Allegheny School District: Proposed Course Sequence/Offerings as of 12/5/06.
West Allegheny School District.

Table 4-3. West Allegheny School District: Sample 6-day Rotation Schedule for a Student in the Elementary Grades.
West Allegheny School District.

Table 4-4. West Allegheny School District: Sample 6-day Rotation Schedule for a Student in Middle School.
West Allegheny School District.

Table 4-5. West Allegheny School District: Sample 6-day Rotation Schedule for a Student in High School.
West Allegheny School District.

Table 4-6. West Allegheny School District: Recommended Technology Purchases for the 2007-2008 School Year. West Allegheny School District.

Table 4-7. West Allegheny School District: Proposed Five-Year Course Plan of Information and Communications Technology Course Offerings.
West Allegheny School District.

Appendix C. The Association for Computing Machinery's Computer Science Curriculum.
Association for Computing Machinery, Inc. (2003). *A Model Curriculum for K-12 Computer Science: Final Report of the ACM K-12 Task Force Curriculum Committee.* New York, NY: Author. Retrieved September 24, 2006 from www1.acm.org/education/k12final1022.pdf

Appendix E. 2007 National Educational Technology Standards for Students (NETS).
International Society for Technology in Education. (2007). *National Educational Technology Standards for Students: The Next Generation*, Washington, DC: Author. Retrieved June 29, 2007 from
http://www.iste.org/inhouse/nets/cnets/students/pdf/NETS_for_Students_2007.pdf
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Appendix F. Initial Curriculum Template for West Allegheny School District.
West Allegheny School District.

Appendix G. Final Curriculum Template with Pennsylvania Academic Standards for Science and Technology Cross-Referenced to ISTE's new NETS.
West Allegheny School District.

Appendix H. Needs Assessment for West Allegheny School District. Adapted with permission from Learning Point Associates.
North Central Regional Education Laboratory & Metiri Group. (2003). *EnGauge 21st Century Skills for 21st Century Learners: Literacy in the Digital Age*. Naperville, IL: NCREL.

Appendix K.  West Allegheny School District – Information and Communications Technology Curriculum for Grades K-12.
West Allegheny School District.

## DEDICATION

This manuscript is dedicated to:

My husband, Matthew, for his unending love, patience and understanding during this process. I could not have achieved this goal without his incredible spirit and unending support.

My children, Jordan and Samantha for their patience and love during this arduous process. Their sacrifices did not go unnoticed. Their willingness to see me succeed is awe inspiring.

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**TABLE OF CONTENTS**

Chapter 1 .......... 1

INTRODUCTION .......... 1

*Background of the Study* .......... *1*

*Statement of the Problem* .......... *2*

*Significance of the Study* .......... *3*

*Overview of the Methodology* .......... *4*

*Limitations of the Study* .......... *4*

*Definition of Terms* .......... *5*

Chapter 2 .......... 9

REVIEW OF LITERATURE .......... 9

*Today's Students* .......... *9*

*The Need for a Computer Technology Curriculum* .......... *11*

*Curriculum Development* .......... *15*

*Trends and Best Practices* .......... *19*

*Guidelines and Recommendations for Subject Matter* .......... *25*

*Elementary grades K-5* .......... *26*

*Middle school grades 6-8* .......... *30*

*High school grades 9-12* .......... *33*

Chapter 3 .......... 35

RESEARCH METHODOLOGY .......... 35

*Qualitative Method - Action Research* .......... *35*

*Mixed Methods* .......... *39*

Chapter 4 .......... 41

RESULTS .......... 41

*Today's Students* .......... *41*

*The Need for Technology Curriculum* .......... *43*

*Curriculum Development* .......... *45*

*Timeline* .......... *45*

*Influencing Factors* .......... *76*

*Trends and Best Practices* ........ *80*
*Guidelines and Recommendations for Subject Matter* ........ *82*
Chapter 5 ........ 89
SUMMARY AND DISCUSSION ........ 89
*Statement of the Problem* ........ *89*
*Significance of the Study* ........ *90*
*Review of the Methodology* ........ *90*
*Summary of the Results* ........ *91*
*Today's Students* ........ *91*
*The Need for Technology Curriculum* ........ *92*
*Curriculum Development* ........ *93*
*Influencing Factors* ........ *98*
*Discussion* ........ *102*
*Curriculum Development* ........ *102*
*Curriculum Trends* ........ *103*
*Recommendations for Further Study* ........ *109*
REFERENCES ........ 110
Appendix A ........ 119
LETTER OF APPROVAL FROM THE WEST ALLEGHENY SCHOOL DISTRICT ........ 119
Appendix B ........ 121
WEST ALLEGHENY SCHOOL DISTRICT – BUSINESS AND COMPUTER TECHNOLOGY CURRICULUM FOR THE 2006-2007 SCHOOL YEAR ........ 121
Appendix C ........ 133
THE ASSOCIATION FOR COMPUTING MACHINERY, INC. MODEL CURRICULUM FOR K-12 COMPUTER SCIENCE ........ 133
Appendix D ........ 162
THE PENNSYLVANIA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY ........ 162
Appendix E ........ 199
2007 NATIONAL EDUCATIONAL TECHNOLOGY STANDARDS FOR STUDENTS (NETS) ........ 199

Appendix F .......... 202
INITIAL CURRICULUM TEMPLATE USED BY THE WEST ALLEGHENY SCHOOL DISTRICT (SAMPLE) .......... 202
Appendix G .......... 210
FINAL CURRICULUM TEMPLATE USED BY THE WEST ALLEGHENY SCHOOL DISTRICT (SAMPLE) .......... 210
Appendix H .......... 218
WEST ALLEGHENY SCHOOL DISTRICT NEEDS ASSESSMENT .......... 218
Appendix I .......... 223
WEST ALLEGHENY SCHOOL DISTRICT: COMPARISON OF COMPARABLY SIZED SCHOOL DISTRICTS .......... 223
Appendix J .......... 230
COMPUTER AND TECHNOLOGY CURRICULA BY SCHOOL DISTRICT FOR ALLEGHENY COUNTY, PENNSYLVANIA, PUBLIC SCHOOLS FOR THE 2006-2007 SCHOOL YEAR .......... 230
Appendix K .......... 237
WEST ALLEGHENY SCHOOL DISTRICT INFORMATION AND COMMUNICATIONS TECHNOLOGY CURRICULUM FOR GRADES K-12 .......... 237

## LIST OF TABLES

Table 2-1. *ICT Literacy Framework of the Partnership for 21st Century Skills*...............24

Table 2-2. *Keyboarding Scope and Sequence,* Lloyd W. Bartholome, Utah State University.......................................................................................................29

Table 4-1. *COMPARISON OF PUBLIC SCHOOL ENROLLMENTS BY LEA (Local Education Agency), 2006-2007* (West Allegheny School District)...................................42

Table 4-2. *West Allegheny School District: Proposed Course Sequence/Offerings as of 12/5/06* ..........................................................................................................51

Table 4-3. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in the Elementary Grades.* ....................................................................55

Table 4-4. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in Middle School.* ..........................................................................55

Table 4-5. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in High School*..........................................................................56

Table 4-6. *West Allegheny School District: Recommended Technology Purchases for the 2007-2008 School Year*..........................................................................59

Table 4-7. *West Allegheny School District: Proposed Five-Year Course Plan of Information and Communications Technology Course Offerings*....................................70

## LIST OF FIGURES

*Figure 1.* West Allegheny School District Curriculum Development Timeline ..............74

*Figure 2.* Computer technology course selections available in the elementary grades in the public schools of Allegheny County, Pennsylvania....................................................83

*Figure 3.* Public school district in Allegheny County, Pennsylvania, that offer Basic Computer Operations in the elementary grades................................................................84

*Figure 4.* Public school districts in Allegheny County, Pennsylvania, that offer Keyboarding or a combination of Keyboarding and Word Processing.............................85

*Figure 5.* Computer technology courses offered in public schools in Allegheny County, Pennsylvania, for the Middle/Junior High School grade levels........................................86

*Figure 6.* Microsoft Office Suite courses offered in the public schools of Allegheny County, Pennsylvania ......................................................................................................87

*Figure 7.* Computer technology course selections for public high schools in Allegheny County, Pennsylvania ......................................................................................................88

*Figure 8.* Keyboarding Trends: Allegheny County, Pennsylvania vs. U.S ..................106

**ABSTRACT**

Curriculum development has become a very crucial part of the education process. As the needs of students and national and state requirements change, curricula must evolve to accommodate these needs and requirements. Curricula must be dynamic, free to change with the needs of the student body, district needs, and federal and state mandates. Computer technology curriculum is no exception. It, too, must meet the needs of students, districts, and governing bodies. Computer technology is constantly changing and improving, and school systems have an obligation to keep pace with emerging technology.

This dissertation is a report and analysis of current trend data on computer technology curricula and an action research project on writing computer technology curriculum for a suburban school district. The study is based primarily on participant observation and data collection of the curriculum development process with the final product being a formalized computer technology curriculum. Data was collected from all public school districts in Allegheny County, Pennsylvania for the 2006-2007 school year. Clearly defined trends will be identified based on course selections for kindergarten through twelfth grade.

Chapter 1

# INTRODUCTION

This dissertation is a report of current trend data on computer technology curricula and an action research project on writing computer technology curriculum for a suburban school district. The study was based primarily on participant observation and data collection of the curriculum development process with the final product being a formalized computer technology curriculum to be implemented in the 2007-2008 school year. The first chapter presents the background of the study, specifies the problem of the study, describes its significance, and presents an overview of the methodology used. The chapter concludes by noting the limitations of the study and defining the special terms used.

## *Background of the Study*

Curriculum development has become a very crucial part of the education process. As the needs of students and national and state requirements change, curricula must evolve to accommodate these needs and requirements. Curricula must be dynamic, free to change with the needs of the student body, district needs, and federal and state mandates. Technology curriculum is no exception. It, too, must meet the needs of students, districts, and governing bodies. Computer technology is constantly changing and improving, and school systems have an obligation to keep pace with emerging technology. In an effort to keep pace with technology, federal and state regulations mandate minimum requirements for instruction in technology.

### *Statement of the Problem*

In order to meet student needs, the requirements of No Child Left Behind (NCLB) and Pennsylvania Academic Standards, West Allegheny School District must develop a formal, district-wide, K-12 Computer Technology Curriculum. The school's current computer technology curriculum is lacking; it is possible for a student to progress through the grades and graduate without keyboarding skills or a basic understanding of computer technology. Elementary students receive rudimentary exposure to basic computer functions; middle school students have basic exposure to ethical use of the internet; and high school students may choose a business course elective to receive instruction in keyboarding, software applications, or programming; none of these are requirements for graduation.

Administration is undertaking the challenge of addressing this very serious issue by writing a formal information and communications technology curriculum that will not only meet the requirements of NCLB and the Pennsylvania Academic Standards, but also produce a high school graduate who demonstrates technology skills that will allow him or her to become a productive member of society in a technologically advanced world.

*Significance of the Study*

The significance of this study is two-fold. First, current trend data does not exist that defines K-12 Computer Technology Curricula for the 2006-2007 school year in public school districts for Allegheny County, Pennsylvania. Second, a district-wide, formal K-12 Computer Technology Curriculum does not exist for West Allegheny School District.

This study will address the following research questions:

1. What impact does NCLB and Pennsylvania Academic Standards have on technology curriculum?
2. What are the current trends in K-12 computer technology curriculum for Allegheny County, Pennsylvania?
3. What Information and Communications Technology curriculum should be adopted and implemented by West Allegheny School District for the 2007-2008 school year?

This study will provide a report of the many factors influencing the curriculum development process as it relates to computer technology curriculum in a suburban school district. It will present data to support the curriculum choices and the requirements of the federal and state governments as outlined in the NCLB legislation and the Pennsylvania State Academic Standards. The researcher will provide a formal, district wide K-12 Information and Computer Technology Curriculum that will be implemented in the 2007-2008 school year. The structure will be an abbreviated course plan that will include: Unit Content, Student Outcomes, Level of Proficiency, the Pennsylvania Academic Standards, and the International Society for Technology

Education's recommendations, also known as the National Educational Technology Standards (NETS).

### *Overview of the Methodology*

Two primary methods of research will be conducted in this study: action research and unobtrusive measures. Action research will be utilized by participant observation techniques to document the different factors that influence the curriculum development process. The researcher will be an active member of the West Allegheny School District's Computer Technology Curriculum Committee by participating in curriculum development meetings with administration and teachers. The resulting curriculum will be a collaborative effort, actively involving school district stakeholders.

Unobtrusive measures will be used to collect public data from the school districts in Allegheny County, Pennsylvania, to determine the computer technology curricula offered in the 2006-2007 school year. Data will be collected from the school district websites, via e-mail, and from oral and written requests.

### *Limitations of the Study*

This study is limited to computer technology curricula. It does not include the category of Technology Education (formerly known as shop, trade, or industrial arts classes). The data collected to determine current trends in computer technology curricula is limited to Allegheny County, Pennsylvania. The resulting curriculum is based on the needs and contractual limitations of the West Allegheny School District.

*Definition of Terms*

A+ Certification/Networks – Courses that include instruction in computer networking and hardware concepts, some resulting in the test to become an A+ certified computer technician.

Advanced Microsoft Office – Courses that include instruction in the advanced features of Word, Excel, PowerPoint and Access. Advanced features include those that are not typically used by the average home computer user. Topics focus on business use.

Allegheny County – the second most populace county in Pennsylvania (Pennsylvania State Data Center, 2002). Based on the 2000 census data, the most populace city in this county is Pittsburgh, Pennsylvania (U.S. Census Bureau, n.d.).

Basic Computer Operations (Elementary Grades) – Familiarity with introductory concepts and procedures, such as use of the mouse, basic hardware and software, and file access procedures.

CAD – Courses that offer instruction in Computer Aided Drafting.

CISCO or ORACLE Academy – Courses delivered in the high school where the curriculum is provided by CISCO or ORACLE, providing in-depth coverage of networking or database systems.

Computer Programming I – School districts that offer at least one class in computer programming. Primary programming languages offered are JAVA and Visual Basic.

≥Computer Programming II – School districts that offer at least a second class in computer programming. These courses could be another programming language or advanced class(es) in JAVA or Visual Basic.

Course – "a series of units that lasts for a specified time (semester, year, etc.) and is designed around a specified school subject" (International Technology Education Association, 2005, p.23).

Curriculum – A comprehensive document focusing on a particular content area that contains a philosophical statement for the content area and individual course materials. The course materials consist of a course description page and an overview of the course. The course overview is built using the Revised Curriculum Template (Appendix G) and contains the Unit Content, Student Outcomes, Level of Proficiency, PDE Academic Standards addressed, and the appropriate national standard. In the case of Computer Technology curriculum, the national standards used are the National Educational Technology Standards for Students (NETS) developed by the International Society for Technology in Education (ISTE).

Curriculum writers – members of the West Allegheny School District Computer Technology Curriculum Committee.

Desktop Publishing – Courses that focus on basic desktop publishing features such as brochures, logo and document design. Common software packages used are Microsoft Publisher and Adobe PageMaker.

ESEA – the Elementary and Secondary Education Act.

Ethics – Instruction in methods to properly and legally access the computer and Internet. Topics include plagiarism and how to evaluate information found on the Internet.

Grade 8 Web Design/Desktop Publishing – A course that focuses on basic concepts of graphics and images to produce the middle school newspaper and a student centered website. Basic web design features are covered.

IC3 – Internet and Computing Core Certification.

Informal Curriculum – course descriptions or general guidelines that a school district considered its curriculum. It has no formal structure or continuity, and does not subscribe to a generally accepted format.

ISTE – International Society for Technology in Education.

ITEA – International Technology Education Association.

K-12 – Kindergarten through twelfth grade.

Keyboarding – "The manipulation of the computer keyboard by touch" (Erthal, 2002). Once introduced, additional courses include skill building instruction to improve speed and accuracy.

Level of Proficiency – Depth of content to be covered by a specific course, as defined by the curriculum writers. Levels are: I – Introduce, R – Review, and M – Master.

MOS Certification, or ICDL – Courses that offer instruction to become MOS (Microsoft Office Specialist) or ICDL (International Computer Drivers License) certified.

MS Office – Instruction in the use of the Microsoft Office Suite. Emphasis is given to Word, Excel and PowerPoint. Access is minimally covered.

Multimedia/Web Page Design – Courses that offer instruction in basic Web Page Design. Concepts covered utilize HTML and popular software such as Front Page, Flash, or Dreamweaver.

NCLB – Public Law 107-110, also known as the No Child Left Behind Act of 2001.

NECC – National Education Computing Conference.

NETS – National Educational Technology Standards for Students, as written by ISTE (International Society for Technology in Education).

PDE - Pennsylvania Department of Education.

Student Outcomes – Behavioral objectives of the course as defined by the curriculum writers.

Technology – Pertaining to the theory, or use of computer hardware or software.

Unit Content – An overview of the units to be covered in a specific course, as defined by the curriculum writers.

West Allegheny School District – A school district located in Allegheny County, Pennsylvania, formed in 1966. It is made up of approximately 19,000 residents, is 58 square miles, and the largest geographic school district in Allegheny County. For the 2006-2007 school year, total enrollment was 3,267. Three elementary schools have a combined enrollment of 1,479; the middle school has 769 students; and the high school has 1,019 students (West Allegheny School District, n.d.).

Word Processing – Instruction is provided in Microsoft Word as a skill building tool for keyboarding and to cover formatting applications for business documents.

## Chapter 2

## REVIEW OF LITERATURE

Although a large body of literature exists to support development and implementation of a computer technology curriculum, a limited body of literature exists to provide a model computer technology curriculum. This chapter will review literature to examine the status of today's students, the need for a computer technology curriculum, the curriculum development process, the latest trends and best practices, and the current guidelines and recommendations for subject matter.

### *Today's Students*

Today's students are maturing at an exciting time: the information age. The *American Heritage Dictionary* (Pickett, 2000) defines the information age as "a period beginning in the last quarter of the 20th century when information became easily accessible through publications and through the manipulation of information by computers and computer networks." Although there are many different terms describing today's children, a majority of the experts refer to children in terms of the information age and their access to digital technology. Lemke (2002) says that "Today's children are growing up digital. Their view of the world is quite different from that of adults. They are growing up with unprecedented access to information, people, and ideas across highly interactive media" (p. i) Prensky (2005) refers to today's students as:

> Digital Natives. They are native speakers of technology, fluent in the digital language of computers, video games, and the Internet . . . They're already busy adopting new systems for communicating (instant messaging), sharing (blogs), buying and selling (eBay), exchanging (peer-to-peer technology), creating (Flash), meeting (3D worlds), collecting (downloads), coordinating (wikis), evaluating (reputation systems), searching (Google), analyzing (SETI), reporting (camera phones), programming (modding), socializing (chat rooms), and even learning (Web surfing). (p. 9-10)

The U.S. Department of Commerce (2002) reports these interesting facts about today's youth:

> Children and teenagers use computers and the Internet more than any other age group.
>
> - Ninety percent of children between the ages of 5 and 17 (or 48 million) now use computers.
> - Seventy-five percent of 14-17 year olds and 65 percent of 10-13 year olds use the Internet (p. 1)
>
> Children and young adults have embraced new information technologies in large numbers. More than any other age group, these younger age groups use computers and the Internet widely for many of their daily activities. (p. 42)

Children do not have the same reluctance about technology as their parents. Millard (2005) reports that "Kids see technology as a normal part of life, it's second nature to them" (p. 48).

School districts must take the initiative and meet the needs and interests of these children. The U.S. Department of Education (2004) refers to today's students as "the Millennial generation or The Millennials" and provides the following statistics:

- Forty-nine percent say they may be interested in pursuing a career in technology, 47 percent in business, 41 percent in medicine, 35 percent in law, 34 percent in entertainment and 33 percent in teaching.
- Ninety percent of children between ages of 5 and 17 use computers.
- Teens spend more time online using the Internet than watching television.
- Ninety-four percent of online teens use the Internet for school-related research.
- Twenty-four percent have their own web pages. (p. 16-17)

With these facts in mind, school districts have an obligation to their students to address these needs and career aspirations, and to provide the best possible instruction.

### *The Need for a Computer Technology Curriculum*

Technology permeates our daily lives and creates a demand for new skills. The Partnership for 21st Century Skills (n.d.) states:

> Rapidly evolving technologies have made new skills a requirement for success in everyday life. Effectively managing personal affairs, from

shopping for household products to selecting health care providers to making financial decisions, often requires people to acquire new knowledge from a variety of media, use different types of technologies and process complex information. (p. 6)

Access to information and technology are a necessity to function in everyday life. Eisenberg & Johnson (2002) believe that:

> Defining and describing technology skills is only a first step in assuring all our children become proficient information and technology users. A teacher-supported scope and sequence of skills, well designed projects, and effective assessments are also critical. (p. 3)

Additional research supports the need for public schools to instruct today's students in the use of technology (Association for Computing Machinery, Inc., 2003; Educational Testing Service, 2002; Institute for the Advancement of Emerging Technologies in Education at EAL, 2005; International Technology Education Association, 2002; Lemke, 2002; Partnership for 21st Century Skills, n.d.a; U.S. Department of Education, 2004; Yopp, 2003).

As today's students are exposed to technology earlier, it's important that technology is embraced and incorporated into the school curriculum. By doing so, students actively construct meaning from instruction. "Access to technology makes school seem more "real-world" to the students and consequently, their learning pushes the boundaries of the traditional school curriculum" (Farwick-Owens, Hester & Teale, 2002, p. 620). Students have more than an interest in technology, they have come to expect technology as part of their school experience. Rucker & Reynolds (2002, p. 5) state: “Because of their constant exposure to technology, today’s students have grown to expect many of their courses to center around technology or to have a significant technology base.” Experts have put the call out to school districts to meet this demand. “Teachers and administrators must work together to include the study of technology. This knowledge will empower students to deal with the many technological issues and problems that will confront them in the future” (Gilberti, 1999, p.1). The U.S. Department of Education (2004) concurs by stating “Public schools that do not adapt to the technology needs of students risk becoming increasingly irrelevant. Students will seek other options” (p. 45).

Technology education is the only subject area specifically designed to deliver technological literacy. “Identifying technology education as a core subject area – and therefore a requirement for graduation – is one way to ensure that all students will become technologically literate as intended by NCLB” (Meade & Dugger, 2004, p. 32). The Partnership for 21st Century Skills (2005) confirms:

> A broad consensus exists among education ministries and major education-oriented NGOs throughout Europe, Asia, Australia, and the Pacific Rim that Information and Communications Technology literacy must be treated as a core skill area in the new century. (p. 8-9)

Technology cannot simply be looked at as a graduation requirement. Those without access to technology are at a considerable disadvantage and their needs must be addressed by the public education system. Without access to technology education at school, the digital divide will widen. The Digital Divide Organization (n.d.) defines the digital divide as “the gap between those able to benefit from digital technology and those who are not.” Zelif (2002) writes:

> This Digital Divide widens and narrows for different groups as the telecommunication and technology infrastructure improves and progresses. Those who have access to technology develop computer knowledge and skills as technology advances. Those without technology at home must access computers and Internet services in the community and schools or remain without the knowledge and skills necessary for careers and economic success, a factor that attaches important responsibilities to the schools. (p. 21)

Schools have an obligation to alleviate this gap as directed by the No Child Left Behind Act (2001, Section 2402b Goals):

> To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student’s race, ethnicity, gender, family income, geographic location, or disability.

Lack of technology education is not just a disadvantage for those without access to technology at home. Schools are not addressing technology education with the immediacy and needs of today’s students. “Nationwide most students receive little or no formal exposure to the study of technology. They are graduating with only a minimal understanding of one of the most powerful forces shaping society today” (International Technology Education Association, 2002, p. 2).

Although most states are slow to respond, some are beginning to comprehend the importance of technology education. Meade & Dugger (2004) reflect:

> The increase in the number of states that include technology education in the state framework may indicate that, as a nation, we are placing increasing importance on technology education as part of the overall learning experience. This trend is likely instigated by research on the increasing need for a technologically literate populace. (p. 32)

As technology education receives attention, additional benefits are being reaped. It is also a lesson in curriculum development. Technology curriculum, by its very nature, is dynamic. The National Research Council of the National Academies (2003) contends:

> Alignment of curriculum, instruction and assessment needs to be dynamic, that is, able to incorporate new knowledge or understanding about subject content and how people learn. IT (Information Technology) has the potential to allow revisions of curriculum content, instructional strategies, and assessment on a continuous improvement basis. (p. 23)

As curriculum writers become accustomed to writing dynamic curricula, other content areas will benefit as well.

### *Curriculum Development*

Every school district has a written curriculum, or master plan, for delivering content to its student body. The term curriculum can refer to multiple parts of the plan. When referring to the master plan, Ornstein & Hunkins (2004) define curriculum as "a plan for action or a written document that includes strategies for achieving desired goals or ends" (p. 10) As the plan is broken down for implementation, Morrison, Ross & Kemp (2004) refer to curriculum as "the subject content and skills that make up an educational program" (p.2) Curriculum also entails the lesson plans used by the teacher on a day-to-day basis. The definition of curriculum, according to The International Technology Education Association (2005), is narrowed further by stating that curriculum is:

> a written plan that defines how content is arranged, ordered, and emphasized. It provides a means by which the teacher and students interact. A curriculum is the plan for the delivery of the content day-by-day in the laboratory-classroom, which engages students in learning. The curriculum allows for flexibility and freedom so that individual teachers can adapt it to student needs and ensures that the content is based on the appropriate standards. (p. 2)

The curriculum for a school district can be broken down into components that directly pertain to subject matter. Each public school district plans and implements its own curriculum based on the requirements of the No Child Left Behind Act of 2001 (NCLB), state academic standards, the needs of its students, and unique issues.

The goal of public education is to instruct students so they develop the skills and competencies necessary to be effective citizens in the ever-changing world of the 21st century. "Our community vibrancy, personal quality of life, economic viability and business competitiveness depend on a well-prepared citizenry and workforce" (Partnership for 21st Century Skills, n.d., p. 2). Technology plays a vital role in helping students develop the skills and competencies necessary to be effective citizens. As the

Internet and technology evolve and become more universally used and accepted, graduates must demonstrate technology skills to be successful. The skills themselves must encompass a wide variety of complex activities that have the ability to change as technology itself evolves and changes. The CEO Forum on Education and Technology (2000, p.11) provides this list of 21st Century Skills:

- Demonstrate technological literacy
- Communicate using a variety of media
- Access and exchange information
- Compile, organize and synthesize
- Draw conclusions and make generalizations
- Know content and locate information
- Become self-directed learners
- Collaborate and cooperate in teams
- Interact in ethical ways

These skills are increasingly important because technology has become such an important part of our everyday lives. Technology is no longer limited to a select few. "New computer and communications technology are penetrating the home, the workplace, the marketplace, government, and the community" (Educational Testing Service, 2002, p. 5).

In the workplace, technology penetrates every aspect of job performance. The skills necessary to use technology are no longer a luxury, but a requirement for even the most monotonous occupation. Lemke (2002) tells us that "technological literacy is an essential component of job readiness" (p. 1.3) Workers with technological skills are in higher demand than those without. Meggison (2002) provides this example, "Business graduates are better able to market themselves if they are competent in today's most frequently used software applications" (p. 308) The Partnership for 21st Century Skills (n.d. ) further iterates that "Workers must be equipped not simply with technical know-how but also with the ability to create, analyze and transform information and to interact effectively with others" (p. 6). They are "required to navigate complex information to locate data, to identify patterns for problem solving, and to use sophisticated representations to communicate their ideas" (Dede, 2000, p. 288). It is important that these critical technology skills are taught by the public school system to prepare graduates for college or career entry.

As the curriculum development process unfolds, the needs of the community and the school district's stakeholders must be considered. Morrison, Ross & Kemp (2004) believe that "the emphasis of a curriculum depends on philosophical, social, and cultural forces that affect the school in terms of the broad society and the specific community it serves" (p. 3) The curriculum development process has evolved in recent years to include additional factors that have a direct impact on the choices made by school administrators. These factors include, but are not limited to, government legislation and state academic standards.

The implementation of NCLB continues to have a dramatic effect on curriculum choices. High stakes testing and accountability on core subjects defined by NCLB have forced administrators to revise curriculum to emphasize these subjects, at the demise of others. "Today's climate of high stakes testing and accountability has focused teacher's efforts on achieving standards. Products and programs that do not contribute to these efforts increasingly receive less attention" (Marshall, 2005, p. 121). Consequently, NCLB has resulted in fewer choices for students. The main thrust of NCLB is on language arts proficiency and mathematics. As the tiered structure of NCLB is implemented, science will soon follow.

Although technology falls under the umbrella of science, NCLB contains only two brief sections about technology:

> (A) To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability; (B) To encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies. (NCLB, 2001, Section 2402b, item 2)

Current state standards also play an important role in curriculum development. The current Pennsylvania Academic Standards for Science and Technology are contained in Appendix D.

### *Trends and Best Practices*

Trend data for current K-12 technology curriculum practices do not exist for public schools in Pennsylvania. The existing body of literature provides limited information on existing technology curriculum. However, to meet the requirements of NCLB, technology curriculum must be addressed by every school district nationwide.

NCLB requires that students must be technologically literate by the time they finish eighth grade. However, the legislation itself does not provide a definition for technologically literate. It is therefore up to the states and individual school districts to provide their own definition of technologically literate.

Even the experts do not agree on one simple definition of technological literacy. The Institute for the Advancement of Emerging Technologies in Education at AEL (Appalachia Educational Laboratory) (2005) states, "When the word *technology* is mentioned in the context of U.S. education, it is associated almost exclusively with computers and Information Technology" (p. 2). They go on to identify three independent dimensions of technological literacy: knowledge, capability, and ways of thinking and acting. Eisenberg & Johnson (2002) believe that "the end result of computer literacy is not knowing how to operate computers, but to use technology as a tool for organization, communication, research, and problem solving" (p. 2). Shields & Behrman (2000) believe that "computer literacy must encompass a more active role for children, one that empowers them to use computers to create, to design, to invent – not merely to receive information passively from the screen" (p. 13).

In 1995, Lajeane Thomas (President) and Donald G. Knezek (Executive Board) for the International Society for Technology in Education (ISTE) recognized the need for technology literacy and provided this definition:

> Technology literacy is more than the understanding of current uses of technology, and it is more than the ability to use common technology-based tools according to a given prescription for achieving some specific outcome. Technology literacy involves:

- demystifying technology through conceptual understandings of the underlying science and mathematics principles,
- operational competence with modern technology systems,
- the ability to evaluate and use a variety of common technology applications,
- the ability to innovate and invent ways of applying technology in challenging new situations,
- an awareness of technology-related careers and of factors critical to success in those careers, and
- understanding of and sensitivity to societal issues related to technology. (Thomas & Knezek, 1995)

ISTE has based their National Educational Technology Standards (NETS) on this definition.

The North Central Regional Education Laboratory & Metiri Group (2003) and Lemke (2002, p. 1.1-1.6) discuss more than one literacy. They support the idea of digital-age literacy, which encompasses more than just technological literacy:

- Functional or Basic Literacy: the ability to read, write, listen, and speak.
- Scientific Literacy: knowledge of science, scientific thinking, mathematics, and the relationships between science, mathematics, and technology.
- Technological Literacy: competence in the use of computers, networks, and applications.

- Visual Literacy: the ability to decipher, interpret, and express ideas using images, graphics, icons, charts, graphs, and video.
- Information Literacy: the competence to find, evaluate, and make use of information appropriately.
- Cultural Literacy: a recognition and appreciation of the diversity of peoples and cultures.
- Global Awareness: the understanding and recognition of the interrelationships among nation states, multinational corporations, and peoples across the globe.

> Technological literacy is a dynamic skill that involves continual effort. Students must be able to build on what they already know as they learn new languages, adapt to new systems, and weigh the benefits and applications of technological development. (Lemke, 2002, p. 1.3)

The International Technology Education Association (2005) defines technological literacy as "the ability to use, manage, evaluate, and understand technology" (p. 3). They go on to describe a technologically literate person as one who "understands the significance of technology in everyday life and the way in which it shapes the world" (The International Technology Education Association, 2002, p. 23). The American Association of School Librarians & Association for Educational Communications and Technology (1998) prefer the term information literacy and provide standards for student learning. Education Testing Service (2002) supports Information and Computer Technology (ICT) literacy. Their definition is that "ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (p. 2).

The Partnership for 21st Century Skills (2005) believes:

> As technology increasingly becomes the medium for communication and information sharing, students need to be capable of harnessing technology to perform learning skills, such as communicating effectively with presentation software or juggling personal responsibilities with a personal digital assistant, which are identified as Information and Communication Technology (ICT) literacy. (p. 18)

ICT skills are comprised of:

- *Information and media literacy skills.* Analyzing, accessing, managing, integrating, evaluating and creating information in a variety of forms and media. Understanding the role of media in society.
- *Communication skills.* Understanding, managing and creating effective oral, written and multimedia communication in a variety of forms and contexts.
- *Interpersonal and self-directional skills.* Becoming more productive in accomplishing tasks and developing interest in improving ones own skills. (Partnership for 21st Century Skills, 2005, p. 16)

They further contend:

> ICT literacy is the ability to use 21st century tools in service of thinking and problem-solving skills, information and communications skills, and

interpersonal and self-directional skills. (Partnership for 21st Century Skills, 2005, p. 32)

In the Report and Mile Guide for 21st Century Skills, the Partnership for 21st Century Skills (n.d., p. 11) provides Table 2-1 as a framework for ICT literacy.

Table 2-1. *ICT Literacy Framework of the Partnership for 21st Century Skills*

| LEARNING SKILLS + | 21ST CENTURY TOOLS = | ICT LITERACY |
|---|---|---|
| THINKING AND PROBLEM-SOLVING SKILLS | Problem-solving tools (such as spreadsheets, decision support, design tools) | Using ICT to manage complexity, solve problems and think critically, creatively and systematically |
| INFORMATION AND COMMUNICATION SKILLS | Communication, information processing and research tools (such as word processing, e-mail, groupware, presentation, Web development, Internet search tools) | Using ICT to access, manage, integrate, evaluate, create and communicate information |
| INTERPERSONAL AND SELF-DIRECTION SKILLS | Personal development and productivity tools (such as e-learning, time management/calendar, collaboration tools) | Using ICT to enhance productivity and personal development |

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Although an abundance of literature exists to support the need for technology education, little has been published on a model curriculum. Experts agree on the different age categories and what should be taught, but not on a specific curriculum. Each state's department of education and several sources (American Association of School Librarians & Association for Educational Communications and Technology, 1998; International Society for Technology in Education, 2002; International Technology Education Association, 2002; Meggison, 2002; National Business Education Association, 2001; U.S. Department of Education, 2004), put forth standards, grade level recommendations, and competencies to incorporate into curricula, but none offer a specific curriculum.

The Association for Computing Machinery, Inc. (2003) supports a computer science curriculum to fulfill technology education. Appendix C is ACM's model curriculum for K-12 Computer Science.

*Guidelines and Recommendations for Subject Matter*

Since a model for technology curriculum does not exist, several experts provide recommendations to help school districts customize content to meet their individual needs. As a starting point, ITEA (2005) reminds us that the "goal is for <u>all</u> students to achieve technological literacy" (p. 13). They further suggest that:

> Local programs need to emphasize the role of the study of technology in a child's educational development and in educational reforms across the school curriculum. Articulated K-12 technology programs are needed; technological literacy development begins with students' engaged learning

> experiences in elementary grades, continues in middle school explorations, and culminates in wide-ranging applications in the high school. (p. 56)

We cannot neglect those students without access to technology at home. The Partnership for 21st Century Skills (n.d.a) reminds us that "Students without access to technology at home are the victims of a widening digital divide, unable to practice the learning skills that are increasingly valued in the world today" (p. 6). The CEO Forum on Education and Technology (2000) concurs by stating:

> the absence of technology resources has the potential to build new barriers. This lack of resources limits the possibilities for education and may perpetuate and even solidify economic disparities, class advantage and racial bias. The U.S. Department of Commerce defined this barrier as the digital divide, and has chronicled the widening gape between those who do and don't have access to technology. (p. 32)

The following additional research provides guidelines and recommendations for subject matter inclusion. They are segregated into three grade categories: K-5, 6-8, and 9-12.

*Elementary grades K-5*

With unprecedented access to technology at an early age, today's students need to have access to an official technology education program as early as possible. Gilberti (1999) tells us that "technology education needs to be implemented at all grade levels to bring about a technologically literate populace" (p. 11). The Partnership for 21st Century Skills (n.d.) concurs by stating, "Students need to learn how to use 21st century tools beginning in elementary school to take full advantage of the vast array of research and multimedia resources, digital content and communications options available to them" (p. 11).

There is a myriad of evidence that supports elementary technology education. Shafer (2002) reminds us that "More and more children are entering school having experience with computers, the Internet, and other forms of technology at a younger age" (p. 51-52). The U.S. Department of Commerce (2002) provides this statistic about elementary age children, "Even among 5 to 9 year olds, a large portion (84.3 percent) are using computers at home, at school, or both" (p.44). "Children and young adults are among the highest users of new technologies, integrating the Internet in their schoolwork and other activities" (p. 6).

> Shafer (2002) offers this advice to school administrators and curricularists: Addressing technology literacy at the elementary level can and should be a joint effort of elementary educators, other elementary professionals, and business educators who are involved in developing a technical, research-based curriculum. The scope of this effort should include:
>
> - Hardware and software use with proper keyboarding skills
> - Research use and strategies
> - Software application to related core subjects
> - Use of telecommunication technologies to access documents
> - Transfer of written data to and from audio and visual formats. (p. 52)

Shafer further suggests:

> The main goal of computer training at the lower levels should be the use of the computer as a tool. Students should develop basic keyboarding skills to use all fingers effectively, to format word processing documents, and to use database and spreadsheet applications for reports required in core subjects. Students should also have a working knowledge of hardware use and software applications. (p. 43)

As the availability of computers becomes more prevalent in elementary schools, the issue of keyboarding instruction becomes a priority. There is an abundance of research to support keyboarding instruction, starting when the students reach age 10-12 (Andelore, 2001; Bartholome, n.d.; Draus, 2002; Erthal, 2002; Haug, 2002; ITEA, 2002; Jennings, 2001; Mairs, 2004; Peterson, 2005; Shafer, 2002; Wells, 2003; Yopp, 2003). Bartholome (n.d.) tells us that "business educators have known since the early 1930s that elementary school students can learn to type (keyboard). Not only can elementary students learn to type, but those who do type improve their language arts skills." He goes on to provide us with Table 2-2 Keyboarding Scope and Sequence.

The only limitation for when to begin keyboarding is the size of the hand. Erthal (2002) states, "Students below the third grade, typically, do not possess the dexterity and hand size to manipulate the keys effectively." Wells (2003) further explains:

> Children need to be taught proper technique as soon as they begin using computers. Once students reach grades 4 or 5, their fine motor skills and eye-hand coordination are developed enough so that they can participate in formal keyboarding instruction. Rather than just being familiar with technique and the keyboard, formal keyboarding instruction will teach the

Table 2-2. *Keyboarding Scope and Sequence*
Lloyd W. Bartholome, Utah State University

| | Topic | Time Frame | Skill Level Alphabetic Copy |
|---|---|---|---|
| Grades 1 or 2 | Home Keys | 3-4 hours | Don't measure |
| Grades 2 or 3 | 1. Alphabetic keys and commonly used punctuation marks<br>2. Spelling words and other short activities | 30-35 hours | 20 wam* |
| Grades 4 or 5 | 1. Review alphabetic keys and introduce numbers and commonly used symbols.<br>2. Incorporate in language arts. | 25 hours | 30 wam |
| Grade 6, 7, or 8 | Review skills<br>Use skills in all language arts.<br>Use for personal use, reports, essays, letters, etc. | Min. of 1 semester – 190 hours<br>1 yr if preparing for vocational skill | 40 wam |
| Grades 9-10 | Introduction to business skills (word processing, database, spreadsheets, etc.) | 1 semester | 40-50 wam |

Table 2-2. *Keyboarding Scope and Sequence* (cont.)
Lloyd W. Bartholome, Utah State University

| | Topic | Time Frame | Skill Level Alphabetic Copy |
|---|---|---|---|
| Grades 11-12 | Advanced business skills (word processing, database, spreadsheets, etc.) | 1-2 semesters | 50+ |

NOTE: Students can use word processing programs and microcomputers at any grade level where equipment is available.
*Words a minute – a standard word is five strokes, spaces, etc.
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> students to touch type. Keyboarding skills are ongoing, so students need to continue to use their skills in order to maintain and improve them. (p.5)

Mundrake (2003) addresses the issue of keyboarding and age by stating:

> Articulation, duplication, and overlap of course content and coverage at all education levels must be considered in course design and delivery. As content has moved into elementary grade levels in the forms of keyboarding and the use of computers for interactive lessons, educators must address the trickle-down effect of new content throughout the curriculum and raise levels of expected student outcomes. (p. 131)

*Middle school grades 6-8*

As the comfort level and skill level of middle/junior high school students improves with technology, so must their courses. Gilberti (1999) suggests:

> At the middle level, most students are beginning to think seriously about a career path. Technology education programs allow them to explore various occupational choices by examining the roles of scientists, researchers, technicians, and technologists related to technological pursuits. (p. 11)

ITEA (2002) further declares:

> Students in the middle-level grades (6-8) will explore in greater detail the scope of technology. From personal and classroom experience, students will be familiar with specific ways in which technology is dynamic, and teachers should build on this experience by reinforcing the idea that technology is constantly changing. (p. 27)

Mundrake (2003) believes that course work should evolve “from an early emphasis on “how-to” and hands-on experiences to a later emphasis on understanding concepts and ways to use technology to solve problems” (p. 130). Yopp (2003) also suggests:

> In junior high or middle school, business educators introduce students to concepts of basic business, entrepreneurship, and personal finance. Students learn to apply technology skills and work to develop the “soft,” or interpersonal skills needed to become successful in the business world. (p. 37)

If students in this age group have not already received instruction in keyboarding, word processing can be combined with keyboarding (Maxam, 2002, p. 257). Yopp (2003) further confirms:

> Business teachers are often hired to teach keyboarding, computer applications, and/or career awareness at the middle school and junior-high level. Business education at this level provides students with a solid foundation for developing good keyboarding techniques and computer skills that secondary teachers can build and expand upon. (p. 40)

Technology education must be addressed at the middle/junior high school level to even the playing field for those students who do not have access to technology at home. For some students, school provides the only available means of access to technology. The U.S. Department of Commerce (2002) provides the following information:

> 80.7 percent of children (ages 10-17) in the lowest income category use computers at school, little different from the 88.7 percent of children at the highest income level. School helps to equalize the disparity that would otherwise exist in computer and Internet use among the various household income categories. In the lowest income category, 33.1 percent of children use computers at home, in contrast to 91.7 percent of children in the highest income category. The gap in computer use narrows, however, from almost 60 points between the highest and lowest income children's use at home to a 12 point gap in computer use when home and school are combined. (p. 46)

The importance of technology education with this age group is further evidenced by the requirements of NCLB. This legislation (NCLB, 2001) specifically states:

> Section 2402b Goals

(2) ADDITIONAL GOALS – The additional goals of this part are the following:

(A) To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability.

The Partnership for 21$^{st}$ Century Skills, The Road to 21$^{st}$ Century Learning (n.d.a) reports that "eighth grade technology literacy is just a starting point – and a crucial way to get to the other high-level knowledge and skills essential for the 21$^{st}$ century" (p. 10). They even go one step further to say, "states also should not stop at the eighth grade requirement. States should plan to establish requirements that articulate 21$^{st}$ century skill expectations for elementary school students and high school graduates" (p. 19).

*High school grades 9-12*

The body of literature available on technology curriculum is somewhat limited for guidelines and recommendations for grades 9-12. The focus is primarily on grades K-8. By doing so, there is the supposition that:

> In grades 9-12, students will gain a broader perspective of the importance of human innovation and ingenuity in refining existing technologies and developing new ones. They will also continue to develop higher-order thinking skills, such as questioning, investigating, and researching. By the time they graduate, students should have developed an understanding of the scope of technology. (ITEA, 2002, p. 30)

The types of courses recommended by current research are somewhat limited. Mundrake (2003, p. 140) suggests desktop publishing (DTP) classes. The Association for Computing Machinery, Inc. (2003) recommends courses that “emphasize scientific and engineering aspects of computer science – mathematical principles, algorithmic problem-solving and programming, software and hardware design, networks, and social impact” (p. 11).

As the curriculum development process unfolds, Shafer (2002) reiterates, “Curriculum and instructional leadership ensures that students reach secondary school ready for a business education curriculum that will focus on the use of technology in careers” (p. 45). The U.S. Department of Labor (1991) demands that “all American high school students must develop a new set of competencies and foundation skills if they are to enjoy a productive, full, and satisfying life” (p. i).

Technology curriculum for K-12 is no longer something to contemplate. The current body of literature sends the following message to school administrators saying that now is the time to develop and implement a K-12 technology curriculum, which will provide students with the skills and competencies necessary to survive in a world that is constantly changing and evolving. Without these programs, public schools will produce graduates that are ill-prepared to cope in modern society.

Chapter 3

## RESEARCH METHODOLOGY

The research methodology for this dissertation study entails mixed methods. The curriculum development section is qualitative, specifically action research. Additional data was collected utilizing unobtrusive measures in the compilation of computer technology curriculum for school districts in Allegheny County, Pennsylvania. Descriptive statistics are used to identify prevailing trends in course selections and availability.

### *Qualitative Method - Action Research*

Action research has a long and varied history. Its roots can be traced to John Dewey in education and Kurt Lewin in the social sciences. Dewey (1929) was an early practitioner of action research in the educational arena. In his book, *The Quest for Certainty: A Study of the Relation of Knowledge and Action*, he states "Action is the means by which a problematic situation is resolved. Such is the net outcome of the method of science" (p. 244). He believed that educators were in a unique position to identify problems and devise scientific methods to solve the problem at hand. Lewin (1946) used action research to instigate social reconstruction. In his article, *Action Research and Minority Problems,* he provides this early definition of action research as

"A comparative research on the conditions and effects of various forms of social action, and research leading to social action" (p. 35).

More contemporary definitions are provided by Berg and Park. Berg (2004) defines action research as "A collaborative approach to research that provides people with the means to take systematic action in an effort to resolve a specific problem" (p. 197). Park (2001) narrows the definition to include the researcher as participant by saying that "Participatory research is an action-oriented research activity in which ordinary people address common needs arising in their daily lives and, in the process, generate knowledge" (p. 81). When applied to education, this process directly involves stakeholders such as students, teachers, administrators, and community members. A problem is identified and action is taken to resolve the issue or problem.

In this study, the West Allegheny School District identified the problem as a lack of a formal computer technology curriculum. As a stakeholder in the community, with children attending this school district, this researcher took an active, participatory role in creating the formal computer technology curriculum for the West Allegheny School District. The researcher is a faculty member in higher education that teaches technology. Having knowledge of computer technology and a good relationship with the administrators in the school district, the researcher approached West Allegheny School District in an effort to participate in the curriculum development process. The superintendent welcomed this opportunity and believed that an outsider viewpoint would be extremely beneficial. As a result, this researcher became a member of the Computer Technology Curriculum Committee and a member of the Technology Committee for the 2006-2007 school year.

Herr and Anderson (2005) support the researcher as an outsider by stating "In other traditions of action research, the researcher is an outsider who collaborates to varying degrees with insider practitioners of community members" (p. 3). In this instance, the researcher is the outside collaborator, the insider practitioners are the administrators and teachers of the school district. For the 2006-2007 school year, the members of the Computer Technology Curriculum Committee were the Superintendent, Assistant Superintendent for Curriculum and Instruction, current business certified computer technology teachers, and elementary level building computer facilitators. This committee met two days per month starting December, 2006 and concluding May, 2007. The primary purpose of the curriculum committee was to write a formal computer technology curriculum to submit to the school board for approval in August, 2007 to implement in the 2007-2008 school year.

The members of the Technology Committee for West Allegheny School District for the 2006-2007 school year were the Superintendent, Assistant Superintendent for Technology and Human Resources, teacher representatives, and representatives of the company that supports the computer hardware and school network. This researcher was the only member that was neither an employee of the district or the support company. The committee met the first Wednesday of every month starting September, 2006, and concluding May, 2007. The primary purpose of the committee was to address the needs, problems and current technology issues of the district. The researcher took an active role on each of these committees.

Prior to the first Computer Curriculum Committee meeting, the researcher met with the Assistant Superintendent for Curriculum and Instruction on several occasions to outline a timeline and conduct research. These meetings took place from August, 2006, until December, 2006. The purpose of these meetings was to ensure that in depth research was conducted on technology curriculum to provide the committee members with a solid research base on which to support their curriculum decisions. The Assistant Superintendent approached the researcher to provide missing expertise in the area of computer technology. The researcher is an experienced instructor teaching computer technology in higher education, has a M.S. degree in Business Education, and conducts research into educational technology. The Assistant Superintendent deemed the researcher qualified to meet this need.

A variety of qualitative research techniques were used to document this action research study. Participant observations were undertaken to document the curriculum development process. Field notes were taken from all meetings and experiences and were transcribed and analyzed for the study. A reflective journal was kept by the researcher to document impressions, feelings, and additional notations. Each observation was dutifully scrutinized to identify the context of the situation and to explain, with as much detail as possible, all factors influencing the perspective and experience of the researcher.

As an active participant, the role of the researcher was defined by the needs of the committees and the school district. In this manner, duties were performed as needed. A needs assessment tool for the school district was developed by the researcher. This tool was given to members of the curriculum committee to determine the weaknesses and strengths of the current curriculum. The needs of the student body, school district, and all ancillary stakeholders were included. The researcher also collaboratively participated with the other members to write curriculum that is researched based, topical, and dynamic in nature, to be able to adapt as technology changes and evolves. The final curriculum is provided as Appendix K.

### *Mixed Methods*

Concurrently, the researcher also utilized unobtrusive measures to collect public data from all school districts in Allegheny County, Pennsylvania. When describing unobtrusive measures, Berg (2004) states, “Public records are viewed as prepared for the expressed purpose of examination by others” (p. 211). This public data included formal and informal computer technology curriculum offered in the 2006-2007 school year. No experiment was conducted to produce the data. As such, public data also falls under the guise of archival material. Berg (2004) also states, “Archival material is virtually nonreactive to the presence of investigators” (p. 211). The purpose of this data collection was to determine trends in course offerings for the geographic area that includes West Allegheny School District. Trend data did not exist for computer technology curriculum for any county in Pennsylvania.

Descriptive statistics were tabulated to describe trends for computer technology courses offered for the 2006-2007 school year in a defined geographic area, specifically Allegheny County, Pennsylvania. A spreadsheet was compiled detailing each school district, the type of courses offered by grade level for kindergarten through middle/junior high school, and course selections available at the high school level. The data was also charted to provide a visual representation of the resulting trends.

Once completed, the curriculum data for Allegheny County was compared to that of West Allegheny School District for the 2006-2007 school year to determine if any significant differences exist. The differences were analyzed by the Computer Technology Curriculum Committee to determine if the proposed curriculum was similar or superior to surrounding districts. If the opinion of the committee was that additional changes were to be made to the proposed curriculum, revisions occurred.

The primary purpose of this study was to facilitate a formal computer technology curriculum for West Allegheny School District and document the factors that influenced the curriculum development process. The projected timeline of the study was to have the formal curriculum completed and the full approval of the school district's board of directors at the end of the 2006-2007 school year for implementation in 2007-2008.

Chapter 4

# RESULTS

This study focuses on the current trends of computer technology curricula and an action research project for writing computer technology curriculum in a suburban school district. This chapter will provide a description of the student body of the West Allegheny School District; the prevailing information and communications technology curricular needs of the district as determined by the curriculum committee; and an overview of the curriculum development process as observed by the researcher, including factors that had a direct influence on curriculum decisions. This chapter will conclude with a summary of the current trends for computer technology curricula in Allegheny County, Pennsylvania.

## *Today's Students*

Table 4-1 lists the data available for the 2006-2007 school year that describes the ethnic makeup of the student body for the West Allegheny School District (Pennsylvania Department of Education, 2007).

Data collected by the school district revealed that only 16% of the student body came from low-income families. This percent was determined by the criteria to qualify for Title I funds from the federal government.

Table 4-1. *COMPARISON OF PUBLIC SCHOOL ENROLLMENTS BY LEA (Local Education Agency), 2006-2007* (West Allegheny School District)

| | West Allegheny School District | |
|---|---|---|
| Race | Number | % |
| American Indian/ Alaska Native | 4 | 0.1% |
| Asian/Pacific Islander | 53 | 1.6% |
| Black (Non-Hispanic) | 112 | 3.4% |
| Hispanic | 18 | 0.6% |
| White (Non-Hispanic) | 3,080 | 94.3% |
| Total Enrollment | 3,267 | 100.0% |

*Source = Pennsylvania Department of Education
www.pde.state.pa.us/k12statistics/site/default.asp?g=0

The researcher spent time in the schools, classrooms, and at school sponsored social events observing students, the purpose of which was to determine common use of technology. At the social events, such as sporting events and school activities, the researcher observed students using cell phones, hand held video games, and other electronic devices. The students observed using these devices ranged in age from five to 18 years[1]. All appeared at ease with the operation of these devices. These activities did not appear to be out of the norm, as observed by the non-reaction of parents, teachers, and administrators. During school hours, all electronics are banned from the classrooms and must be kept in lockers. Therefore, the researcher observed no display of electronic devices of any kind being used by students in the classrooms, halls, cafeteria, or in common areas.

[1] Ages of observed students were obtained from the student or parent during the observation.

*The Need for Technology Curriculum*

As part of an ongoing initiative, the administration of the West Allegheny School District is in the process of writing a formal curriculum for all content areas. This initiative started in the 2005-2006 school year with Health and Physical Education, Mathematics, Science, and Social Studies. Family and Consumer Science, Information and Communications Technology (Business and Computer Technology), Technology Education (formerly Industrial Arts), and World Language were targeted for completion in the 2006-2007 school year. This study is limited to the Information and Communications Technology curriculum.

Until this initiative began, some content areas were following an old, outdated curriculum. Other areas had an informal, unwritten curriculum, and still others had only general guidelines that were followed by the teachers. The administration started this initiative to offer a consistent, standards driven curriculum that was research based, formal, written and available for public inspection and scrutiny. The Business and Computer Technology Curriculum used for the 2006-2007 school year is included as Appendix B.

Traditionally in this district, computer technology courses (with the exception of Computer Aided Drafting, or CAD) were taught in the business department. Several years ago, a previous administration had tried unsuccessfully to adopt a formal curriculum for the business department. The actual reasons for the failure are unknown and can only be speculated upon by senior teachers who were employed at that time. As a result, all computer technology courses were electives. For the 2006-2007 school year, a technology course was not required for graduation. Thus, it was possible for a student to graduate from the West Allegheny School District without any keyboarding skills or with even an understanding of basic computer technology. The administration and teachers believed that these were not acceptable options and, therefore, needed to be addressed when the new curriculum was written. As the curriculum development process progressed, the school board approved adding a one-credit, year-long course titled Basic Technology Skills at the February school board meeting. This course will be required for graduation by all ninth grade students, starting with the 2007-2008 school year. The course will be graded on a pass/fail basis and students must pass the course to be eligible to graduate.

Another issue that the teachers wanted to address in the curriculum development process was the integration of themes and technology use across the curriculum. The administration realized the importance of computer technology and supported the need to reinforce applications not just as a core course, but across all content areas. With the support of administration, the formal curriculum was presented to the teaching staff at the end of the 2006-2007 school year. At this presentation, the importance of cooperation in all disciplines to provide technology instruction across the entire curriculum was stressed by the administration.

Although the school district has a small percentage of low-income families, 16%, as defined by Title I fund eligibility, the district administration realized that the Digital Divide exists and believes that the school system should provide access to computer technology for all students to help bridge this divide. To address the Digital Divide issue, the new curriculum provides access to and instruction in computer technology, starting in kindergarten and continuing through high school. By doing so, the administration expects students from low income families will gain more experience with computer technology, which, in turn, will enable them to cross the Digital Divide.

## *Curriculum Development*

### <u>*Timeline*</u>

The study began in April, 2006, with a series of meetings involving the Superintendent and Assistant Superintendent for Curriculum and Instruction for West Allegheny School District to seek approval of the researcher's proposed study to work with the school district to develop a computer technology curriculum. The purpose of these meetings was to outline the study, discuss the duties of the researcher, and to receive approval for the researcher to use this process as the basis for this dissertation study.

The content area of computer technology was targeted as one of the subject areas to have a written, formal curriculum in the 2006-2007 school year for implementation in the 2007-2008 school year. The proposed study was to include the researcher as participant observer in the curriculum development process, to provide the research base for the new curriculum and expertise in the area of educational technology, to write and edit curriculum, to collect available data on curriculum offered at school districts in Allegheny County, and to collect additional data as required. Both school administrators approved the proposed study. The formal approval letter is included as Appendix A. The Superintendent agreed to add the researcher as a member of the West Allegheny School District Computer Technology Curriculum Committee and as a member of the West Allegheny School District Technology Council.

The researcher spent the summer of 2006 collecting research to build a solid foundation on which to build a model computer technology curriculum. In October, the researcher began working closely with the Assistant Superintendent to put together a plan of action to prepare for the initial meeting of the Computer Technology Curriculum Committee. The researcher was assigned many tasks; the first was to begin collecting curricula from all the school districts in Allegheny County. This entailed contacting each school district via telephone and e-mail to request copies of their computer technology curriculum.

The second task was to prepare a condensed version of the draft of this dissertation's chapter two, Literature Review, for the full computer technology curriculum committee to review. The purpose was to provide a solid research base on which to build the curriculum and to familiarize committee members with current research on which to base their decisions.

The third task was to create a curriculum template to be used by the committee. This template needed to include the format used by other content areas, but modified to pertain to the content area of computer technology. The format used by the school district for other content areas included the following components:

1. Title Page
2. Acknowledgements Page(s)
3. Philosophical Orientation Statement
4. Table of Contents
5. Course Description Page (for each course)

6. Course Curricula (broken down by grade level for K-8, individual courses for high school)

The Title Page, Acknowledgements Page, and Table of Contents would be added at the end of the process. The Philosophical Orientation Statement would be decided by the curriculum committee. The Course Description Page and individual Course Curricula would be developed by the appropriate committee member that taught the particular course. To determine what constituted a course, the school district endorsed the following definition: "A *course* is a series of units that lasts for a specified time (semester, year, etc.) and is designed around a specified school subject" (ITEA, 2005, p. 23). The teachers will use the final, formal curriculum to build individual unit and lesson plans.

The template to be used by this committee needed to include the required Pennsylvania Department of Education Academic Standards for Science and Technology, sections 3.6, 3.7, and 3.8. A copy of the Science and Technology Standards is included as Appendix D. This template was also to include the National Educational Technology Standards (NETS) for Students, cross-referenced to the Pennsylvania standards. A copy of the 2007 NETS for Students is included as Appendix E. A sample of the initial template used is provided as Appendix F. Establishing pertinent standards is the first step in writing curriculum. The International Technology Education Association (2005) concurs by stating:

> Teachers and other curriculum developers begin by selecting the specific standards and benchmarks that should be covered in the curriculum. If curricula are being developed for a specific course (several units, for

example), then the developer should primarily select from the standards and benchmarks that have been identified as essential for that course. (p. 10)

November 2006 was spent preparing documents and finalizing the template for review by the full committee. At this time, the researcher was also assigned the task to develop a Needs Assessment to determine the strengths and weaknesses of the current courses, to be completed by the committee during the December meetings. The North Central Regional Education Laboratory's (n.d.) Data Primer was selected and adapted to apply to the West Allegheny School District. The adaptation is included as Appendix H. An early revision of this dissertation's chapter two, Literature Review, was disseminated to the committee members to review prior to the December meeting.

The first full meeting of the Computer Technology Curriculum Committee occurred December 5-6, 2006. The first day had two goals: 1) to develop a written philosophical orientation that will serve as a foundation for all decisions made regarding district technology instruction for the school district; 2) to complete and then review the results of the Needs Assessment. Both goals were attained in the time allotted.

The committee first undertook the task of compiling a draft of the philosophical orientation. The teachers and assistant superintendent first addressed the name of the department and corresponding curriculum. They thought that the title of Business Department/Business Curriculum was too outdated and limiting. It did not accurately represent all courses offered. As a whole, the committee believed that changing the department and curriculum title to include business and computer technology would be more appropriate, appeal to the student body, and focus on current content. As a result, the committee voted to change the name to Information and Communications Technology. A rough draft of the philosophical orientation was compiled, based on the new name and focus, and e-mailed to all committee members to review and make changes prior to the January meeting.

The committee members then divided into two groups to complete the Needs Assessment. The groups were determined by grade level taught; one group for elementary teachers, the other for middle and high school grade teachers. The Assistant Superintendent and researcher had already completed the Needs Assessment prior to the meeting. The afternoon was spent reviewing the Needs Assessment and discussing the technology skills that graduates need to be successful citizens in today's society.

As the committee reviewed the results of the Needs Assessment, some insightful discoveries were made. The curriculum committee members were in agreement that current students were lacking in technological literacy in elementary and middle school, but were at or above proficient in technological literacy at the high school level. All members agreed that the district was deficient in meeting the NCLB requirement for technological proficiency by the end of eighth grade. Their prevailing opinion for the deficiency in the elementary and middle school levels was the lack of a formal curriculum. The curriculum used had no continuity throughout grades, in grade progression, or across schools. Teachers were self-directed in their subject matter and were not uniform in the elementary grade levels between the elementary schools. However, they believed that West Allegheny was comparable to surrounding school districts. A caveat for the high school was also noted. The computer technology courses at the high school were offered through the business department. For the 2006-2007 school year, all business courses were electives only; thus, there was no technology requirement for graduation. Students who elected to take computer technology courses could be assessed for proficiency status, but those who opted not to take these classes could not be assessed. The committee determined that this was a serious issue that needed to be addressed. Committee members were unanimous in the need to move keyboarding down to the sixth grade. The Needs Assessment turned out to be a unifying catalyst for the committee. What started out as individual ideas and opinions coalesced into a theme of agreement and cooperation. It helped provide a general direction for the committee to follow.

The committee then concentrated on the technology skills that they deemed important and wanted students to have upon graduation. These skills included keyboarding (touch typing), elementary software mastery (Microsoft Office), problem-solving and decision-making skills. The committee utilized the concept of Backward Design, which Wiggins and McTighe (2005) so eloquently state:

> We cannot say how to teach for understanding or which material and activities to use until we are quite clear about specific understandings we are after and what such understandings look like in practice. . . . Only by having specified the desired results can we focus on the content, methods, and activities most likely to achieve those results. (pp. 14-15)

This is the first step in writing curriculum.

With the desired skills as goals, the committee then used the remainder of the day reviewing the current course offerings, the purpose of which was to determine if the desired skills were currently being taught, if the courses could be viewed as a precursor to another course that would deliver the desired results, and what additional courses would be needed. The informal curriculum used for the 2006-2007 school year is included as Appendix B. As a result of this meeting the committee developed Table 4-2, an abbreviated scope and sequence of proposed course offerings.

Table 4-2. *West Allegheny School District: Proposed Course Sequence/Offerings as of 12/5/06*

| Grade Level | Course |
|---|---|
| K-5 | Basic Computer Skills |
| 6 | Grade 6 Computers (*Keyboarding/MS Word, Basic Computer Literacy) |
| 7 | Grade 7 Computers (Expand on MS Word, PowerPoint, Basic Computer Literacy, *Review Keyboarding) |
| 8 | Grade 8 Computers (Excel, Internet Usage, Basic Computer Literacy, *Review Keyboarding) |
| High School | 9$^{th}$ Grade ICT, Accounting I, II, III, Computer Applications (change name to *Web Design), Desktop Publishing I, II, Excel/Access (next year), Keyboarding/MS Word, PowerPoint, Programming I, II, III, Word Processing II, Yearbook I, II |

*Proposed changes/new courses (required board approval).

The meeting began on December 6, 2006, with the Assistant Superintendent for Curriculum and Instruction providing instructions for the curriculum mapping process. Once each course was written, the authoring teacher mapped the course to visually show the academic standards that were addressed in the course content. Enlarged replications of the grade level curriculum templates were displayed on the walls of the meeting room (see sample, Appendix F). Each template listed the Pennsylvania Academic Standards cross-referenced with the National Educational Technology Standards (NETS) for students. Each teacher was given a unique set of stickers that identified their course. As the individual courses were completed, the authoring teacher was to place a sticker next to the corresponding standard. Once a draft of the entire curriculum was completed, the committee would focus on any unaddressed standards. The completed maps would then be filed away and used as supporting documentation for the final content area curriculum. Although simplistic in nature for a mapping process, it worked very well. At any time teachers could easily see what standards were being met and what standards needed to be addressed.

The committee members then divided into the two grade level subgroups, elementary and middle/high school, to begin writing curriculum. The researcher was assigned to work with both groups to provide any needed research and support. All teachers were provided with a packet that contained the curriculum templates, a copy of the Pennsylvania Academic Standards for Science and Technology, the National Educational Technology Standards (NETS), course descriptions for current course offerings, and a copy of the concepts currently covered. The teachers were to work together and individually, writing the curriculum for the courses they taught. Their assignments were to:

1. Identify units of study
2. Determine units of content (general)

3. Write student instructional learning outcomes (specific)
4. Identify levels of proficiency (I-introduce, R-review, M-master)
5. Indicate alignment with the Pennsylvania Academic Standards for Science and Technology
6. Map instructional outcome alignment with Pennsylvania Academic Standards & NETS (identifying grade span benchmarks for K-4, 5-7, 9-10, 11-12)
7. Analyze maps to address gaps
8. Ensure continuity from grade level to grade level, and course to course

The committee utilized the entire day to start the curriculum writing process. Committee members interacted with each other and the researcher to start this daunting task.

The researcher was given the additional task to contact 13 comparably sized school districts to gather more detailed information regarding their computer technology instruction. The data was to be collected and compiled for presentation at the January meeting of the committee. The data to be collected was to include: the technology philosophy of the school district (if one existed); how computer technology classes were scheduled at the elementary, middle and high school level; the current number of staff/teachers that delivered the instruction at the elementary, middle, and high school level; if the school district had a technology requirement for graduation; and any technology requirements for teachers. Appendix I represents the compiled data of comparably sized school districts.

The Technology Curriculum Committee met again on January 23-24, 2007. The first order of business was to review the draft of the philosophical orientation. Revisions were suggested and a revised draft was composed for additional review to be completed prior to the February meeting. The researcher then distributed copies of the compiled data on comparably sized school districts (Appendix I) and presented the results to the committee. As comparisons were made, one item in particular warranted attention. For elementary and middle school, the West Allegheny School District includes computer class with their special content area classes (art, foreign language, health, library, music, physical education), once a day, on a six-day rotation. On two of the six days in the elementary grades, each student has two specials. Tables 4-3, 4-4, and 4-5 provide a sample schedule for elementary, middle school and high school students. None of the comparably sized school districts offer the six-day rotation. The results indicated that in the elementary grades, students in these districts receive computer instruction one day a week, or from the classroom teacher. In the middle school grades, these districts primarily offered computer instruction on a daily basis for a 6-, 9-, or 12-week rotation. Much discussion ensued about this issue. The reason for the 6-day rotation was discussed, as well as the history of its implementation. The Assistant Superintendent believed the 6-day rotation warranted attention by the remaining members of the administration and agreed to present this data to them in the appropriate setting.

The committee then reviewed the proposed course sequence/offerings (Table 4-2) to determine if any revisions needed to be made. After some discussion and no revisions, the committee unanimously agreed to write the course-level curriculum based on this proposal for the 2007-2008 school year. In addition, the current department head was assigned the task to develop a proposed five-year plan for course additions, deletions and changes based on this proposal and teacher input. The proposed five-year plan was to be completed by the April 2007 meeting.

Table 4-3. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in the Elementary Grades.*

| Rotation Day # | | Special Content Area/Class | Time |
|---|---|---|---|
| Day 1 | | Swimming | 9:45-10:30am |
| Day 2 | A | Computers | 10:45-11:20am |
| | B | Physical Education | 1:00-1:35pm |
| Day 3 | A | Library | 9:40-10:15am |
| | B | Computers | 12:30-1:05pm |
| Day 4 | | Music | 11:00-11:35am |
| Day 5 | | Art | 1-1:35pm |
| Day 6 | | Spanish | 1-1:35pm |

Table 4-4. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in Middle School.*

| Subject | Period | Rotation Day | | | | | | Term: 1-4 (9 weeks each) | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| English | 1 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Math | 2 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Reading | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Lunch | 4 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | |
| Social Studies | 5 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Science | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Family Consumer Science | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | | | | 0.200 |

Table 4-4. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in Middle School.* (cont.)

| Subject | Period | Rotation Day | Term: 1-4 (9 weeks each) | Credits |
|---|---|---|---|---|
| Music | 7 | 1 2 3 4 5 6 | 2 | 0.200 |
| Industrial Arts | 7 | 1 2 3 4 5 6 | 3 | 0.200 |
| Spanish | 7 | 1 2 3 4 5 6 | 4 | 0.200 |
| Art | 7 | 1 2 3 4 5 6 | 4 | 0.200 |
| Physical Education | 8 | 5 6 | 1 2 3 4 | 0.250 |
| Study Hall | 8 | 4 | 1 2 3 4 | |
| Computer Lab | 8 | 3 | 1 2 3 4 | 0.125 |
| Health | 8 | 2 | 1 2 3 4 | 0.125 |
| Study Hall | 8 | 1 | 1 2 3 4 | |
| Activity | 9 | 4 5 6 | 1 2 3 4 | |
| Study Hall | 9 | 1 2 3 | 1 2 3 4 | |
| Total Credits | | | | 6.500 |

Table 4-5. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in High School.*

| Subject | Period | Rotation Day | Term: 1-4 (9 weeks each) | Credits |
|---|---|---|---|---|
| English | 1 | 1 2 3 4 5 6 | 1 2 3 4 | 1.000 |
| Study Hall | 2 | 3 4 | 1 2 | |
| Geometry Lab | 2 | 5 6 | 1 2 3 4 | |

Table 4-5. *West Allegheny School District: Sample 6-day Rotation Schedule for a Student in High School.* (cont.)

| Subject | Period | Rotation Day | | | | | | Term: 1-4 (9 weeks each) | | | | Credits |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Physical Education | 2 | 1 | 2 | | | | | 1 | 2 | 3 | 4 | 0.250 |
| Study Hall | 2 | | | 3 | 4 | | | | | 3 | 4 | |
| Geometry Lab | 3 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.250 |
| Videography I | 4 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| PowerPoint | 5 | 1 | 2 | 3 | | | | 1 | 2 | 3 | 4 | 0.500 |
| Web Page Design | 5 | | | | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 0.500 |
| Lunch | 6 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | |
| U.S. History | 7 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Physical Science | 8 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Spanish I | 9 | 1 | 2 | 3 | 4 | 5 | 6 | 1 | 2 | 3 | 4 | 1.000 |
| Total Credits | | | | | | | | | | | | 7.500 |

Remaining district administrators, building administrators, and technology support staff then joined the meeting to discuss technology (hardware and software) needs to ensure that the proposed course sequence/offerings would be properly supported with hardware and software. The current technology inventory was reviewed and new technology needs were addressed. Although the development of a computer technology curriculum was in the early stages, the technology requirements were addressed at this time due to the fiscal financial budget process to which the school district was required to subscribe. In addition to the technology equipment available at West Allegheny, Table

4-6 lists the proposed technology items that were to be included in the proposed 2007-2008 district budget.

For the remainder of the two meeting days in January, the committee broke into the two subgroups (elementary and middle/high school) and wrote curriculum. The targeted areas were identified units of study, unit content, instructional learning outcomes, and indicated alignment with standards. The elementary group was able to finish a draft of grade level courses. The middle school teacher had the most work to do. The existing informal curriculum for the middle school was determined to be lacking by the committee, so it needed a complete rewrite. The high school business and computer curriculum has been informal only (see Appendix B). In the past, the school board followed the practice of approving this content area curriculum based on course descriptions only. Teachers were given the course descriptions and basic guidelines, on which to build lesson plans. This will be the first officially documented Information and Communications Technology Curriculum for the school district.

On February 21, 2007, at the monthly school board meeting, the school board approved a one-credit technology class requirement for ninth grade students. This will be a graduation requirement starting with the freshman class of 2007-2008. This class will present technology and study skills and will be titled Basic Technology Skills. The class was devised to be three days for technology and three days for study skills to accommodate the six-day rotation schedule currently in place. A business certified teacher will teach the technology portion, which will include keyboarding, Windows, and an introduction to the Microsoft Office Suite. An English certified teacher will teach the study skills portion, which will include time management, test taking strategies and

Table 4-6. *West Allegheny School District: Recommended Technology Purchases for the 2007-2008 School Year*

| | | Proposed | **Approved | Cost (per item) | Total Cost |
|---|---|---|---|---|---|
| Elementary: | Hardware: | | | | |
| | SMART boards (1 per grade level/per building) | 15 | | | |
| | Mobile labs: | | | | |
| | -Carts | 3 | | | |
| | -Laptops | 90 | | | |
| | Flash drives (20 per building) | 60 | | | |
| | Updated printers (McKee and Wilson only) | 2 | | | |
| | Software: Investigate new elementary software (Compass and Study Island) | | | | |
| Middle | Hardware: | | | | |
| School: | Flash drives | 20 | | | |
| | Mobile lab: | | | | |
| | -Cart | 1 | | | |
| | -Laptops(1 additional – 36 computers needed) | 36 | | | |
| | Projectors (1 per team/6 total) | 6 | | | |
| | Additional printers (investigate) | | | | |
| | Software: None at this time | | | | |

Table 4-6. *West Allegheny School District: Recommended Technology Purchases for the 2007-2008 School Year* (cont.)

| | | Proposed | **Approved | Cost (per item) | Total Cost |
|---|---|---|---|---|---|
| High School: | Hardware: | | | | |
| | Flash drives | 20 | | | |
| | Mobile lab: | | | | |
| | -Cart | 1 | 3 | $898.00 | $2,694.00 |
| | -Laptops1 additional – 36 computers needed) | 36 | 98 | $1,012.00 | $99,176.00 |
| | Color printer in the writing lab | 1 | | | |
| | Faculty printer Laptops for homebound students (15 needed) | 15 | | | |
| | Projectors | 0 | 8 | $679.00 | $5,432.00 |
| | SMART board in each lab (4 permanent, 1 additional mobile) | 5 | 8 | $1,032.10 | $8,256.80 |
| | Software: | | | | |
| | Macromedia | 1 | | | |
| | *MicroType and assessment software for new 9th grade course | 1 | | | |
| | *Edline – site reporter | 1 | | | |
| Total Approved Purchases: | | | | | $115,558.80 |

*MicroType and Edline are specific software application packages currently used by the district.
**Approved items were purchased for the entire district and support all content areas. Data was insufficient to isolate purchases made to support ICT curriculum only.

general study skills. The class will be graded on a pass/fail basis. Students must pass the class to be eligible to graduate.

The next curriculum writing session took place February 27-28, 2007. This session primarily focused on writing curriculum. The elementary group had finished a draft of their section, so they utilized this session to review software updates and to participate in software demonstrations from potential vendors. The middle school/high school group utilized the first day of this session to work individually on their assigned courses. The researcher worked with the middle school/high school group to provide research support and to help write curriculum. Drafts of several courses were completed. The completed drafts were then mapped to the Pennsylvania Academic Standards to ensure that all the appropriate standards were being addressed.

On Wednesday, February 28, 2007, the session began with the Assistant to the Superintendent for Curriculum and Instruction reviewing the curriculum maps to ensure that the new curriculum addressed the appropriate standards. Any standards that were not mapped were addressed to ensure that science courses were addressing these standards, or technology courses would be revised to ensure compliance. At this time, the elementary technology courses did not address Pennsylvania Academic Standards 3.6.4.A, 3.6.4.C, and 3.8.4.C (see Appendix D). Upon further investigation, it was determined that the elementary science courses did meet these standards. For the Pennsylvania Academic Standards for grade seven, it was determined that standards 3.6.7.A, and 3.6.7.C were not being addressed by the computer technology courses. It was also determined that the middle school science courses met these standards as well.

At this time, the high school group did not have a draft of enough courses to identify unmet standards for the tenth and twelfth grade.

The remaining tasks were then reviewed to ensure that the timeline would be met to finish the curriculum writing process as scheduled. The remaining tasks included:

- Finalize a draft of individual courses
- Forward a draft of completed courses to the Assistant Superintendent for Curriculum and Instruction for review
- Consolidate drafts into grade level groups (elementary, middle school, high school)
- Forward grade level group drafts to an administration secretary to combine into one consistent curriculum
- Draft of Information and Communications Technology curriculum forwarded to all committee members for review
- Make changes or corrections
- Finalize draft
- Forward draft to the school board for review
- Present final draft to the school board for approval
- Receive approval of final draft of Official Information and Communications Technology curriculum
- Implement in the 2007-2008 school year

Once these tasks were defined, the committee members spent the remainder of the February session working on individual courses and completing drafts of additional courses. The researcher noted that this session was extremely productive. Due to district scheduling conflicts, the next curriculum writing session was scheduled for only one day in March.

To prepare for the next session, the researcher and the Assistant Superintendent for Curriculum and Instruction decided that the researcher was to complete the collection of research data that included the computer technology curricula currently offered in Allegheny County. Although the committee members had been reviewing collected curricula all along, a more complete picture would be needed to evaluate how the West Allegheny School District course offerings compared to other school districts in the county. It was important to the committee members that the West Allegheny School District offer courses based on current research and on par with, or superior to, surrounding districts.

The researcher complied with this request. At this time, only one school district had not responded with the researcher's request for curriculum; the Duquesne City School District, a distressed school district, whose school board voted to close its high school after the 2006-2007 school year. However, the curriculum for this district was eventually received. The collected data were compiled and synthesized into a comprehensive worksheet and accompanying charts. This data compilation is represented in Appendix J, titled Computer & Technology Curriculum by School District for Allegheny County – Public Schools, 2006-207 School Year.

The next curriculum writing session took place Monday, March 26, 2007. The meeting started with a review of the curriculum maps. Several courses were not completed, so there were still several unaddressed Pennsylvania Academic Standards for Science and Technology. The remainder of this meeting was spent working individually on courses. The atmosphere of this gathering changed with this meeting. Whereas previous meetings set the pace and expectations of each member, this meeting became more relaxed, even social in nature. Looking at the curriculum maps that were lining the walls, you could definitely see progress was being made. Members felt more comfortable in their role as a contributing member. Individual members steadily worked on their courses, but also joked and discussed individual challenges. They solicited input from each other and the researcher. The group had grown into a collaborative team, supportive and reassuring of one another.

This meeting was also unique because it was dedicated solely to curriculum writing; no other issues needed addressed. All committee members were able to focus on the task at hand without distractions. Preliminary drafts of most courses were completed. In the afternoon, the researcher helped members map their courses with the corresponding Pennsylvania Academic Standards.

In the afternoon, the group reassembled to review what had been completed and what still needed to be accomplished. The curriculum maps were given attention to determine that all the standards were properly addressed. Upon examination, not all science and technology standards had been addressed. However, when the standards that were not directly addressed in the Information and Communications Technology courses were examined in detail, it was confirmed by the Assistant Superintendent that these standards were being addressed in the science curriculum. With all grade level groups represented, the committee then discussed transition issues between grade levels and courses to ensure that prerequisites were being covered uniformly, that all standards were being addressed, and that there was connectivity in the entire curriculum. This was a concern for all involved. In some areas, the current, informal curriculum lacked uniformity and continuity from grade to grade. The committee initially agreed that this was a problem that warranted attention and should be corrected with the new curriculum. At this time, the entire committee reviewed the goals of each course, starting in the elementary group with the kindergarten course and finishing with the computer programming courses at the high school. Once this task was completed, all members felt confident that this issue had been corrected. After reviewing the entire curriculum, some members decided to revise the level of proficiency (I-introduce, R-review, M-master) for their individual courses. This discussion had made an impact on whether the teacher looked at the level of proficiency from the point of view of the entire curriculum or based on a single course. As a group, the committee decided that the level of proficiency should be based on the entire curriculum.

The researcher then presented the curriculum data for Allegheny County. Copies of the compiled worksheet and charts (Appendix J and Figures 2-7) were distributed for review. Once the data was presented, the researcher answered questions and the results were discussed. Based on the data, the committee concluded that the proposed curriculum was superior to most districts, and equivalent to districts that were perceived to have superior resources.

When it came time to schedule the next month's meeting, the committee decided that enough progress had been made, and there was no longer a need to schedule two days a month. One day a month for the remainder of the school year would be sufficient to finish the curriculum on schedule. Only two teachers did not have at least a preliminary draft completed for their individual courses. The next meeting was scheduled for Wednesday, April 14, 2007.

The April meeting was unusual. During the interim between this meeting and the March meeting, changes had been made to preliminary course drafts. Several teachers submitted a final draft for the Assistant Superintendent to review. Also, the Professional Development Committee for the school district (also known as the Act 48 Committee), had met and decided that technology should be the subject of the June 11 teacher in-service training day. They had requested that the Computer Technology Curriculum Committee suggest activities for the training date. The committee felt that this was the perfect opportunity to present the final draft of the Information and Communications Technology Curriculum to the teachers and discuss its effect on other content areas, specifically, the need to integrate computer technology across the entire curriculum. The committee thought that this would be the proper forum to solicit input and open a dialog with other content areas in the hopes of working together to support one another. The two committees agreed to meet Monday, April 30, 2007, to plan the June 11 training day. The results of the April 30 meeting are not reported because in-service training is outside the scope of this study.

The committee then proceeded to address issues that had not been addressed at the last meeting. The first issue was clarification of the new, mandatory technology course that had been approved by the school board in February. Members were not clear on what would be included in this course. The department head clarified this requirement by stating that it is a required, one-year course for all ninth grade students and is to be implemented in the 2007-2008 school year. Those students entering the tenth, eleventh and twelfth grade are exempt from this course. The course is designed to cover basic computer skills for three days, and study skills for three days to fit the 6-day rotation schedule of the district. A business certified teacher will provide instruction for the computer skills portion, and an English certified teacher will cover the study skills portion of the course. The basic computer skills will include keyboarding and word processing to ensure exposure to the skills necessary to support academic achievement. The course will be graded as pass/fail, which students must pass to be eligible to graduate.

The NCLB requirement of becoming technologically literate by the end of the eighth grade was also discussed. To meet the NCLB requirement, the Assistant Superintendent for Curriculum and Instruction required that the NETS for Students be included in the curriculum template, thereby adopting ISTE's definition of technological literacy. The committee agreed that the school district could not adequately meet this requirement with the current, once every six-day class in the elementary and middle school grades. To ensure compliance, computer technology must be integrated across the curriculum. The Assistant Superintendent agreed and stated that the training day on June 11 would present the perfect forum to inform teachers that they will have to use technology in other content areas as well. Most teachers are using computer technology, but this will be the first time that it will be openly discussed by teachers from all content areas. The Assistant Superintendent and researcher expected this would be the perfect opportunity to encourage more collaboration from all content areas and ensure implementation across the entire curriculum for the district. Technology integration would no longer be an option. It was the opinion of the Assistant Superintendent that the professional development committee would support this initiative as well.

A teacher concern was also noted. The new required technology/study skills course is to be graded on a pass/fail basis, the same as the middle school computer courses. The committee proposed changing these courses to the standard A-F grading scale. They believe that when students realize the course is graded on a pass/fail basis, effort and motivation decline dramatically. The Assistant Superintendent agreed to address this concern with administration and respond to before the end of the year. The grade change proposal of the committee was eventually denied.

As a group, the teacher members then addressed the issue of elementary and middle school computer classes being grouped with special content courses (physical education, music, world languages, art, etc.), and as electives at the high school level. They expressed concern over increasing pressure to adhere to the Pennsylvania Academic Standards and NCLB. The researcher brought up the fact that with no required technology course in high school for the 2006-2007 school year, the West Allegheny School District was deficient in meeting the standards required by the state. The committee was confident that the newly required Basic Technology Skills course would be a step in the right direction to help eliminate this deficit.

After a morning of lively discussion, the committee divided into the two subgroups (elementary and middle/high school) to continue to develop the curriculum. The researcher primarily worked with the middle school/high school group to make some minor revisions to the middle school courses and to help complete two unfinished courses. An additional goal of this group was to work with the department head to devise a proposed Five-Year Course Plan that would include a table of course offerings and outline current courses, changes, additions and deletions. Table 4-7 provides the proposed Five-Year Course Plan.

At the end of the day, the committee met as a group to review work completed and put together a timeline to finish this project. The following items were decided:

- A draft of all unfinished courses was to be completed by the end of May.
- For the 6/11/07 in-service training day, the curriculum draft will be presented to the faculty by the committee.
- A draft of the proposed curriculum will be submitted to the school board policy committee in July 2007 for approval. This proposal is to include:
    - The newly approved, 1-credit, Basic Technology Skills course required for graduation
    - Proposed course offerings, with additions/changes/deletions (Table 4-7)

It was also decided at this time that there was no need for additional meetings of the full committee. Drafts of currently unfinished courses were to be completed by the individual teacher members on the above timeline and forwarded to the Assistant Superintendent for review. However, the committee did meet again on April 30, 2007, with the Professional Development Committee to plan the district wide in-service training day for teachers. The purpose of this meeting was beyond the scope of this dissertation and is not included in the data.

The researcher continued to work with the Assistant Superintendent to prepare the draft for submittal to the school board for approval. The month of May was spent compiling all the individual courses into one draft of the complete Information and

Table 4-7. *West Allegheny School District: Proposed Five-Year Course Plan of Information and Communications Technology Course Offerings*

| | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 |
|---|---|---|---|---|---|
| **Full Year Courses** | | | | | |
| Accounting I | X | X | X | X | X |
| Accounting II/III | X | X | X | X | X |
| Advanced Computer Technology | X | X | X | X | X |
| *Basic Technology Skills | | X | X | X | X |
| Desktop Publishing I | X | X | *Becomes a semester course | | |
| Desktop Publishing II | X | X | X | X | X |
| IC3 Certification | | | *X | X | X |
| Programming I –Introduction | X | X | X | X | X |
| Programming II – VB.net | X | X | X | X | X |
| Programming III – Java | X | X | X | X | X |
| Webpage Design | X | X | X | X | X |
| Word Processing II | X | X | *Becomes a semester course | | |
| Yearbook I/II | X | X | X | X | X |
| **Semester Courses** | | | | | |
| Access | X | X | *Dropped | | |
| Desktop Publishing I | *Previously Year Course | | X | X | X |
| Excel | X | X | X | X | X |
| *Management | | | X | X | X |

Table 4-7. *West Allegheny School District: Proposed Five-Year Course Plan of Information and Communications Technology Course Offerings* (cont.)

| | 2006-2007 | 2007-2008 | 2008-2009 | 2009-2010 | 2010-2011 |
|---|---|---|---|---|---|
| *Marketing | | | X | X | X |
| FrontPage | X | X | *Dropped | | |
| Keyboarding | X | X | X | X | X |
| PowerPoint | X | X | X | X | X |
| Word Processing | X | X | X | X | X |
| Word Processing II | *Previously Year Course | | X | X | X |
| *Additions/Changes<br>X=Scheduled course | | | | | |

Communications Technology curriculum, proofreading for errors and consistency, and reviewing for accuracy. During May, the researcher was alerted that the International Society for Technology in Education (ISTE) had released a proposed draft of updated National Educational Technology Standards (NETS). The researcher recommended to the Assistant Superintendant, that when ISTE officially adopted the new NETS, the curriculum be revised to include them. ISTE had plans to announce the new, official NETS at the National Education Computing Conference (NECC) in June. The Assistant Superintendent agreed to use the new NETS when they were officially adopted by ISTE.

Once the individual courses were compiled into one cohesive document, it was e-mailed to all committee members. At this time, four courses had not been completed and were not included in the initial document. The researcher proofread the entire curriculum, with the primary responsibility to correct spelling and grammar errors, to verify that the Pennsylvania Academic Standards were correctly identified and referenced in each course, and to make changes to ensure consistency from course to course, in content, style and format. The researcher's revisions were marked electronically and sent to all members of the curriculum committee on May 23, 2007. Committee members were to review their courses to accept the revisions made by the researcher or make additional changes. Committee members were given a deadline of May 30 to respond. On May 31, the researcher received the remaining four courses to proofread. Due to the late submittal and approaching summer break, all four courses had to be corrected and returned the following day. These courses were then added to the curriculum draft on June 1, 2007.

The deadline for submitting the proposed curriculum to the school board for review was mid-July. However, the teachers' last work day was June 11. All changes to the curriculum had to be made prior to the teachers' last day. Anticipating that ISTE would approve the new NETS, the researcher began building new matrices that cross-referenced the applicable Pennsylvania Academic Standards for Science and Technology to the new NETS. Appendix G provides a sample of one of the 12 matrices produced.

During the National Education Computing Conference that was held June 24-27, 2007, ISTE officially announced the approval of the new NETS. At this time the researcher began updating all courses that embodied the curriculum, to be current with all recommended standards, not just the required Pennsylvania Academic Standards. Due to the length of the document, this process was ongoing until July 9. The Assistant to the Superintendent for Curriculum and Instruction reviewed and approved the updated draft. Based upon this approval, the draft became the proposed curriculum.

The proposed Information and Communications Technology Curriculum was submitted to the curriculum committee of the school board for the mandatory review in

July. The proposal was added to the agenda for the full school board meeting scheduled for August 8, 2007. The researcher was invited to attend and asked to participate in the formal presentation recommending that the school board approve the new curriculum for implementation in the 2007-2008 school year. The presentation was to be approximately 15 to 20 minutes in length. The Assistant Superintendent for Curriculum and Instruction presented the introduction and overview, the researcher presented the research base and new NETS, and the department head presented an outline of courses and proposed changes. At the conclusion, the board approved the proposed curriculum and implementation schedule. The final version of the curriculum was prepared and added to the school district's website. A hard copy resides at the district office for public inspection. All teachers that participated in the Information and Communications Technology Curriculum Committee were notified of the approval.

Figure 1 provides the Timeline of Events as they occurred in the curriculum development process. The project was initiated in April, 2006, and ended with the school board approval on August 8, 2007. Business and computer technology teachers were involved from December, 2006, until June, 2007. The research base was collected and compiled during the summer months of 2006. Data collection of curriculum for Allegheny County, Pennsylvania, commenced in October, 2006, and was completed in March, 2007. One hundred percent of school districts contributed their computer technology curriculum. Near the end of this project, the International Society for Technology in Education (ISTE) updated their National Educational Technology Standards for Students (NETS), creating the need to revise the curriculum before submission to the school board for approval. The project concluded on August 8, 2007,

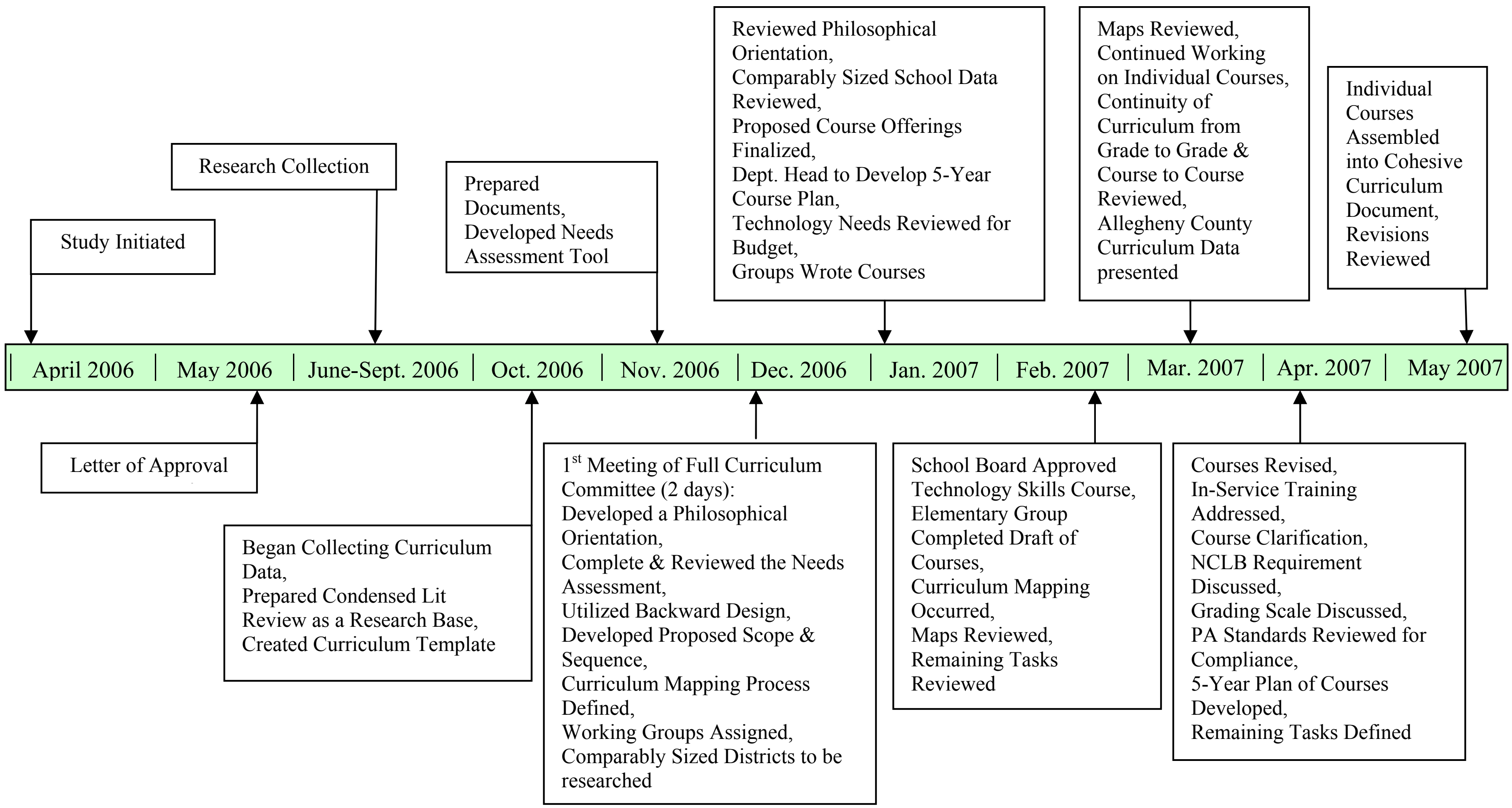


*Figure 1.* West Allegheny School District Curriculum Development Timeline

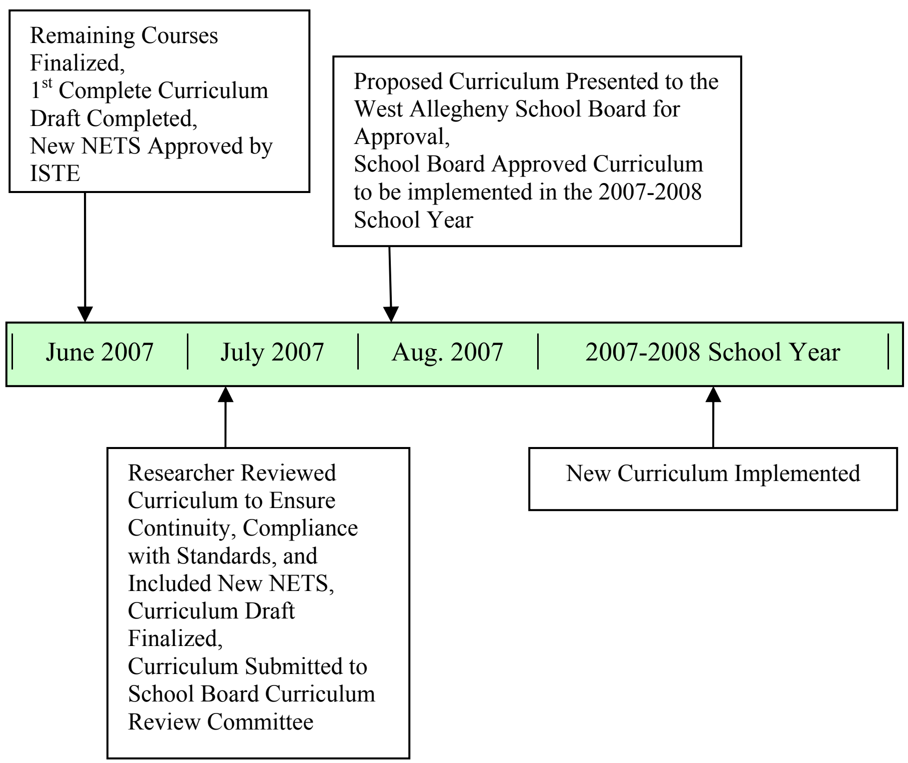


*Figure 1.* West Allegheny School District Curriculum Development Timeline (cont.)

when the new Information and Communications Technology curriculum was unanimously approved by the West Allegheny School District Board of Directors for implementation in the 2007-2008 school year.

*Influencing Factors*

While developing the curriculum, there were four primary factors that are noteworthy because they had a direct impact on the decision making process. They were:

1. The No Child Left Behind Act (NCLB)
2. The Pennsylvania Academic Standards for Science and Technology
3. National Educational Technology Standards for Students (NETS)
4. The Collective Bargaining Agreement between the West Allegheny Education Association and the West Allegheny School District, 2005-2006 Through 2009-2010 (teacher's contract).

In January, 2002, President George W. Bush reauthorized the Elementary and Secondary Education Act (ESEA). It is better known as the No Child Left Behind Act (NCLB), a controversial act aimed at improving accountability. Any school district not complying with its provisions could potentially lose federal funding. NCLB contains a provision that directly pertains to computer technology. It states:

> Section 2402b Goals
>
> (2) ADDITIONAL GOALS – The additional goals of this part are the following:
>
> (A) To assist every student in crossing the digital divide by ensuring that every student is technologically literate by the time the student finishes the

> eighth grade, regardless of the student's race, ethnicity, gender, family income, geographic location, or disability.
>
> (B) To encourage the effective integration of technology resources and systems with teacher training and curriculum development to establish research-based instructional methods that can be widely implemented as best practices by State educational agencies and local educational agencies. (No Child Left Behind Act of 2001, H.R. 20 USC 6301, 107th Congress, 2002)

The second factor, the Pennsylvania Academic Standards for Science and Technology is included as Appendix D. These standards are approved and adopted by the Pennsylvania State Board of Education, "who has the power and duty to review and adopt regulations that govern educational policies and principles and establish standards governing the educational programs of the Commonwealth, upon recommendation of its councils" (Pennsylvania Department of Education, n.d.). As a public school district in the Commonwealth of Pennsylvania, the West Allegheny School District is required to implement all academic standards adopted by the Commonwealth.

The National Educational Technology Standards for Students (NETS), the third factor of note, was not a requirement of any governing body. However, the West Allegheny School District prides itself on not only complying with state standards, but also national standards. Although NETS are not officially adopted by the U.S. Department of Education, "the standards are used in every U.S. state and many countries, are credited by most with significantly influencing expectations and creating a target of excellence relating to technology" (International Society for Technology in Education, n.d.). The West Allegheny School District recognized the expertise and reputation of the International Society for Technology Education (ISTE) that developed the NETS, and believed the NETS to be pertinent to include in their curriculum. In essence, they adopted ISTE's definition of what it means to be technologically literate, as required by NCLB.

The fourth factor that influenced the decision making process of writing curriculum was the current Collective Bargaining Agreement between the West Allegheny Education Association and the West Allegheny School District (teacher's contract). This had particular influence due to a clause that relates to elementary preparation time. The school district operates on a six-day rotation to accommodate special content areas. In the elementary grades, the special content areas (also known as specials) are Art, Music, Physical Education, Swimming, Library, Computer, and Foreign Language. Each student has a daily special. On two of the six days, each student has two specials. While the elementary class attends the specials, the elementary classroom teacher is guaranteed preparation time. The Collective Bargaining Agreement (2005) stipulates:

> Classroom and Special Education teachers in grades K-5 shall receive additional preparation periods of varying lengths and at varying times as a result of being released from supervisory responsibility during instruction in Art, Music, Physical Education, Swimming, Library, Computer, and Foreign Language by appropriate specialists. The total available time for such periods shall be a minimum of 220 minutes. On a 6 day rotation

> (SIC), with no less than a continuous 30-minute prep occurring each day during the student instructional time. (pp. 9-10)

At the middle school and high school level, the specials are more varied. This factor had to be considered.

When the researcher collected data from comparably sized school districts, it was noted that none operated on a six-day rotation (see Appendix I). At the elementary level, comparable schools did rotate their specials on a once-a-week schedule. However, at the middle school level, a majority of schools changed their rotation schedule to daily instruction in 6-, 9-, or 12-week blocks. At the high school level, the rotation was typically on a semester or full-year basis. The West Allegheny School District utilizes the six-day rotation at all grade levels. Only one other school district could be located in Allegheny County that utilizes the six-day rotation. This district is not comparably sized.

The curriculum committee discussed this at length and believed that the school district should consider changing the rotation schedule to be similar to a majority of schools in the county. The Assistant to the Superintendent for Curriculum and Instruction thought this warranted further discussion at the administrative level. The administration did like the recommendation, and believed it warranted attention, but could not make any changes until the current collective bargaining agreement expires, which will not be until 2010. The committee had to proceed and accommodate the six-day rotation.

### *Trends and Best Practices*

For the 2006-2007 school year, all public school districts in Allegheny County, Pennsylvania, were contacted via phone and e-mail with a request for a copy of the curriculum for all courses that included computer technology. In Pennsylvania, school curriculum is considered public information. To fulfill the request of the researcher, some school districts required confirmation of the researcher's academic qualifications, some school districts required written requests via e-mail, and others were satisfied with verbal requests made during the initial telephone call.

The resulting documents came in a wide variety of forms. Some districts complied with documentation that included the full curriculum for the business or computer technology department, while other districts did not have a formal curriculum and provided documentation that included a course listing with short course descriptions. There was a pronounced disparity on what individual school districts consider a curriculum.

To determine if any current trends exist, the researcher looked individually at all the courses offered at each school district and compiled the results into a comprehensive Excel worksheet that listed all courses offered in Allegheny County by school district. Allegheny County consists of 43 school districts with 54 high schools. The resulting worksheet is included as Appendix J. Using the charting option of Excel, the data was compiled to determine current trends. Several apparent trends are represented by Figures 2 through 7.

Figures 2 and 3 represent the trends that were identified in the elementary grades.

The computer technology course selections available in the elementary grades are represented in Figure 2. Figure 3 identifies the public school districts that offer Basic Computer Operations. This type of course begins in kindergarten and peaks in grades three through five. A small percent (11%) of school districts begin keyboarding in the third grade.

Figure 4 represents the trend for courses in keyboarding for Allegheny County School Districts. Keyboarding starts as early as third grade. The number of school districts continues to increase, with a peak of 78% of school districts offering keyboarding courses at the high school level.

Figure 5 represents the computer technology courses available at the middle/junior high school grade levels. Basic operations declines to 35%, keyboarding fluctuates, and the Microsoft Office Suite is introduced.

Figure 6 represents the trend for the Microsoft Office Suite for all grades. Twenty percent of schools introduce this software package in the sixth grade. Usage peaks at the high school level with 96% of school districts offering at least an introductory course.

Figure 7 represents the computer technology courses offered in the high school grades. The number of school districts that offer keyboarding peaks at 78% at the high school level. The number of school districts that offer at least an introductory course on the Microsoft Office Suite software package peaks at 96% at the high school level. Ninety-one percent of high schools in Allegheny County offer Multimedia/Web Page Design courses. The courses that are offered in the fewest number of high schools in Allegheny County are MOS or ICDL Certification (19%), CISCO/ORACLE Academy (19%), and A+ Certification/Networks (15%).

*Guidelines and Recommendations for Subject Matter*

The Computer Technology Curriculum committee voted to change the name of the business curriculum to be the Information and Communications Technology Curriculum to reflect the philosophy of the school district and what it realized to be the importance of computer technology skills to prepare graduates with the skills necessary to compete in an ever-changing society. The Information and Communications Technology curriculum was unanimously approved by the West Allegheny School District, Board of Directors on August 8, 2007, for implementation in the 2007-2008 school year. The approved curriculum is provided as Appendix K.

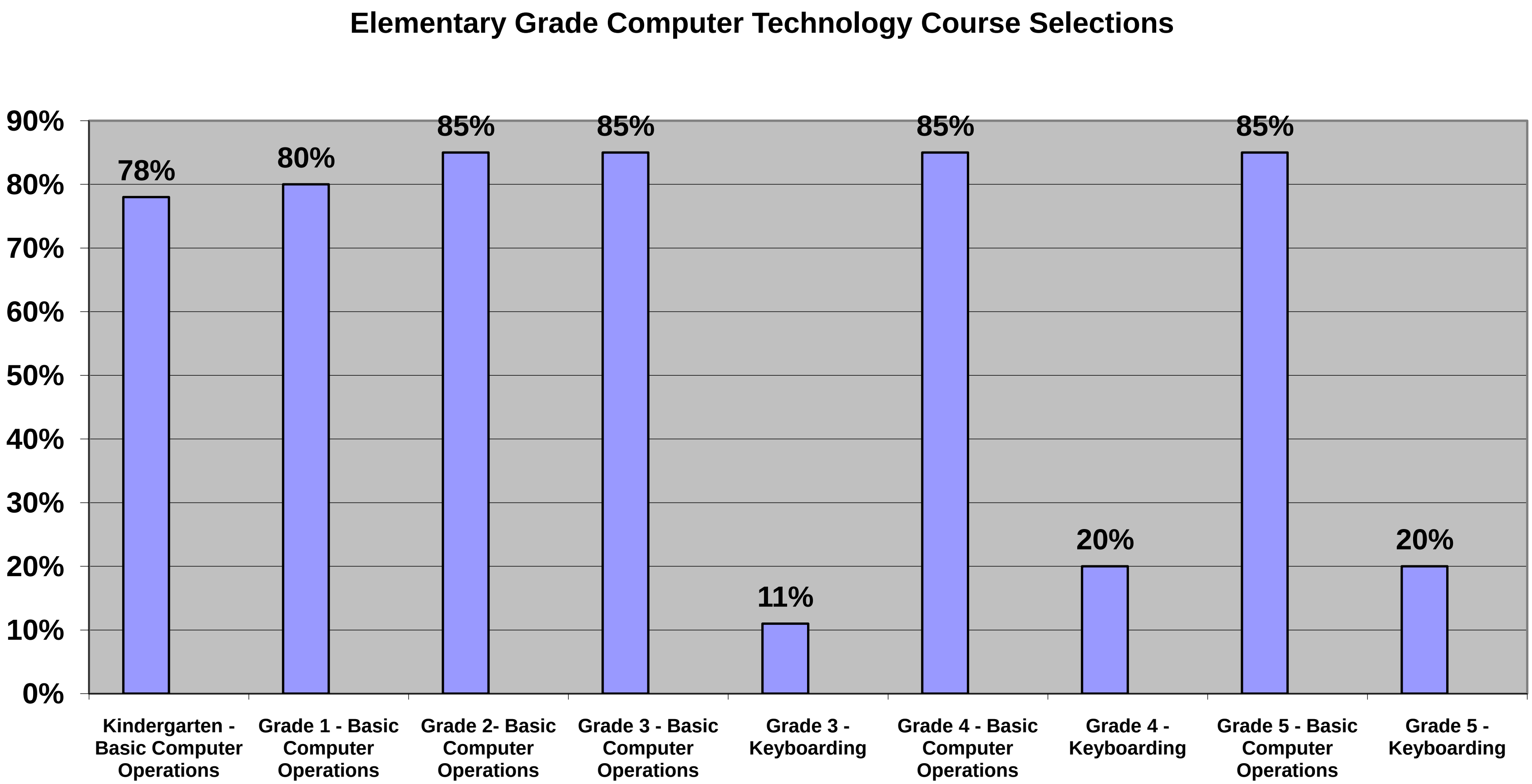


*Figure 2.* Computer technology course selections available in the elementary grades in the public schools of Allegheny County, Pennsylvania.

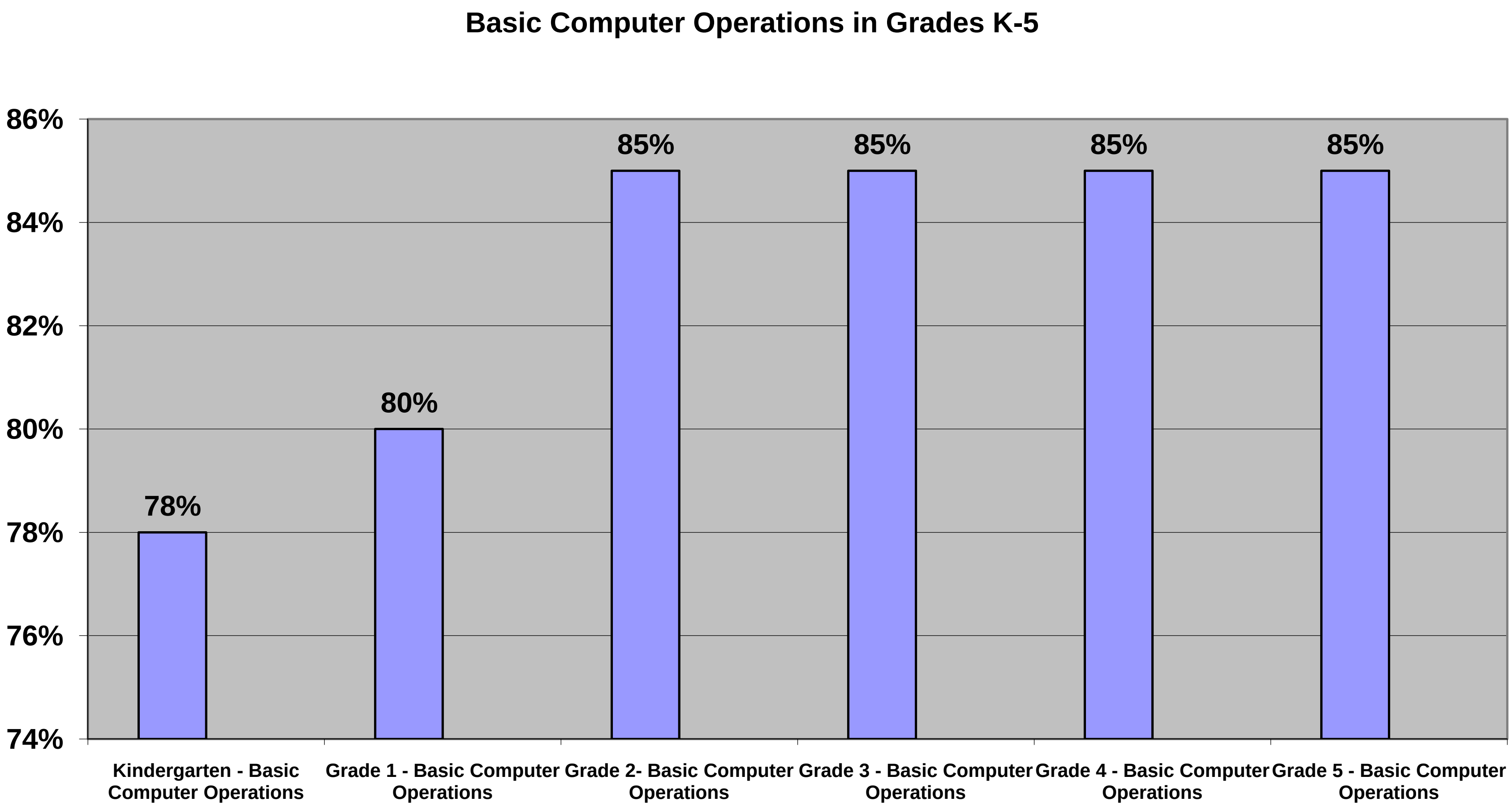


*Figure 3.* Public school districts in Allegheny County, Pennsylvania, that offer Basic Computer Operations in the elementary grades.

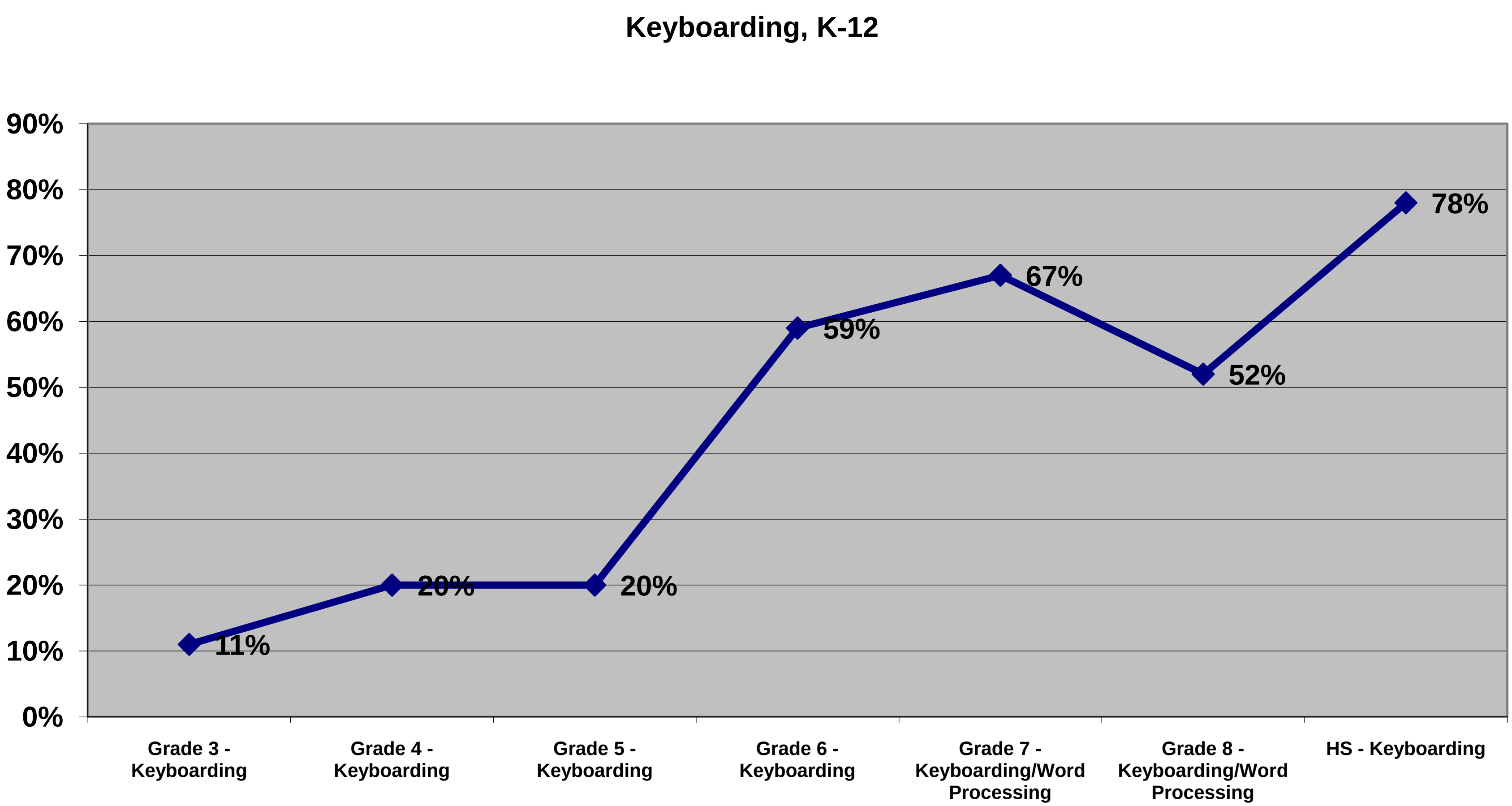


*Figure 4.* Public school districts in Allegheny County, Pennsylvania, that offer Keyboarding or a combination of Keyboarding and Word Processing.

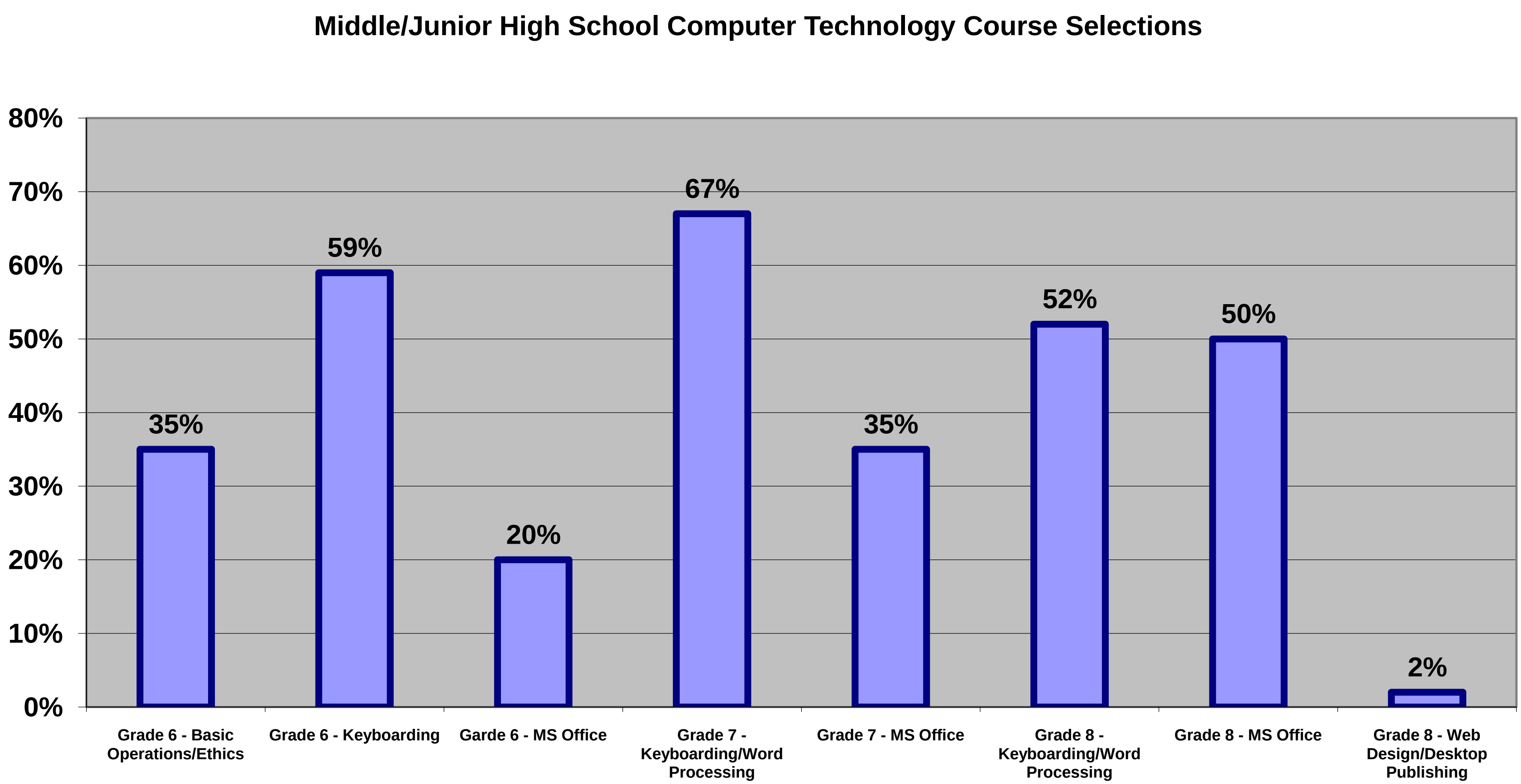


*Figure 5.* Computer technology courses offered in public schools in Allegheny County, Pennsylvania, for the Middle/Junior High School grade levels.

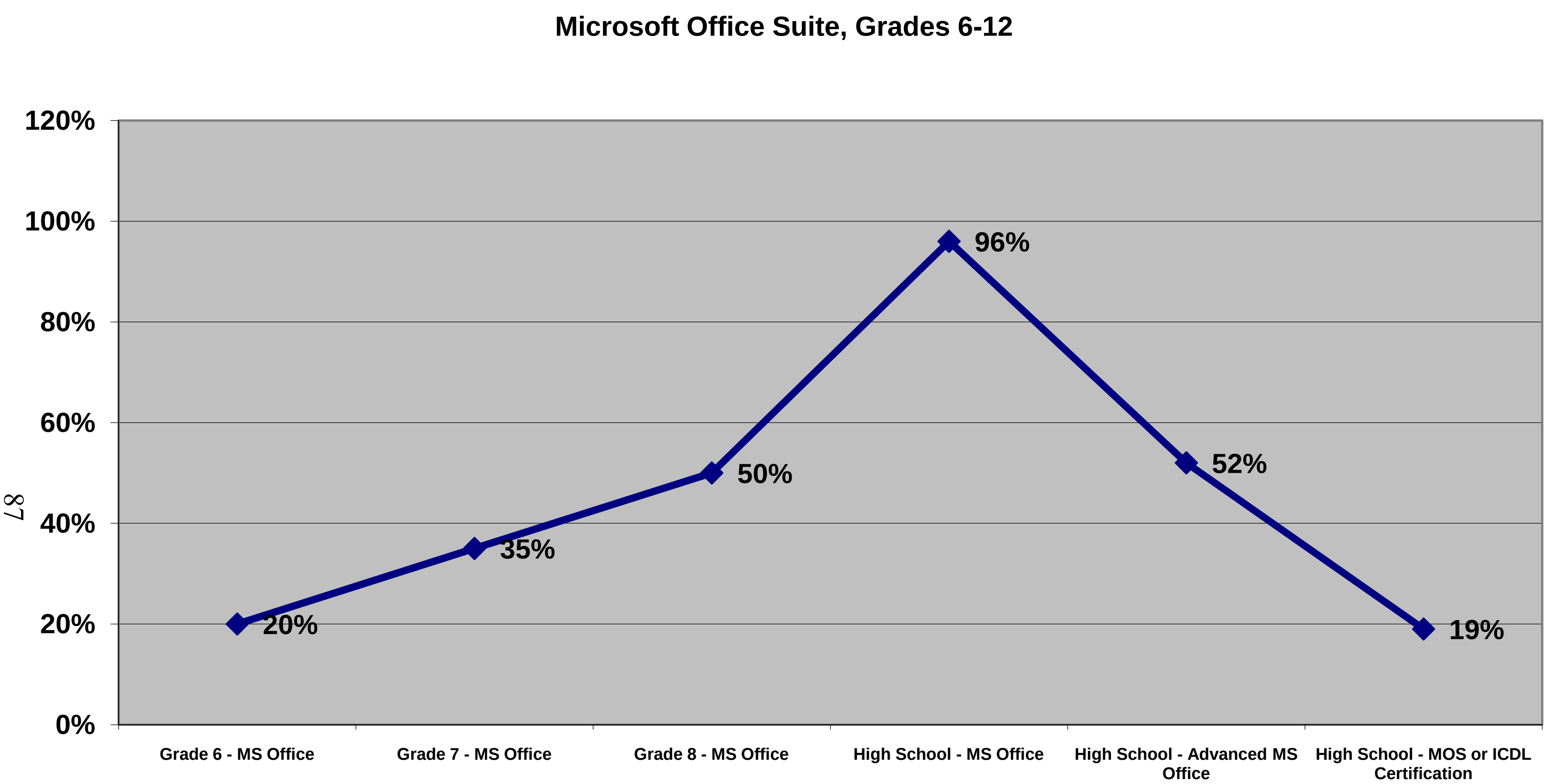


*Figure 6***.** Microsoft Office Suite courses offered in the public schools of Allegheny County, Pennsylvania.

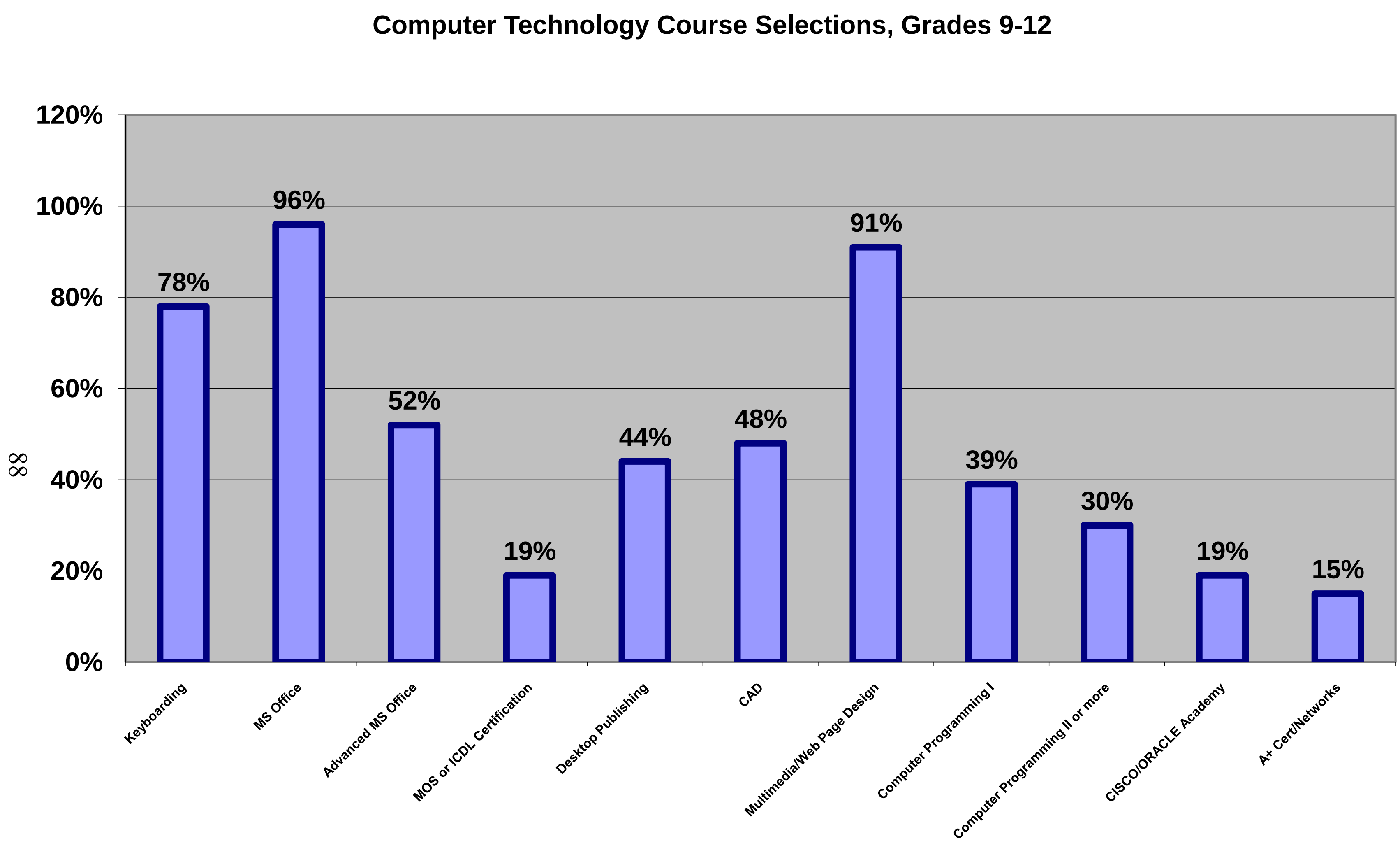


*Figure 7.* Computer technology course selections for public high schools in Allegheny County, Pennsylvania.

## Chapter 5

## SUMMARY AND DISCUSSION

The final chapter of this dissertation is devoted to summary and discussion. The research problem will be restated, the significance of the study revisited, the research methodology reviewed, the results summarized, and the study discussed. This chapter will conclude with recommendations for further study.

### *Statement of the Problem*

Prior to the initiation of this study, the West Allegheny School District did not have a formal computer technology curriculum. The curriculum used was a compilation of course descriptions and general guidelines that the school district administrators acknowledged was lacking. It was determined to be insufficient in meeting the needs of the student body and in meeting state requirements and federal mandates.

With the previous curriculum, it was possible to advance through the grades and graduate without keyboarding skills or a basic understanding of computer technology. The Superintendent and Assistant to the Superintendent for Curriculum and Instruction recognized the importance of technology in today's society and targeted the computer technology curriculum to be updated to meet the needs of the student body and to provide instruction that will give graduates the computer skills necessary to compete in a technologically advanced world.

### *Significance of the Study*

The significance of this study is two-fold. First, when this study was initiated, trend data did not exist that defined K-12 Computer Technology Curricula for the 2006-2007 school year in public school districts for Allegheny County, Pennsylvania. Second, the West Allegheny School District needed a district-wide, formal K-12 Computer Technology Curriculum.

The research questions addressed by this study are:

1. What impact does NCLB and Pennsylvania Academic Standards have on technology curriculum?
2. What are the current trends in K-12 computer technology curriculum for Allegheny County, Pennsylvania?
3. What Information and Communications Technology curriculum should be adopted and implemented by West Allegheny School District for the 2007-2008 school year?

To answer these questions, this study reports the four factors that influenced the development process used by this school district and provides a curriculum that not only meets the needs of the district, but provides current content that will help produce graduates with the needed computer skills to be productive citizens in today's technologically advanced society.

### *Review of the Methodology*

This study entailed qualitative research methodology, primarily action research and unobtrusive methods. For action research, the researcher became a participant observer in the curriculum development process to solve the problem of an antiquated curriculum. The researcher is an outsider that collaborated with insider practitioners, a method substantiated by Herr and Anderson (2005, p. 3). Field notes were transcribed to provide a detailed description of all curriculum committee meetings. A reflective journal was kept by the researcher to document impressions, feelings, and additional notations. Each observation was scrutinized to identify the context of the situation and to explain all factors that influenced the perspective and experience of the researcher.

The researcher utilized unobtrusive measures to collect data from all 43 school districts in Allegheny County, Pennsylvania. Allegheny County was chosen because it encompasses West Allegheny School District, includes a large city (Pittsburgh), and is the second most populace county in the Commonwealth of Pennsylvania. The researcher anticipated that these factors would produce results that could potentially be generalized to other similar populations. In Allegheny County, Pennsylvania, curriculum is considered public information and falls under the guise of archival material. Archival material is not influenced by the research. Berg (2004, p. 211) supports this supposition.

The data was collected and compiled into a comprehensive Microsoft Excel worksheet that included the computer technology course offerings by grade level for all school districts in Allegheny County. Using the charting feature, trends were then analyzed. Descriptive statistics were used to report the results.

## *Summary of the Results*

### *Today's Students*

The ethnic and socioeconomic makeup of the West Allegheny School District is somewhat homogeneous. The student population is predominantly white, with 2%

Asian/Pacific Islander, and 3% black (Table 4-1, p. 42). Sixteen percent of students come from low-income families.

The student body of the West Allegheny School District is similar to any other with respect to technology use. As observed by the researcher in social settings, students were seen using technology such as cell phones, hand held video games, and other electronic devices. These students ranged in age from 5 to 18, and all seemed at ease with the operation of these devices. These activities did not appear to be out of the norm as observed by the non-reaction of parents, teachers, and administrators. Due to a school policy banning electronic devices during school hours, no electronic devices were observed during normal school hours.

## *The Need for Technology Curriculum*

When this study began, teachers were supplied with an informal curriculum comprised of course descriptions and general guidelines. Teachers were given considerable academic freedom to provide instruction. As a result, there was no consistency from grade level to grade level or course to course. The curriculum lacked continuity. Students could progress through the grades and graduate without keyboarding skills or a basic understanding of computer technology. A technology course was not required for graduation.

The district administrators realized that the current curriculum was lacking and were determined to correct this situation. They wanted a solid, dynamic, research-based curriculum that would be free to change as technology changes and provide instruction that would empower graduates with the technology skills needed to succeed in a technologically advanced society. It was important that the curriculum be delivered consistently from grade level to grade level and offered continuity from course to course. It also needed to be implemented across the curriculum in order to be considered successful.

*Curriculum Development*

Previous administrators had tried unsuccessfully to create a formal curriculum for this content area. The reasons for the failure are unknown and could only be speculated on by teachers that were employed at that time. With that in mind, the Superintendent and Assistant to the Superintendent for Curriculum and Instruction were willing to include the researcher in this process. The Superintendent appointed the researcher as a member of the computer technology curriculum committee. The primary roles of the researcher were to provide current research and an outsider's perspective.

The new curriculum needed to follow the design used by West Allegheny School District for all content areas, and consisted of the following components:

1. Title Page
2. Acknowledgements Page(s)
3. Philosophical Orientation Statement
4. Table of Contents
5. Course Description Page (for each course)
6. Course Curricula (broken down by grade level for K-8, individual courses for high school)

The philosophical orientation differed by content area and was written by the content area curriculum committee. The individual course curricula were developed by the individual teacher or teachers that taught the course and consisted of the units covered. These course curricula are used as the basis for individual lesson plans created by the teachers. They are cross referenced to the appropriate Pennsylvania Academic Standard and applicable or recommended national standard. In the case of the computer technology curriculum, the researcher modified the curriculum template to include the Pennsylvania Academic Standards for Science and Technology, sections 3.6, 3.7, and 3.8. Although no national standards exist for computer technology, the West Allegheny School District recognizes the expertise and reputation of the International Society for Technology in Education (ISTE), and decided to include their National Educational Technology Standards for Students (NETS) in their course curricula.

The first priority of the curriculum committee was to develop a philosophical orientation, basically a vision statement to guide curriculum decisions. By accepting input from all curriculum committee members, the members felt that their opinions mattered and they were part of the process.

Once the philosophical orientation was drafted, committee members completed a Needs Assessment (Appendix H), the purpose of which was to identify the strengths and weaknesses of the current curriculum. The results of the Needs Assessment were very important to the committee. By having each member complete the Needs Assessment individually, unique opinions and perspectives surfaced that aided in the curriculum development process. The following areas were identified as weaknesses:

- The current department name did not reflect the currency and importance of subject matter
- Technological literacy was lacking in the elementary and middle school grades
- The computer teachers for the elementary and middle school grades were lacking direction and consistency of instruction
- The NCLB mandate of being technologically literate by the end of the eighth grade was not being met
- Middle school needed the most attention
- High school courses were electives, therefore not meeting the PA Standards
- There was no technology course requirement for graduation

Many committee members commented that the Needs Assessment was the first honest look at the curriculum that anyone had done. The Needs Assessment confirmed to the teachers that the administrators valued their input and supported their ideas. It helped provide direction for the committee.

As a result of the Needs Assessment, two important decisions were made. First, the committee voted to change the name of the department from Business and Computer Science to Information and Communications Technology. Second, the committee utilized Wiggins and McTighe's (2005) concept of Backward Design by focusing on the technology skills that graduates should have. They used these skills as the basis for course selections and curriculum decisions.

Once the Needs Assessment was completed and discussed, the committee reviewed the current course selections and discussed changes and additions. The committee developed Table 4-2 (p. 51) as proposed course sequence/offerings for the new curriculum. Once the committee agreed on the overall course scope and sequence, the members had a better understanding of the overall picture and how their individual courses fit into the curriculum schema.

The teacher members were divided into two grade level groups, one for elementary and one for middle school and high school. By working in these specific groups, the issues of consistency and continuity were addressed. This provided the opportunity for an open exchange of ideas and allowed members to discuss changes and improvements. As a result, these teachers took ownership of their courses.

To map the curriculum, the Assistant to the Superintendent for Curriculum and Instruction used enlarged copies of the curriculum templates (Appendix F), and displayed them on the walls of the meeting room. Members used stickers to identify courses and the appropriate standard that applied. Although simplistic, it worked very well for this committee. Members could easily view progress and see what areas needed attention.

As the process unfolded, the researcher provided the committee with data collected from comparably sized school districts and with the curricula used by all school districts in Allegheny County. It was important to the members of the committee to see what courses and curriculum were currently being offered elsewhere. This information provided them with curriculum examples and allowed them to compare their courses to similar ones offered by other school districts. Armed with examples, teachers felt more confident with their submitted courses. It was also important for teachers and administrators to see how the West Allegheny School District compared to others.

The fact that a student could graduate without keyboarding skills or a basic understanding of computer technology was a problem serious enough that the committee took immediate action. This was interpreted by the committee to mean that the school district was deficient in meeting the Pennsylvania Academic Standards for Science and Technology in the high school grades. Since all business classes were electives, the required high school standards could not be met. The curriculum committee unanimously agreed to propose that a one-credit technology course become a graduation requirement. This proposal was submitted to the school board and approved six months before the formal curriculum. The approved course will cover keyboarding, the Microsoft Office Suite, and study skills. A business certified teacher will provide instruction for keyboarding and the Microsoft Office Suite, and an English certified teacher will provide the instruction for study skills. It will be graded on a pass/fail basis and the freshman class of the 2007-2008 school year must pass this course to be considered a candidate for graduation.

The committee also emphasized the dynamic nature of technology. It was important to members that the curriculum could change to meet the needs of students and the demands of new technology. As such, the department head was assigned the task of putting together a 5-year plan for course additions and changes. The West Allegheny School District follows a 5-year curriculum review cycle. It was important to teachers that they could make changes prior to the next review cycle. The resulting 5-year plan is included as Table 4-7 (p. 70).

Once the study was approved, the curriculum development process took 14 months to complete. Teachers were actively involved for seven months. The remaining time was used to conduct research, create templates, compile drafts, edit the curriculum, and prepare for presentation to the school board. The formal curriculum (Appendix K) was approved by the West Allegheny School District Board of Directors on August 8, 2007.

*Influencing Factors*

Four factors had a direct impact on the decision making process for curriculum development. They were:

1. The No Child Left Behind Act (NCLB)
2. The Pennsylvania Academic Standards for Science and Technology
3. The National Educational Technology Standards for Students (NETS)
4. The Collective Bargaining Agreement between the West Allegheny Education Association and the West Allegheny School District, 2005-2006 Through 2009-2010 (teacher's contract)

NCLB contains a provision that every student must be technologically literate by the time the student finishes the eighth grade. This creates a conundrum for two reasons. First, NCLB does not provide a definition for technologically literate; neither does the Commonwealth of Pennsylvania. It is the responsibility of the individual school district to provide a definition. As chapter 2 (Literature Review) of this dissertation confirms, even the experts cannot agree on a definition. Without a recognized definition, the NCLB mandate cannot be met. The curriculum committee skirted this issue at every turn. As a result, the committee decided against providing their own definition, and instead, to adopt the definition of technology literacy provided by the International

Society for Technology in Education (ISTE), on which the National Educational Technology Standards for Students (NETS) are based. Their definition states:

> Technology literacy is more than the understanding of current uses of technology, and it is more than the ability to use common technology-based tools according to a given prescription for achieving some specific outcome. Technology literacy involves:
>
> - demystifying technology through conceptual understandings of the underlying science and mathematics principles,
> - operational competence with modern technology systems,
> - the ability to evaluate and use a variety of common technology applications,
> - the ability to innovate and invent ways of applying technology in challenging new situations,
> - an awareness of technology-related careers and of factors critical to success in those careers, and understanding of and sensitivity to societal issues related to technology. (Thomas & Knezek, 1995)

The second factor that had a direct influence was the Pennsylvania Academic Standards for Science and Technology, sections 3.6, 3.7 and 3.8 (Appendix D). These standards were approved by the Pennsylvania State Board of Education and are required content for all districts in the Commonwealth.

The third factor that had a direct influence was the National Educational Technology Standards for Students (NETS) (Appendix E). These were developed by the International Society for Technology in Education (ISTE). Recognizing the expertise and experience of this organization, the Superintendent and Assistant to the Superintendent for Curriculum and Instruction included the NETS in the curriculum. This decision was based on the need for the curriculum to be research-based and was confirmed by the curriculum committee when they voted to adopt their definition of technology literacy.

The final factor that had a direct influence in curriculum decisions was the current Collective Bargaining Agreement between the West Allegheny Education Association and the West Allegheny School District (teacher's contract). The school district operates on a 6-day rotation for all grades. The rotation does not include core required subjects. The rotation was initially set up to include what the district considered special content areas (also called specials). These special content areas include: Art, Music, Physical Education, Health, Swimming, Library, Computer, and Foreign Language. On each of the six days, each elementary student has one special. On two of the six days, each elementary student has two specials. In grades 6-12, they are more varied. These specials are recognized in the teacher's contract. Specifically, the elementary classroom teacher is given additional preparation time while their students are receiving instruction in the special content areas.

Being grouped with the special content areas creates a major problem in the middle school grades. Based on a 180-day school year, the 6-day rotation equates to 30 days of instruction for each special. This means that the teacher only sees the same students once every six school days. Too much time lapses between classes to ensure retention, and a major complaint of the computer teacher is that 30 days is not enough time to properly cover the material. When the Needs Assessment was completed, all committee members agreed that this was indeed a problem that warranted attention. The only solution that could be implemented for the 2007-2008 school year was to integrate computer technology instruction across the curriculum. This proposed solution was endorsed by the district administrators and implemented with the approved curriculum.

Upon further investigation by the researcher, only one other school district in Allegheny County, Pennsylvania, operates on a 6-day rotation. All other districts operate with a 6-, 9-, or 12-week block rotation for their special content areas. When this evidence was presented to the committee, the Assistant to the Superintendent for Curriculum and Instruction agreed to present it to the Superintendent and school board, and proposed that the 6-day rotation be discontinued. Unfortunately, the terms of the current contract negated any immediate changes in the rotation schedule. However, the administrators and school board plan to change to a block rotation when the current teacher's contract expires.

Although four factors had a direct influence on the curriculum development process, two other factors emerged that had an indirect influence. As the researcher collected the computer technology curriculum from all other districts in the county, it was made available to members of the curriculum committee. This became a valuable resource. Although none of the curricula were copied, many teachers used other schools' curricula as examples and to help determine the correct Pennsylvania Academic Standard that applied to the units covered in their courses. Many members stated to the researcher that this helped expedite the process. This was unique because the district had never before collected other school districts' curricula to use in the curriculum development process.

The second indirect influence was the data collected from comparably sized districts (Appendix I). The results of this data revealed that the 6-day rotation is not common. It is not used in any of the comparably sized school districts. This fact did not go unnoticed by the Superintendent and school board.

## *Discussion*

### *Curriculum Development*

Although the entire curriculum development process took a total of 14 months to complete, content area teachers were only involved for seven. Their involvement was expedited due to the contributions of the researcher. Having access to current research and curriculum examples was found to be extremely helpful. With examples in hand, teacher members did not feel like they were charting new territory. For several, having examples helped calm their fears of making mistakes.

The researcher observed a tremendous change in the committee members. Having failed in an earlier attempt to write a formal curriculum, members were initially hesitant to put forth effort on a project that might fail. Once the curriculum committee members were shown the resources (the researcher, current research and curriculum examples), they realized that administration was willing to provide them with the tools necessary to write an effective curriculum. Over the course of the meetings, their commitment to this project and willingness to work together increased dramatically. Members began to realize that their input was not only welcomed, but invaluable to the process. They also came to the realization that their opinions mattered, and they had the power to initiate change and control student outcomes. Members felt they were a part of the process. By being totally forthcoming with information, the teacher members came to understand the big picture, and how each course they taught fit into the overall curriculum schema. By being so actively involved in the process, teacher members took ownership of their courses and the curriculum development process.

Having access to other school districts curriculum allowed members to compare the district's course selections with that of other districts. The committee wanted the new curriculum to be on par, or superior to surrounding districts. At the end of the process, it was their opinion that they had succeeded and are now able to offer a superior Information and Communications Technology curriculum to other districts in the area. This realization instilled them with pride for their organization, thereby increasing morale. With renewed vitality, they proudly presented the new curriculum to the teaching staff at the end of the school year.

*Curriculum Trends*

Once the curriculum data was collected from all school districts in Allegheny County, Pennsylvania, it was analyzed to determine if any trends existed for the 2006-2007 school year. Several trends became apparent.

The first noticeable trend was the format of the curricula. There was a wide disparity in what each district labeled as curriculum. The collected curricula ranged from course descriptions and basic content guidelines to formal, voluminous pages of detailed course and unit content. The only common feature of the data collection was that each district supplied a list of course selections and a short description.

The compiled data for Allegheny County revealed several trends in course selections. For the elementary grades, two trends were identified, Basic Computer Operations and Keyboarding. Basic Computer Operations is defined as familiarity with introductory concepts and procedures, such as use of the mouse, basic hardware and software, and file access procedures. A high percent (78%) of school districts offer Basic Computer Operations in kindergarten. However, Basic Computer Operations peaks with a saturation of 85% of districts providing this instruction in grades three through five (Figures 2 & 3, pp. 83-84). The percentage declines to 35% in grade six (Figure 5, p. 86). Some districts offer no instruction in computer technology in the elementary grades. By the time they reach grade six, students should exhibit competency with basic hardware and software operations.

Providing an official technology education program in the elementary grades is the first step to establishing a technology base on which to build. In today's technologically advanced society, students are not only intrigued by technology, they embrace it. It's important that educators harness this curiosity and channel it in the right direction. With unprecedented access to technology at an early age, elementary age students are fascinated with computers and start school ready to learn about them.

The second trend for elementary grades is keyboarding. For Allegheny County, only 20% of school districts provide keyboarding instruction in the $5^{th}$ grade. The noticeable trend for keyboarding instruction is that it starts as early as $3^{rd}$ grade with 11% of districts, but does not peak until high school with 78% of districts providing this instruction (Figures 2, p. 83, Figure 4, p. 85, and Figure 7, p. 88). This is noteworthy. With today's students considered "Digital Natives" (Prensky, 2005), it is imperative that keyboarding and basic computer skills be taught as soon as possible. There is an abundance of research to support keyboarding instruction, starting when the students reach age 10-12 (Andelore, 2001; Bartholome, n.d.; Draus, 2002; Erthal, 2002; Haug, 2002; ITEA, 2002; Jennings, 2001; Mairs, 2004; Peterson, 2005; Shafer, 2002; Wells, 2003; Yopp, 2003). This is the target age group. If not started in the elementary grades, it is a must in the middle/junior high grades.

When the keyboarding data for Allegheny County is compared to Jennings (2001, p. 47) data on National Keyboarding trends, the data reveals that Allegheny County districts are initially outpacing the nation in the elementary and middle level grades. However, a severe discrepancy occurs at the high school level. Jennings national data reports 9% of high schools offer keyboarding, while Allegheny County peaks with 78%, as shown in Figure 8. By high school, students should already have keyboarding skills. The high percentage in Allegheny County may be due to a 2001 change in business teacher certification for Pennsylvania. Prior to 2001, business teacher certification was limited to secondary schools. In 2001, the certification was changed to K-12. For teachers with the older secondary certification, providing instruction to younger students is often met with trepidation. As these experienced business teachers retire, they are replaced with teachers that carry K-12 certification, and are better prepared to teach younger students.

By the ninth grade, students should have already obtained keyboarding skills. If not taught until high school, many students have already developed poor keyboarding habits from blogging, instant messaging, e-mail messaging, and participating in chat rooms. These habits must first be broken, or unlearned, so that proper keyboarding skills can be learned, thereby prolonging the process.

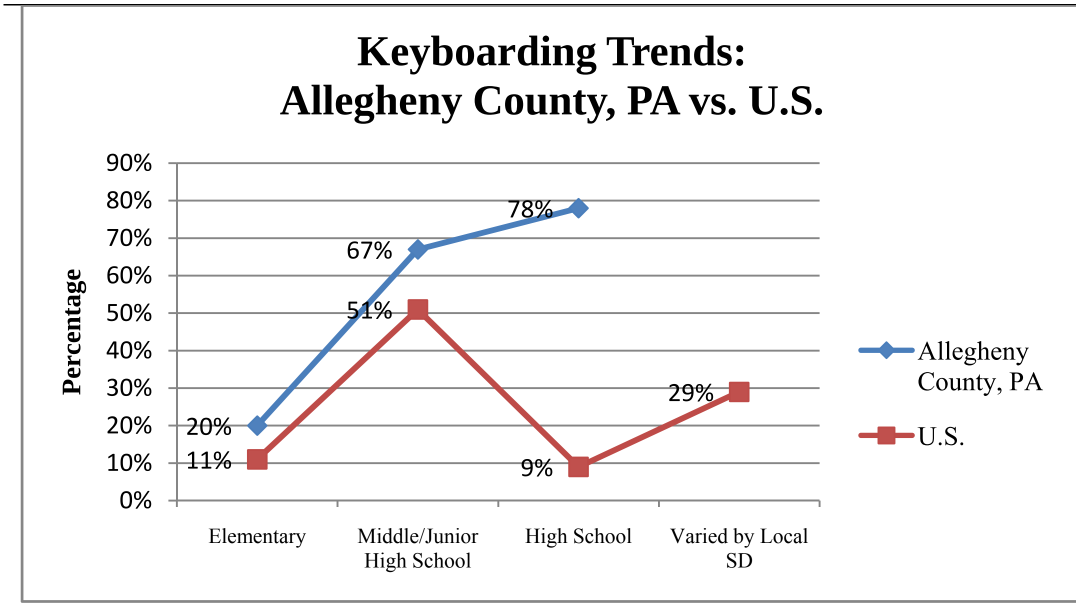


*Figure 8.* Keyboarding Trends: Allegheny County, Pennsylvania vs. U.S.

In the middle/junior high school grades, the results are discouraging. By this age, all students must start keyboarding or continue to build their computer skills. Of all districts in Allegheny County, the highest percent of districts that offer keyboarding/word processing in the middle school grades is 67% (Figure 5, p. 86). Although primary concentration is on keyboarding and introduction of the Microsoft Office Suite, the keyboarding percentage should be much higher.

The importance of technology education with this age group is further evidenced by the requirements of No Child Left Behind. With the requirement of becoming technologically literate by the end of grade 8, many districts are falling short. All school districts should include keyboarding and the Microsoft Office Suite in these grades levels so that they are better prepared for high school courses that require and build critical thinking skills. The Partnership for 21st Century Skills, The Road to 21st Century Learning (n.d.) reports that "eighth grade technology literacy is just a starting point – and a crucial way to get to the other high-level knowledge and skills essential for the 21st century" (p. 10).

For Allegheny County school districts, instruction in the Microsoft Office Suite as a subject is prevalent. It starts as early as grade 6, but does not peak until high school. The peak should occur in grades six through eight. In the high school grades, only half (52%) of high schools offer an advanced course on the Microsoft Office Suite. Allegheny County is sorely lacking in certification courses, whether it is software certification such as MOS or ICDL (19%), or hardware/network certification like A+ (15%). These are areas that need to be improved to prepare graduates that enter the job force. Certification is an advantage for entry level job applicants, whether it is MOS, ICDL or IC3 for office workers, or A+ certification or Cisco/Oracle Academy for entry level computer technicians.

Some districts do offer more advanced courses such as desktop publishing (44%) and multimedia/web page design (91%). However, only 39% minimally offer an introductory computer programming course, and only 30% offer at least a second computer programming course. These are precisely the types of courses needed; they concentrate on developing problem-solving and critical thinking skills. Figure 7 (p. 88) provides the trend data for courses offered at the high school level.

Although some districts are making an effort to prepare their students to become successful citizens in the 21st Century, Allegheny County, Pennsylvania, districts are not currently heeding the advice of experts in the field. Many districts are focusing on basic computer skills such as keyboarding and introduction of the Microsoft Office Suite at the high school level, when these courses should be offered at earlier ages. With access to computer technology at younger ages, students are prepared to embrace technology earlier.

Armed with this information, administrators and teachers should take the lead and revitalize their curriculum to meet the needs of students and prepare them for a technologically advanced world. The trends indicate that progress is being made. School districts are teaching basic skills in the elementary grades, but it's not enough. If these trends are indicative of the rest of the nation, more focus needs to be given to the middle/junior high school level to build on previous skills and lay the foundation so that high school instruction can concentrate on the courses that develop higher-order and problem-solving skills supported by research.

The final, formal curriculum presented here should not be construed as a model curriculum. A model curriculum for all school districts simply does not exist. Every school district is different, with an exclusive student body with exceptional needs. Each district will have unique factors that influence curriculum decisions, such as the 6-day rotation at West Allegheny School District. The needs of the student body and the skills needed upon graduation must be the paramount considerations for all curriculum decisions. Appendix K is provided as the viable solution for the computer technology curriculum dilemma faced by the West Allegheny School District.

*Recommendations for Further Study*

As the first official Information and Communications Technology curriculum for West Allegheny School District, it would be interesting to follow the freshman class of the 2007-2008 school year through graduation. The student perspective on the effectiveness of the new curriculum could then be determined. The curriculum development process utilized by the district included administrators, teachers, and the researcher as observer and participant. Although the needs of the student body were of paramount importance, no students were actively involved in this process. Interviews and surveys could be used to determine the student's perception of the effectiveness of the new curriculum.

Using the collected curricular data, it would also be interesting to see how Allegheny County, Pennsylvania, compares to the remainder of the state, or another major population center to see if the computer technology curriculum trends reported here are isolated to Allegheny County or are more widespread.

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Appendix A

**LETTER OF APPROVAL FROM THE WEST ALLEGHENY SCHOOL DISTRICT**

# West Allegheny School District

FINDLAY TOWNSHIP • NORTH FAYETTE TOWNSHIP • OAKDALE BOROUGH

May 31, 2006

Dear Dr. Semich,

It would be a pleasure to work with Mrs. Kelly Shaffer as she participates in Robert Morris University's doctoral program in Instructional Management and Leadership. The West Allegheny School District will be writing a K-12 technology curriculum in alignment with Pennsylvania Standards and National Educational Technology Standards during the 2006-2007 academic year. Mrs. Shaffer's contributions would be appreciated as the District addresses technology operations, concepts, assessment and evaluation, and professional practice. It would be beneficial if Mrs. Shaffer contact my office in August in order to prepare for her participation in this curriculum initiative.

Sincerely,

Christine Assetta

Christine Assetta, Ed.D.

cc: Mrs. Kelly Shaffer

**Christine Assetta, Ed.D.**, Assistant to the Superintendent for Curriculum and Instruction
P.O. Box 55 • Imperial PA 15126 • (724) 695-5271

Appendix B

## WEST ALLEGHENY SCHOOL DISTRICT – BUSINESS AND COMPUTER TECHNOLOGY CURRICULUM FOR THE 2006-2007 SCHOOL YEAR

**WEST ALLEGHENY SCHOOL DISTRICT**
**COMPUTER TECHNOLOGY CURRICULUM**
**2006-2007**

**Middle School:**

- Students are in a computer class for 41 minutes every 6th school day.
- This is every 8 days.
- Students are having computer in 6th, 7th and, 8th grades.
- A total of 30-32 classes per year, with assemblies, field trips, and testing.
- Students are pulled out for resource, other academic classes, alternative education, meetings, and Honor's Night assemblies.
- Students are graded on a Pass/Fail Basis.
- Class has no weight on the student's GPA.

- Students will report to computers for one nine week grading period during grades 6, 7, 8.
- Students will be graded with the A, B, C, D, F grading scale.
- Students will demonstrate proficiency at the end of each nine-week period.

- Students in 6th grade would have computer class 7th, 8th or 9th period. 9th period is an activity period. Periods 7 and 8 are for specials, study halls and gym class.
- Students in 7th grade would have computer class 3rd, 4th, or 9th. Periods 3 and 4 are specials, gym, and study halls. 9th Period is an activity period.
- Students in 8th grade would have computer class, 1st, 2nd, or 5th period. Periods 1 and 2 are specials, study halls, or gym. Period 5 is a study hall, drama, yearbook or band.
- Students in 9th grade will be required to complete a yearlong course which would build upon the introductory skills acquired in 6, 7, 8 grade.

- Eventually, demonstrating proficiency in technology will become part of No Child Left Behind.
- Students are using My Access and have not received the proper instruction on keyboarding. This is hindering their writing scores and leads to frustration for the students as well as prolonging the testing process.
- Technology use has become an integral part of every job at every level and is needed to develop a well-rounded individual and competent citizen in today's society.

# 6th GRADE-MAJOR UNITS AND SPECIAL ACTIVITIES:

## HARDWARE AND OPERATING SYSTEMS (1 week)

- M- Log on and off
- M- Use menu options and commands
- M- Work with more than one software application:
- I- Demonstrate use of computer hardware
- I- Use a variety of input and output devices
- I AND R- Identify key hardware and software terms
- I AND R- Printing options
- I- Laptop descriptions
- I- SHARED DRIVES

## KEYBOARDING: (4 weeks)

- R- Home Row Keys
- I- Learn the Alpha Keys (alphabet keys)
- R- Use proper keyboarding posture and strokes
- M- Use Typing Time to learn these skills (already at the Middle School)

## WORD PROCESSING: (2 weeks)

- R- Terms: Menu bar, task bar, toolbars, ruler, margins, orientations, landscape, portrait
- R- Format Font styles, colors, and size
- M- Spelling and Grammar Check
- M- Page orientations/layouts
- M- Printing a document
- R- Setting Margins and Tabs
- I- Advanced formatting and Publishing skills
- I- Use templates to create letters, memos, reports, etc.

## FILE MANAGEMENT: (2 weeks)

- M- Save a file
- M- Difference between save and save as
- M- Open a file
- M- Create a new file
- R- Create a folder
- R- Copy and paste items/Cut and paste items
- R- Identify files
- R- Window resizing
- R- Save to a folder
- R- Place documents in a folder
- I- Switch locations of files from folders

- I- Deleting files
- I- Renaming a file
- M- Opening Drives
- I- Searching for files or folders
- R- Terms: desktop, desktop shortcuts, icons, drive, files, folders, task bar, Properties menu

## ETHICS: (ongoing)

- Follow district Acceptable Use Policy and Netiquette rules

## INTERNET: (1 Week)

- I- Using word with the Internet for Research and Reporting
- R- Citing Internet Sources
- R- Online Safety
- I- Visit appropriate middle level history, mathematical, geography and science sites.
- I- Basic searching Tools

# 7TH GRADE- MAJOR UNITS AND SPECIAL ACTIVITIES:

**INTERNET: (1/2 week)**

- M- Basic Search Techniques
- R- citing sources http://www.apastyle.org/elecref.html- http://search3.apa.org/results.cfm
- R- Using the Internet for Research

**KEYBOARDING: (2 weeks)**

- M- Continue with the alpha key mastery
- I- Introduce number and symbol keys
- R- Skill Building (increasing speed and accuracy)

**CONTINUE MICROSOFT WORD: (1 week)**

- R- Skill building with keyboarding while typing a report
- R- Basic document formatting (report, letter, title page, bibliography)
- R- Using Templates

**INTRO TO MICROSOFT EXCEL: (1 ½ weeks)**

- R- Terms: spreadsheets, workbooks, cells, columns, cell reference
- M- Build formulas
- M- Format rows, columns, and cells
- I- Create Graphs
- I- inserting functions

**INTRO TO MICROSOFT POWERPOINT: (2 weeks)**

- M- Format backgrounds,
- M- Insert Slides
- M- Slide Layouts
- I- Slide Master
- R- Viewing slides and shows
- R- Inserting photos
- R- Inserting text boxes

# 8th GRADE- MAJOR UNITS AND SPECIAL ACTIVITIES

**REVIEW: (3 days)**
- Hardware, file management, terms

**CONTINUE WORD APPLICATIONS: (1 week)**
- M- Formatting
- M- Setting up documents
- M- Terms

**CONTINUE SKILL BUILDING: (1 week)**
- M- Timed Typing

**CONTINUE EXCEL: (1 week)**
- M- Review: Graphing, Formatting
- M- Functions
- M- Formulas

**CONTINUE POWERPOINT: (2 weeks)**
- M- formatting backgrounds, inserting slides, changing layouts
- R- Text boxes and photo formatting.
- I- sounds and photos from a file.
- I- animations, transitions, timings
- I- recording voices

**ETHICS: (ongoing)**

**INTERNET: (1 ½ weeks)**
- M- Searching
- I- Identifying addresses
- I- Identifying good/poor web pages or sources- evaluating

**INTRODUCTION TO PUBLISHER: (1 ½ weeks)**
- I- Terms
- I- Creating a brochure

**INTRODUCTION TO FRONTPAGE: (1 ½ weeks)**
- I- Terms
- I- Creating and designing a basic web page.

# ISTE national educational technology standards for students

**Grades 6-8**

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.

2. Demonstrate knowledge of current changes in information technologies and the effect those changes have on the workplace and society.

3. Exhibit legal and ethical behaviors when using information and technology and discuss consequences of misuse.

4. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.

5. Design, develop, publish and present products (web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.

6. Collaborate with peers, experts, and others, using telecommunications and collaborative tools to investigate curriculum-related problems, issues, and information, and to develop solutions or products for audiences inside and outside the classroom.

7. Select and use appropriate tools and technology resources to accomplish a variety of tasks and solve problems.

8. Demonstrate an understanding of concepts underlying hardware, software, and connectivity, and of practical applications to learning and problem solving.

9. Research and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.

**High School Courses:**

**ACCOUNTING I, WITH AUTOMATION [0606] 10, 11, 12 YEAR 1 CREDIT**

The general objectives of Accounting I are to teach the student basic accounting procedures so that he or she may develop a better understanding of business activities and an appreciation of the values and possibilities of accounting for personal needs, vocational preparation, and for preparation for further study. Automated Accounting Projects will be integrated throughout the course. A hands-on approach provides understanding of the automated accounting systems. Previous computer experience is **not** necessary.

**ACCOUNTING II, WITH AUTOMATION [0608] 11,12 YEAR 1 CREDIT**

Students will learn accounting concepts and practices related to departmentalized, accounting vouchers, inventories, general accounting adjustments and corporate accounting. This course is recommended for any student planning to major in business or accounting in college.

***Prerequisite:*** *A passing grade in Accounting I or the permission of the instructor*

**ACCOUNTING III, WITH AUTOMATION [0609] 12 YEAR 1 CREDIT**

Students will further study accounting concepts and practices related to corporate accounting and be introduced to concepts and practices related to management accounting, cost accounting, budgeting and accounting for not-for-profit organizations. This course is recommended for any student planning to major in accounting in college.

***Prerequisite:*** *A passing grade in Accounting II or the permission of the instructor.*

***Keyboarding and Word Processing I are recommended for ALL students.***

**✷ KEYBOARDING [0610] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students will learn to type using the touch type method on personal computers using Microsoft Office Word software. They will learn to set up documents that include letters, envelopes, reports, and simple tables. Development of good work habits is emphasized.

**✷Must be taken with Word Processing I. Students MUST REGISTER for both courses.**

**✷ WORD PROCESSING I [0612] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students will learn the Microsoft Office Word software package to generate documents using merge, tables, formatting, printing, and editing. Development of good work habits is emphasized.

***Prerequisite:*** *Passing grade in Keyboarding*

**✷This course must be taken with Keyboarding. Students MUST REGISTER for both courses.**

**WORD PROCESSING II [0604] 10, 11, 12 YEAR 1 CREDIT**

Students will work with the Microsoft Office Word software package to learn advanced features such as macros, special print features, sorting, tables, graphics, merging, and templates. This course will include a job simulation as a year-end project. **Development of good work habits is emphasized.**

***Prerequisite:*** *Passing grade in Keyboarding and Word Processing I*

**▼DATABASE [0616] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students will learn how to use a current database software package to create, enhance, design, and print database files. Updating, searching, editing, indexing, and sorting are basic concepts that will be taught. More advanced concepts of reports, letters, labels, custom screens and queries will also be explored.

***Keyboarding experience is helpful, but not required.***

**▼This course must be taken with Spreadsheets. Students MUST REGISTER for both courses.**

**▼SPREADSHEETS [0618] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students will learn how to use a current software package to create, enhance, design and print worksheets. Functions, advanced formulas, charts and maps are other topics taught. **This one semester course is recommended for any student planning to attend college.**

***Keyboarding experience is helpful, but not required.***

**▼This course must be taken with Database. Students MUST REGISTER for both courses.**

**DESKTOP PUBLISHING I [0620] 10, 11, 12 YEAR 1 CREDIT**

Students will learn how to design flyers, newsletters, programs, certificates and brochures using Microsoft Publisher. Students will be able to create a newspaper as part of this course.

**DESKTOP PUBLISHING II [0621] 11, 12 YEAR 1 CREDIT**

Students will create in-house publications such as programs, flyers, brochures, schedules, invitations, advertisements, newsletters, etc. Students will also create and publish a newspaper for distribution to High School students as part of this course.

***Prerequisite:*** *Completion of Desktop Publishing I with a minimum of a "B" average or Teacher permission*

**✦POWERPOINT [0623] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students will learn how to use Microsoft PowerPoint. PowerPoint is a complete presentation graphics program that allows you to produce professional-looking presentations. PowerPoint gives you the flexibility to make informal presentations using overhead transparencies, or make electronic presentations using a projection device attached to a personal computer.

**✦This course must be taken with Web Page Design. Students <u>MUST REGISTER</u> for both courses.**

**✦WEB PAGE DESIGN [0624] 9, 10, 11, 12 SEMESTER .5 CREDIT**

Students in this course will use FrontPage software to create web pages. Topics will include: planning and creating Web pages, adding and formatting content, creating forms, creating lists with numbers and bullets, incorporating images, creating hypertext links between and within pages, and applying themes.

**✦This course must be taken with PowerPoint. Students <u>MUST REGISTER</u> for both courses.**

**ADDITIONAL COMPUTER COURSES ARE AVAILABLE THROUGH THE COMPUTER SCIENCE DEPARTMENT.**

# COMPUTER SCIENCE

**COMPUTER APPLICATIONS [0330] 9, 10, 11, 12 YEAR 1 CREDIT**
**WITH IMAGE DESIGN, HTML, AND JAVASCRIPT**

This course will introduce students to image design using Adobe Photoshop and JavaScripts basic concepts. HTML organization and power techniques will teach students how to program web pages and insert custom images. Students will also explore database, spreadsheets, and presentation software using Microsoft Office.

KEYBOARDING EXPERIENCE IS HELPFUL, BUT **NOT** REQUIRED FOR THIS COURSE.

**COMPUTER PROGRAMMING I [0332] 10, 11, 12 YEAR 1 CREDIT**
**Fundamentals of Computer Programming**

This hands-on course provides a comprehensive introduction to programming and builds a solid foundation of programming skills that can be used with any programming language. Students will write, compile, and debug programs in JAVA. Topics include: data types and variables, operators and expressions, input/output, programming logic, functions, and introduction to object-oriented programming.

**Note:** Great language for the following majors in college: Business/Computer Science/Engineering.

***Prerequisite for students in 9th Grade:*** *Must be enrolled in* ***Honors Geometry.***
**No prerequisite for 10, 11, 12**

**COMPUTER PROGRAMMING II [0334] 10, 11, 12 YEAR 1 CREDIT**
**Visual Basic Net**

This course is designed to introduce the student to object-oriented programming. An introduction to all the major features of Visual Basic (designing a User Interface, creating fancy pull-down menus within the Windows environment). This will enable students to write programs within the Windows environment utilizing pull-down menus, dialog boxes, and scrollable windows. Students will be able to draw the appearance of their program first in Windows, and focus on making the program perform to solve problems in a graphic form.

***Prerequisite:*** *"B" or higher in Computer Programming I or Teacher permission*

CAN BE TAKEN FOR 3 CREDITS FROM THE UNIVERSITY OF PITTSBURGH COLLEGE IN HIGH SCHOOL PROGRAM.

**COMPUTER PROGRAMMING III [0336] 11, 12 YEAR 1 CREDIT**
**Java Object Oriented Programming**

This course is a continuation of Programming I and II. The students will gain a solid grasp of the object-oriented features of Java programming. Topics include: classes, arrays and recursion. Material covers AP compliant information for the A level testing. **Note**: A must for college bound Computer Science/Engineering Majors.

CAN BE TAKEN FOR 3 CREDITS FROM THE UNIVERSITY OF PITTSBURGH COLLEGE IN HIGH SCHOOL PROGRAM.

***Prerequisites:*** *Programming I and II or Teacher permission*

**ADVANCED COMPUTER TECHNOLOGIES [0622] 10, 11, 12 YEAR 1 CREDIT**

This course is designed for students who have passed Programming I and have the desire to learn about the hardware "guts" of the machine. The objectives of this course are listed below.

- Students will identify and assemble the components of a PC computer.
- Students will assemble and manage a LAN using 10baseT networking software.
- Students will identify and modify the BIOS settings of three different PC models.
- Students will respect Internet protocols, construct a WEB page and interact in a responsible manner on the Internet.
- Students will troubleshoot hardware and software problems on personal computers.
- Students will identify, install and configure three different operating systems.

***Prerequisite:*** *Programming I*

**ADDITIONAL COMPUTER COURSES ARE AVAILABLE THROUGH THE BUSINESS EDUCATION DEPARTMENT.**

Appendix C

**THE ASSOCIATION FOR COMPUTING MACHINERY, INC. MODEL CURRICULUM FOR K-12 COMPUTER SCIENCE**

## 3. A Comprehensive Model Curriculum

Building on the lessons of the past and the needs of the present and the future, we propose a four-level model curriculum for K-12 computer science that focuses on fundamental concepts and has the following general goals:

1. The curriculum should prepare students to understand the nature of computer science and its place in the modern world.
2. Students should understand that computer science interleaves principles and skills.
3. Students should be able to use computer science skills (especially algorithmic thinking) in their problem-solving activities in other subjects. One simple example is the use of logic for understanding the semantics of English in a language arts class. There are many others.
4. The computer science curriculum should complement IT and AP computer science curricula in any schools where they are currently offered.

If a K-12 computer science curriculum is widely implemented and these goals are met, high school graduates will be prepared to be knowledgeable users and critics of computers, as well as designers and builders of computing applications that will affect every aspect of life in the 21st century.

The overall structure of this model is shown in figure 1. As this figure suggests, our model has four different levels, whose goals and content are introduced below.

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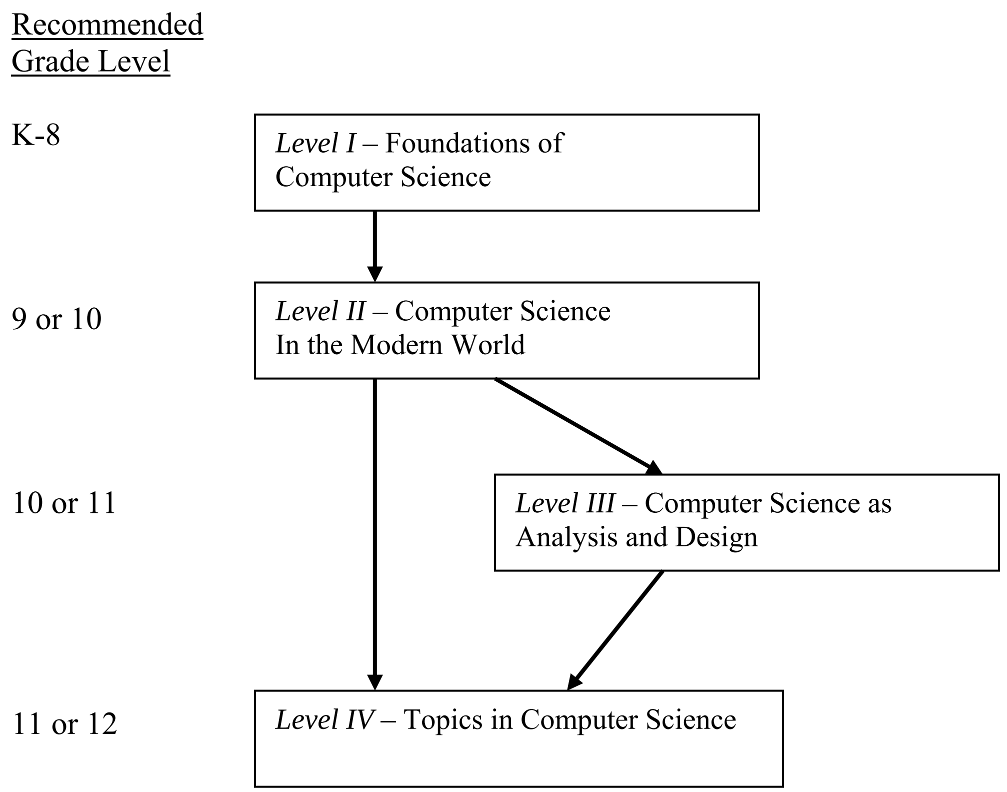


**Figure 1. Structure of a K-12 Computer Science Curriculum**

*Level I* (recommended for grades K-8) should provide elementary school students with foundational concepts in computer science by integrating basic skills in technology with simple ideas about algorithmic thinking. This can be best be accomplished by adding short modules to existing science, mathematics, and social studies units. A combination of the NETS (ISTE, 2002) standards and an introduction to algorithmic thinking (as offered, for instance, by Logo (Papert, 1980) or other hands-on experiences (Bell, 2002) would ensure that students meet this goal.

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Students at *Level II* (recommend for grade 9 or 10) should acquire a coherent and broad understanding of the principles, methodologies, and applications of computer science in the modern world. This can best be offered as a one-year course accessible to all students, whether they are college-bound or workplace-bound. Since, for most students, this *Level II* course will be their last encounter with computer science, it should be considered essential preparation for the modern world.

Students who wish to study more computer science may elect the *Level III* (recommended for grade 10 or 11) course, a one-year elective that would earn a curriculum credit (e.g. math or science). This course continues the study begun at Level II, but it places particular emphasis on the scientific and engineering aspects of computer science – mathematical principles, algorithmic problems-solving and programming, software and hardware design, networks, and social impact. Students will elect this course to explore their interest and aptitude for computer science as a profession.

Finally, the *Level IV* (recommended for grade 11 or 12) offering is an elective that provides depth of study in one particular depth of study in one particular area of computer science. This may be, for example, an AP computer science (AP, 2002) course, which offers depth of study in programming and data structures. Alternatively, this offering may be a projects-based course in multimedia design of a vendor-supplied course that leads to professional certification. Any Level IV course will naturally require the Level II course as a prerequisite, and some will require the Level III course as well.

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The following subsections provide more detailed discussions of the topics and courses that can be offered at each of these four levels.

### 3.1 Level I – Foundations of Computer Science

Because the foundations of computer science have a major information technology component, it is important here to reaffirm the need for technology support in the K-12 classroom.[3] Successful integration of technology to support learning goals depends upon several factors:

- vision and leadership for successful implementation and long-term success.
- access to physical resources (hardware and software).
- physical arrangement of those resources in accessible learning spaces.
- time and incentives to support classroom-relevant professional development opportunities for educators.
- time for planning effective integration into new and existing curricula.
- time for reviewing and evaluating new technologies and resources, and
- ongoing financial support for a sustained technology infrastructure.

It also depends upon a clear vision of what expectations are necessary and appropriate at every level. In this document we explore a number of different levels of computer science education throughout the K-12 years. It is clear to us that whatever is achieved in high school depends upon the effectiveness of student access to technology and

[3] Too frequently, new and complex expectations are downloaded onto classroom teachers without a realistic consideration of the resources available to teachers to achieve these expectations. Often, there is an assumption that technology itself is the panacea, and so, little consideration is given to preparing teachers to use the technology effectively and in support of their own teaching and learning goals.
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achievement of computer-related learning milestones at the elementary level. So if elementary schools provide students with these first building blocks of computer fluency, secondary schools will be able to implement more comprehensive computer science programs themselves.

### 3.1.a Topics and Goals

The National Educational Technology Standards (NETS) (ISTE, 2002) provide an excellent starting place for defining requirements for elementary student preparedness in computer science.[4]

To live and work successfully in an increasingly information-rich society, K-8 students must learn to use computers effectively and incorporate the idea of algorithmic thinking into their daily problem-solving vocabulary. To ensure these outcomes, schools must provide computing tools that enable students to solve problems and communicate using a variety of media; to access and exchange information; compile, organize, analyze, and synthesize information; draw conclusions and make generalizations from information gathered; understand what they read and locate additional information as needed; become self-directed learners; collaborate and cooperate in team efforts; analyze a problem and develop an algorithmic solution; and interact with others using computers in ethical and appropriate ways.

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[4] These standards were originally developed by the International Society for Technology Education (ISTE) as part of an ongoing effort to enable stakeholders in Pre-K-12 education to develop national standards for educational uses of technology.
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Except in the context of mathematics education, this particular topic area is not a conventional part of the K-8 curriculum. That is, the concept of algorithm is used only to teach students the steps of arithmetic (addition, multiplication) and other basic mathematical ideas. However, the notion of algorithm affects students in a much richer array of problem-solving situations that they encounter in their lives.

In its simplest form, an algorithm is a method for solving a problem in a step-by-step manner. So children learn about algorithmic problem solving whenever they discover a collection of steps that can be carried out to accomplish a task. These steps should accommodate unusual contingencies (using conditional, or "if" statements) and repetitions (using loops, or "while" statements). Viewed in this way, algorithmic thinking is not simply a means to help children understand mathematic concepts – it has a much richer range of uses. Here are a few example problems that illustrate this point and would be appropriate at the K-8 level.

Give a complete algorithmic definition for:

1. finding your way out of a maze (Turtle graphics, robotics)
2. a dog retrieving a thrown ball
3. baking cookies
4. going home from school
5. making a sand castle
6. arranging a list of words in alphabetical order

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Thus, we agree with teachers who believe that students at this age ought to begin thinking algorithmically as a general problem-solving strategy. What children do, not what they see, may have the greatest impact on learning at the K-8 level. Thus, it makes sense to develop more teaching strategies that encourage students to engage in the process of visualizing an algorithm. Seymour Papert's pioneering experiments in the 1980s corroborate this belief, and his seminal work *Mindstorms* and related curricula (Papert, 1980) provide many more examples of how K-8 students can be engaged in algorithmic thinking. Additional examples of computer science topics appropriate for the K-8 level are included in the next section.

### 3.1.b Grade-Level Breakdown

To ensure that students achieve these goals, we paraphrase here the NETS model (ISTE, 2002), which identifies different sets of outcomes for three different groups of students: grades K-2, grades 3-5, and grades 6-8. We have augmented that model by adding outcomes that engage students with algorithmic thinking and other foundational elements of computer science.

*Grades K-2*: Upon completion of grade 2, students will:

1. Use standard input and output devices to successfully operate computers and related technologies.
2. Use a computer for both directed and independent learning activities.

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3. Communicate about technology using developmentally appropriate and accurate terminology.
4. Use developmentally appropriate multimedia resources (e.g. interactive books, educational software, elementary multimedia encyclopedias) to support learning.
5. Work cooperatively and collaboratively with peers, teachers, and others when using technology.
6. Demonstrate positive social and ethical behavior when using technology.
7. Practice responsible use of technology systems and software.
8. Create developmentally appropriate multimedia products with support from teachers, family members, or student partners.
9. Use technology resources )e.g., puzzles, logical thinking programs, writing tools, digital cameras, drawing tools) for problem solving, communication, and illustration of thoughts, ideas, and stories.
10. Gather information and communicate with others using telecommunications, with support from teachers, family members, or student partners.
11. Understand how 0s and 1s can be used to represent information, such as digital images and numbers.
12. Understand how to arrange (sort) information into useful order, such as a telephone directory, without using a computer.

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*Grades 3-5*: Upon completion of grade 5, students will:

1. Be comfortable using keyboards and other input and output devices, and reach an appropriate level of proficiency using the keyboard with correct fingering.
2. Discuss common uses of technology in daily life and the advantages and disadvantages those uses provide.
3. Discuss basic issues related to responsible use of technology and information, and describe personal consequences of inappropriate use.
4. Use general-purpose productivity tools and peripherals to support personal productivity, remediate skill deficits, and facilitate learning throughout the curriculum.
5. Use technology tools (e.g., multimedia authoring, presentation, Web tools, digital cameras, scanners) for individual and collaborative writing, communication, and publishing activities to create presentations for audiences inside and outside the classroom.
6. Use telecommunications efficiently to access remote information, communicate with others in support of direct and independent learning, and pursue personal interests.
7. Use online resources (e.g. calculators, data collection probes, video, educational software) for problem-solving, self-directed learning, and extended learning activities.

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8. Use technology resources (e.g., calculators, data collection probes, videos, educational software) for problem-solving, self-directed learning, and extended learning activities.
9. Determine which technology is useful and select the appropriate tool(s) and technology resources to address a variety of tasks and problems,
10. Evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias that occur in electronic information sources.
11. Develop a simple understanding of an algorithm, such as text compression, search, or network routing, using computer-free exercises.

*Grades 6-8*: Upon completion of grade 8, students will:

1. Apply strategies for identifying and solving routine hardware and software problems that occur during everyday use.
2. Demonstrate knowledge of current changes in information technologies and the effects those changes have on the workplace and society.
3. Exhibit legal and ethical behaviors when using information and technology and discuss consequences of misuse.
4. Use content-specific tools, software, and simulations (e.g., environmental probes, graphing calculators, exploratory environments, Web tools) to support learning and research.
5. Apply productivity/multimedia tools and peripherals to support personal productivity, group collaboration, and learning throughout the curriculum.

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6. Design, develop, publish, and present products (e.g., Web pages, videotapes) using technology resources that demonstrate and communicate curriculum concepts to audiences inside and outside the classroom.
7. Collaborate with peers, experts, and others using telecommunication tools to investigate educational problems, issues, and information, and to develop solutions for audiences inside and outside the classroom.
8. Select appropriate tools and technology resource to accomplish a variety of tasks and solve problems.
9. Demonstrate an understanding of concepts underlying hardware, software, algorithms, and their practical applications.
10. Discover and evaluate the accuracy, relevance, appropriateness, comprehensiveness, and bias of electronic information sources concerning real-world problems.
11. Understand the graph as a tool for representing problem states and solutions to complex problems.
12. Understand the fundamental ideas of logic and its usefulness for solving real-world problems.

### 3.2 Level II – Computer Science in the Modern World

This is a one-year course (or the equivalent) that would be accessible to all students, whether they are college-bound or workplace-bound. The goals of this course is to

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provide all students with an introduction to the principles of computer science and its place in the modern world. This course should also help students to use computers effectively in their lives, thus providing a foundation for successfully integrating their own interests and careers with the resources of a technological society.

In this course, high school students can acquire a fundamental understanding of the operation of computers and computer networks and create useful program implementing simple algorithms. By developing Web pages that include images, sound, and text, they can acquire a working understanding of the Internet, common formats for data transmission, and some insights into the design of the human-computer interface. Exposure to career possibilities and discussion of ethical issues relating to computers should also be important threads in this course.

Prior to this course, students should have gained experience using computers, as would normally occur at Level I. They should have used, modified, and created, files for a variety of purposes, accessed the Internet and databases for both research and communication, and used other tools such as spreadsheets and graphics. Finally, they should have been introduced to the basic idea of algorithmic thinking and its uses in their daily lives.

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### 3.2.a. Topics and Goals

A major outcome of this course (or its equivalent) is to provide students with general knowledge about computer hardware, software, languages, networks, and their impact on the modern world.[5] That is, since most students at Level II will eventually encounter computers and networks as users, the overarching aim here is to prepare students to master computer science concepts from the user's point of view rather than from the designer's. For instance, the idea that a robot needs a method of acquiring sensory data from its environment draws attention to the general notion of an "input device" beyond the standard keyboard and mouse. Teaching students about various input devices currently in sue should help demystify the general idea of input, and prepare students to be comfortable using devices with which they are not yet familiar.

Students should gain a conceptual understanding of the following topics in computer science:

1. Principles of computer organization and the major components (input, output, memory, storage, processing, software, operating system, etc.)
2. The basic steps in algorithmic problem-solving (problem statement and exploration, examination of sample instances, design, program coding, testing and verification).

[5] Coincidentally, students will acquire proficiency with a current computer model and programming language, but that is not the main goal of this course.
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3. The basic components of computer networks (servers, file protection, routing, protocols for connection/communication, spoolers and queues, shared resources, and fault-tolerance).
4. Organization of Internet elements. Web page design (forms, text, graphics, client- and server-side scripts), and hypermedia (links, navigation, search engines and strategies, interpretation, and evaluation).
5. The notion of hierarchy and abstraction in computing, including high-level languages, translation (compilers, interpreters, linking), machine languages, instruction sets, and logic circuits.
6. The connection between elements of mathematics and computer science, including binary numbers, logic sets, and functions.
7. The notion of computers as models of intelligent behavior (as found in robot motion, speech and language understanding, and computer vision), and what distinguishes humans from machines.
8. Examples (like programming a telephone answering machine) that identify the broad interdisciplinary utility of computers and algorithmic problem solving in the modern world.
9. Ethical issues that relate to computers and networks (including security, privacy, intellectual property, the benefits and drawbacks of public domain software, and the reliability of information on the Internet), and the positive and negative impact of technology on human culture.

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10. Identification of different careers in computing and their connection with the subjects studies in this course (e.g., information technology specialists, Web page designer, systems analyst, programmer, CIO).

**3.2.b. Laboratory Work: Algorithms, Programming, and Web Page Design**

Students in this course should gain experience designing algorithms and programming to a variety of computational problems. While the choice of programming language and environment is up to the instructor, the algorithmic design and programming component of the course should include the following:

- Variables, data types, and the representation of data in computers
- Managing complexity through top-down and object-oriented design
- Procedures and parameters
- Sequences, conditionals, and loops (iteration)
- Tools for expressing design (flowcharts, pseudocode, UML, N-S charts)

The Web page design component of this course should cover the following ideas:

- The use of hypertext links to load new pages or activate processes
- Storing, compressing, encrypting, and retrieving image, video, and sound data
- User interface design
- Tools for expressing design (storyboard, site map)

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### 3.2.c  Context and Constraints

Each school system has its own constraints with regard to student scheduling, availability of knowledgeable staff, and computer resources.  Some schools may choose to begin by implementing an elective course that covers only a subset of the above concepts. We believe that, while such initial steps are valuable, they must nonetheless be identifies as first steps toward the ultimate goals of a full course required of all students for graduation.

Finally, it is important to distinguish the goals and themes of this course from those of information technology, especially those that comprise the notion of IT fluency (see section 2.1).  This course provides the first opportunity to view computer science as a coherent field of study and professional engagement.  That is, while IT fluency focuses on technological skills and their uses in other academic subjects, this course is a study of computer science as an academic subject *per se*.

Several example activities that can be used to teach this course are shown in the appendix.

### 3.3 Level III – Computer Science as Analysis and Design

This is a one-year course (or the equivalent) that should earn curriculum credit (e.g., science or math).  The goals of this course is to continue the study of computer science, placing particular emphasis on its features as a scientific and engineering discipline.

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In this course, high school students can go beyond a fundamental understanding of the operation of computers and explore more complex and interesting topics of computer science. This course also helps students improve their problem-solving and programming skills in preparation for the Advanced Placement A course. As in higher level math and science curricula, students will be able to see the connection between the fundamentals they have learned in Levels I and II to integrate programming and design with complex "real world" projects.

### 3.3.a. Topics and Goals

The major goals of this course is for students to develop the computer science skills of algorithm development, problem-solving, and programming while using software engineering principles. While the emphasis of the course will be on programming, students will also be introduced to other important topics, such as interface design, the limits of computers, and societal and ethical issues of software engineering.

By the end of this course, students should understand or have a working knowledge of these topics:

1. Fundamental ideas about the process of program design and problem solving, including style, abstraction, and initial discussions of correctness and efficiency as part of the software design process.
2. Simple data structures and their uses

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3. Topics in discrete mathematics: logic, functions, sets, and their relation to computer science
4. Design for usability: Web page design, interactive games, documentation
5. Fundamentals of hardware design
6. Levels of language, software, and translation: characteristics of compilers, operating systems, and networks
7. The limits of computing: what is a computationally "hard" problem? (e.g., ocean modeling, air traffic control, gene mapping) and what kinds of problems are computationally unsolvable (e.g., the halting problem)
8. Principles of software engineering: software projects, teams, the software life cycle
9. Social issues: software as intellectual property, professional practice
10. Careers in computing: computer scientists, computer engineer, software engineer, information technologist

**3.3.b. Laboratory Work: Programming, Design, and Other Activities**

Students in this course should gain experience designing algorithms and programming solutions to a variety of computational problems. While the choice of programming language and environment is up to the instructor, the programming component of the course should include the following:

- Methods (functions) and parameters
- Recursion

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- Objects and classes (arrays, vectors, stacks, queues, and their uses in problem-solving)
- Graphics programming
- Event-driven and interactive programming

Hardware and software engineering has several topics that can be introduced during this course and included among its programming projects:

- Hardware and systems: logic, gates and circuits, binary arithmetic, machine and assembly language, operating systems, user interfaces, compilers
- Software engineering: requirements, design, teams, testing and maintenance, documentation, software design tools
- Societal issues in software engineering, limits of computing, levels of languages, computing careers

### 3.3.c. Context and Constraints

Since this is a laboratory-intensive course, students will need regular access to appropriate computing facilities and software. A number of viable programming language alternatives exist, and so we recommend no particular programming language to support this course. Surely, the choice of language depends on local conditions, such as teacher expertise, laboratory hardware configuration, and availability and cost of software support.

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Moreover, this course is intended to be much broader in scope than the AP curriculum, and thus should complement it in a way that is accessible to all students – not just those preparing for college. However, for students who are thinking about taking an AP computer science course at Level IV (see section 3.4), this course can serve as a precursor.

This course is also intended to cover the fundamentals of computer science more broadly than a typical information technology course. While it has elements of IT, this course also introduces students to concepts that are not typically covered in an IT curriculum, such as the limits of computing and data structures.

Example activities that have been used in this kind of course are shown in Appendix A.3.

**3.4 Level IV – Topics in Computer Science**

At this level, interested and qualified students should be able to select one from among several electives to gain depth of understanding or special skills in particular areas of computer science. All of these electives will require the Level II course as a prerequisite, while some may require the Level III course as well. Most important, these courses provide students with an opportunity to explore topics of personal interest in greater depth, and thus prepare for the workplace or for further study at the post-secondary level.

These electives include, but are not necessarily limited to:

- Advancement Placement (AP) Computer Science
- A projects-based course in which students cover a topic in depth.
- A vendor-supplied course, which may be related to professional certification.

These are discussed in more detail below.

### 3.4.a. AP Computer Science

The AP Computer Science curriculum is well established (AP, 2002), and is offered at many secondary schools for students planning to continue their education in a two- or four-year college or university, possibly in computer science, business, or a related field.

Students taking an AP course should have completed Levels I and II. Students entering an AP Computer Science course need to be familiar with the basic algorithmic concepts introduced at those levels. The programming concepts covered in Level III overlap somewhat with the AP course, so some of the AP course can serve as a review if students have had the Level III course.

The curriculum that prepares students for the AP computer science exams provides an excellent foundation for future study. This curriculum has two courses:

- The A course emphasizes problem solving and algorithm development, and introduces elementary data structures. Students who complete the A course and score well on the exam may qualify for one-semester of college credit.

- The AB course extends the foundation of the A course by including more substantial work with data structures and recursive algorithms.

The College Board suggests that the choice between A and AB be left to the school and students. A school might wish to initially offer the A course as it is less comprehensive, and then move toward the AB course as instructor knowledge and entering student levels increase.

In schools that implement this curriculum recommendation, students will arrive at Level IV with a standard background that enables them to be successful in the AB course. Also, high schools need to consider the significant staffing issues implied by this curriculum recommendation, along with the staffing tradeoffs that result from offering 0, 1, or 2 AP course in a setting that also offers the Level II and III courses described above.[6] For example, a school that is neither large nor resource-rich may prefer to offer the Level III course alone, and then supplement that course with additional material that will support a smaller group of students preparing for the AP A exam.
Example modules that can be used to teach this course are shown in the Appendix A.4.

[6] Achieving a high score on the AP A Exam is typically considered to be equivalent to completing a one-semester college course in computer science. Programming language differences between the AP exam and the one taught at a particular college (e.g., C++ vs. Java) may present an issue in granting AP credit for students with high scores. That is, some colleges may require students to repeat the introductory semester(s) so they can continue effectively in the undergraduate computer science major program.
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### 3.4.b. Projects-Based Courses

This kind of course would be available to all students who have completed the Levels I and II curricula. Some variants of this course would also require completion of Level III (see below). This could be either a half-year or a full-year course.

The projects in this kind of course will naturally address diverse student interests and specific faculty expertise. The specific projects that are chosen from year to year will be fluid and will adjust as needed to meet the ever-changing characteristics of computer science and information technology. Ideally, each project should build upon basic computer science concepts and help students develop professional skills in the application of technology.

While some of the project curriculum may be more skills-based, the skills need to be tied to the "behind-the-scenes" activities of the software – particularly how is each task implemented in the software (e.g., what is happening when you click "bold"?). Answering such questions enables students to problem-solve when software does not perform as anticipated. Additional computer science topics are visited throughout these projects.

Here are some projects that could populate such a course. See the Appendix for more details.

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***Example: Desktop Publishing*** This course introduce planning, page layout, and the use of templates to create flyers, documents, brochures, and newsletters. Word processing and graphical editing fluency (Level I) will help ensure student success. Methods of distribution of these documents in both written and electronic formats should be included. This will necessitate understanding of Internet concepts and network connectivity (Level II)>

***Example: Presentation Design*** The ability to communicate and share ideas should be a core requirement for all high school graduates. Communication can be written and/or oral. This type of project focuses on planning a presentation – including outlining, converting the outline into a document, and generating the presentation. Concepts covered include appropriate use of text, colors, graphics, sound, and animations on slides as well as linking within and outside the presentation. Ultimately, students will present to an audience. Fluency with word processing software (Level I) and multimedia concepts (Level II) is required.

***Example: Multimedia*** The use of multimedia is increasing steadily at the user level, fueled by more efficient hardware and the availability of digital cameras and digital audio equipment. However, multimedia is often abused when incorporated into programs, Web pages, and presentations. This project will provide instruction in the use of digital audio and video equipment and related editing software. A major focus will be deploying

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multimedia in a responsible fashion. Basic software skills (Level I) and an understanding of multimedia concepts (Level II) are required.

***Example: Graphics*** This class explores bitmap and vector-based graphics. The discussion includes benefits and limitations of each type of software and hands-on experience with both. CAD, CAM, and 3-D design software should be explored as well as bitmap software for creating and editing of graphics. Availability of a digital camera and scanner is required. Responsible deployment of graphics including style and legal issues needs to be investigated. The discussion of vector-based graphics will be facilitated by completion of Level III – limits of computers and design for usability.

***Example: Design and Development of Web Pages*** At Level II, students are exposed to Internet concepts and HTML. This course presents a more in-depth view of the design and development issues that need to be considered for a multi-platform international implementation. A focus issue is the standardization of Web page development using the recommendations of the WWW Consortium. Web page development is presented and evaluated using text editors, HTML editors, converters, and Web authoring programs.

***Example: Web Programming*** Students who have successfully completed Level III but do not wish to take an AP course might nevertheless enjoy applying their programming skills to the WWW. To be successful, a solid understanding of Internet concepts, Web page design and development issues, and basic programming concepts will be required.

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Topics in this course can include client-side and server-side scripting languages. Students will need to write scripts and deploy them within Web pages or on the Web server.

***Example: Emerging Technologies*** This project can include several distinct topics, and its content is expected to change on a regular basis. An example topic for upcoming years might be XML/XSL and wireless connectivity. These areas can be tied together with a discussion of requirements for the same data to be represented on a PC, personal digital assistant (PDA), and cell phone. Curriculum and materials for this topic would need to be developed from current resources on the Web, perhaps in conjunction with local colleges and universities, and with input from the professional sector of the Business Community.

A sample of some other topics (along with their prerequisites) includes:

- The computer and animation (Level II)
- Networking technologies (Level III)
- Programming simulations (e.g., a computer-controlled chemistry experiment) (Level III)
- Object-oriented design and coding (Level IV – AP computer science)
- Effective use of computer applications (Level II)

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### 3.4.c. Courses Leading to Industry Certification

Such a course is primarily geared toward students planning on entering the workforce, continuing their education in a post-secondary technical school, or entering a two-year college AAS program. Students taking this course should have completed the Level II and Level II courses.

Industry certification provides a standard that is useful to potential employers in evaluating a candidate who has no prior work experience. Industry certifications are either vendor-neutral or vendor-sponsored. Vendor-sponsored curricula need to be evaluated carefully. While rich in content, some of these courses are structured to emphasize proprietary products rather than general concepts. Students who complete certification courses should be encouraged to take the corresponding exam as proof of acquired knowledge. Here are some examples of vendor-neutral certification programs.

***Example: A+ Certified Technician*** "A+ certification signifies that the certified individual possesses the knowledge and skills essential for a successful entry-level (6 months' experience) computer service technician, as defined by experts from companies across the industry" (http://www.comptia.org/certification/a/default.asp). Two different exams are available – software and hardware. Both of these assume that students have gained an understanding of the way a computer works, including hands-on experience. The hardware section includes installation of new equipment and troubleshooting. The software section encompasses various operating systems. The use of critical thinking

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skills to problem-solve is necessary for hardware and software support. These skills reinforce and extend the concepts presented in Levels I and II.

***Example: Certified Internet Webmaster (CIW)*** "CIW certification validates competency in IT industry standards, concepts and best practices; and familiarity with leading hardware and software technology." (http://www.ciwcertified.com/program/about.asp?comm=home&llm=1) The Foundations level exam requires competency in Internet, Web page authoring, and networking fundamentals. These concepts are introduced in Levels I and II. While the scope of the exam is beyond the reach of high school students, its objectives can serve to extend the foundation of the previously discussed related issues.

***Example: i-Net+*** This certification is designed for "individuals interested in demonstrating the baseline of technical knowledge that would allow them to pursue a variety of Internet-related careers. The I-Net+ exam was specifically designed to certify entry-level Internet and e-commerce technical professionals responsible for participating in the maintenance of Internet, Intranet and Extranet infrastructure and services as well as the development of Web-related applications" (http://www.computer-certification-training.com/CompTIA/inet/i-net.html).
More detailed information about these and other certification programs, both vendor-specific and vendor-neutral, can be found at http://www.computer-certification-training.com/index.html.

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Appendix D

**THE PENNSYLVANIA ACADEMIC STANDARDS FOR SCIENCE AND TECHNOLOGY**

# Academic Standards for Science and Technology

*Pennsylvania Department of Education*

## Academic Standards for Science and Technology

# VII. TABLE OF CONTENTS


**Introduction**.......................................................... **VIII.**

**THE ACADEMIC STANDARDS**

**Unifying Themes** .............................................. **3.1.**
*A. Systems*
*B. Models*
*C. Patterns*
*D. Scale*
*E. Change*

**Inquiry and Design** ............................................. **3.2.**
*A. Nature of Scientific Knowledge*
*B. Process Knowledge*
*C. Scientific Method*
*D. Problem Solving in Technology*

**Biological Sciences** ............................................. **3.3.**
*A. Living Forms*
*B. Structure and Function*
*C. Inheritance*
*D. Evolution*

**Physical Science, Chemistry and Physics** .................. **3.4.**
*A. Matter*
*B. Energy*
*C. Forces and Motion*
*D. Astronomy*

**Earth Sciences** .................................................... **3.5.**
*A. Land Forms and Processes*
*B. Resources*
*C. Meteorology*
*D. Hydrology and Oceanography*

**Technology Education** ......................................... **3.6.**
*A. Biotechnology*
*B. Information Technology*
*C. Physical Technologies*
*(Construction, Manufacturing, and Transportation)*

**Technological Devices** ......................................... **3.7**
*A. Tools*
*B. Instruments*
*C. Computer Operations*
*D. Computer Software*
*E. Computer Communication Systems*

## Academic Standards for Science and Technology

**Science, Technology and Human Endeavors ……………....** **3.8.**

*A. Constraints*

*B. Meeting Human Needs*

*C. Consequences and Impacts*

**Glossary ………………………………………..……………...** **IX.**

# Academic Standards for Science and Technology

## VIII. INTRODUCTION

This document describes what students should know and be able to do in the following eight areas:

- ◊ 3.1. Unifying Themes of Science
- ◊ 3.2. Inquiry and Design
- ◊ 3.3. Biological Sciences
- ◊ 3.4. Physical Science, Chemistry and Physics
- ◊ 3.5. Earth Sciences
- ◊ 3.6. Technology Education
- ◊ 3.7. Technological Devices
- ◊ 3.8. Science, Technology and Human Endeavors

These standards describe what students should know and be able to do by the end of fourth, seventh, tenth and twelfth grade. In addition, these standards reflect the increasing complexity and sophistication that students are expected to achieve as they progress through school.

This document avoids repetition, making an obvious progression across grade levels less explicit. Teachers shall expect that students know and can apply the concepts and skills expressed at the preceding level. Consequently, previous learning is reinforced but not retaught.

Standards are arranged by categories, for example, 3.5 Earth Science. Under each category are standard statements that are preceded by a capital letter; for example, in 3.1 Unifying Themes, grade 10.B, "Describe concepts of models as a way to predict and understand science and technology." Following the standard statements are bulleted standard descriptors, which explain the nature and scope of the standard. Descriptors specify the nature of the standard and the level of complexity needed in meeting that standard in a proficient manner. Descriptors serve to benchmark the standard statement. Curriculum, instruction and assessment should focus on meeting the standard statement. Technology Education, computer applications and science are separate curricular areas. Meeting standards should be approached as a collaborative effort among all curricular areas.

# Academic Standards for Science and Technology

*The following descriptors explain the intent of each standard category:*

**3.1. Unifying Themes**

Unifying themes of science and technology provide big ideas that integrate with significant concepts. There are only a few fundamental concepts and processes that form the framework upon which science and technology knowledges are organized - motion and forces, energy, structure of matter, change over time and machines. These themes create the context through which the content of the disciplines can be taught and are emphasized in each standard.

**3.2. Inquiry and Design**

The nature of science and technology is characterized by applying process knowledge that enables students to become independent learners. These skills include observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, raising questions, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models, and producing solutions. Everyone can use them to solve real-life problems. These process skills are developed across the grade levels and differ in the degree of sophistication, quantitative nature and application to the content.

**3.3. Biological Sciences**

Biology concerns living things, their appearance, different types of life, the scope of their similarities and differences, where they live and how they live. Living things are made of the same components as all other matter, involve the same kinds of transformations of energy and move using the same basic kinds of forces as described in chemistry and physics standards. Through the study of the diversity of life, students learn to understand how life has changed over a long period of time. This great variety of life forms continues to change even today as genetic instructions within cells are passed from generation to generation, yet the amazing integrity of most species remain.

**3.4. Physical Science Chemistry and Physics**

Physics and chemistry involve the study of objects and their properties. Students examine changes to materials during mixing, freezing, heating and dissolving and then learn how to observe and measure results. In chemistry students study the relationship between matter, atomic structure and its activity. Laboratory investigations of the properties of substances and their changes through a range of chemical interactions provide a basis for students to understand atomic theory and a variety of reaction types and their

# Academic Standards for Science and Technology

applications in business, agriculture and medicine. Physics deepens the understanding of the structure and properties of materials and includes atoms, waves, light, electricity, magnetism and the role of energy, forces and motion.

**3.5. Earth Sciences**

The dynamics of earth science include the studies of forces of nature that build the earth and wear down the earth. The understanding of these concepts uses principles from physical sciences, geography and mathematics.

**3.6. Technology Education**

Technology education is the use of accumulated knowledge to process resources to meet human needs and improve the quality of life. Students develop the ability to select and correctly use materials, tools, techniques and processes to answer questions, understand explanations and solve problems encountered in real life situations. These overriding themes require students to design, create, use, evaluate and modify systems of Biotechnologies, Information Technologies, and Physical Technologies.

**3.7. Technological Devices**

Students use tools to observe, measure, move and make things. New technological tools and techniques make it possible to enact far-reaching changes in our world. Technology enhances the students' abilities to identify problems and determine solutions. Computers play an integral role in every day life by extending our abilities to collect, analyze and communicate information and ideas.

**3.8. Science, Technology and Human Endeavors**

Scientific knowledge and societal needs often create a demand for new technology. Conversely, new technology advances scientific knowledge. Both influence society through the impact of their products and processes.

# Academic Standards for Science and Technology

**What Is Science?** Any study of science includes the search for understanding the natural world and facts, principles, theories and laws that have been verified by the scientific community and are used to explain and predict natural phenomena and events.

Acquiring scientific knowledge involves constructing hypotheses using observation and knowledge in the content area in order to formulate useful questions that provoke scientific inquiry. As a result of repeated, rigorous testing over time and applying multiple perspectives to a problem, consistent information emerges. A theory describes this verifiable event or phenomena. Theories are powerful elements in science and are used to predict other events. As theories lose their ability to predict, they are modified, expanded or generalized or incorporated into a broader theory.

Knowledge of what science is incorporates carefully developed and integrated components:

- **Nature of science** -- the ways in which scientists search for answers to questions and explanations of observations about the natural world; includes process knowledge of observing, classifying, inferring, predicting, measuring, hypothesizing, experimenting and interpreting data
- **Unifying themes of science** -- concepts, generalizations and principles that result from and lead to inquiry
- **Knowledge** -- facts, principles, theories and laws verifiable through scientific inquiry by the world community of scientists; includes physics, chemistry, earth science and biological sciences
- **Inquiry** -- an intellectual process of logic that includes verification of answers to questions about and explanations for natural objects, events and phenomena
- **Process skills** -- Recognition by students how knowledge is acquired and applied in science by observing, classifying, inferring, predicting, measuring, computing, estimating, communicating, using space/time relationships, defining operationally, formulating hypotheses, testing and experimenting, designing controlled experiments, recognizing variables, manipulating variables, interpreting data, formulating models, designing models and producing solutions.
- **Problem solving --** application of concepts to problems of human adaptation to the environment that often leads to recognition of new problems; has social implications and leads to personal decision-making and action; a process which forms the link for interactions between scientific and technological results or findings; involves operational definitions, recognizing variables, formulating models and asking questions
- **Scientific thinking** -- the disposition to suspend judgment, not make decisions and not take action until results, explanations or answers have been tested and verified with information.
-

170

# Academic Standards for Science and Technology

**What Is Technology Education**? It is the means by which we teach technology. Technology is a body of knowledge separate from but related to the sciences, with specific content, curriculum and specific certification requirements. Technology is the application of tools, materials, processes and systems by humans to solve problems and provide benefits to humankind. We use technology in an attempt to improve our environment. These improvements may relate to survival needs (e.g., food, shelter, defense) or they may relate to human aspirations (e.g., knowledge, art, control). They can include unexpected benefits, unexpected costs and unexpected risks.

Technology education involves a broad spectrum of knowledge and activities. Effective technology education combines knowledge of content, process and skills to provide students with a holistic approach to learning. Technology education offers unique opportunities to apply numerous academic concepts through practical, hands-on applications. Instructional technology, on the other hand, deals specifically with use of computers and different software to solve problems and communicate effectively. Knowledge of content, process and skills should be used together to effectively engage students and promote a complete understanding of the sciences, related technologies and their interrelationship. The relationship between science and technology is one where science builds principles or theories and technology provides the practical application of those principles or theories.

Knowledge of content, process and skills in technology involves learning processes that include these components:

- Methods of designing and developing solutions
- Standards for selecting and using appropriate materials, tools and processes
- Experimental and design specifications for testing and evaluating solutions
- Criteria for judging the performance and impact of the solutions
- Evaluating the impact of modifying a system to improve performance.

# Academic Standards for Science and Technology

Technology education can be divided into three main systems that include biotechnological, informational, and physical technologies:

| **Biotechnological Systems** | **Informational Systems** | **Physical Systems** |
|---|---|---|
| Bioconversion | Computer-Aided Drafting / Design (CADD) | Automation / Robotics |
| Bioprocessing | Drafting & Design | Computer-Aided and Integrated Manufacturing (CAM/CIM) |
| Environment | Desktop Publishing | Construction |
| Ergonomics | Electronic Communications | Electronic Circuits / Control Systems |
| Engineering / Design Systems | Engineering / Design Systems | Energy Systems |
| Research and Development | Graphic Communications | Architecture and Community Planning |
| | Communications Systems | Engineering / Design Systems |
| | Multimedia Technology | Enterprise Organization & Operation |
| | Networking Systems | Manufacturing |
| | Research and Development | Material Processes |
| | Video and Television Production | Research and Development |
| | World Wide Web Design & Publishing | Transportation |

172

# Academic Standards for Science and Technology

| 3.1. Unifying Themes | | | |
|---|---|---|---|
| 3.1.4. **GRADE 4** | 3.1.7. **GRADE 7** | 3.1.10. **GRADE 10** | 3.1.12. **GRADE 12** |
| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Know that natural and human-made objects are made up of parts.<br>• Identify and describe what parts make up a system.<br>• Identify system parts that are natural and human-made (e.g., ball point pen, simple electrical circuits, plant anatomy).<br>• Describe the purpose of analyzing systems.<br>• Know that technologies include physical technology systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. | A. Explain the parts of a simple system and their relationship to each other.<br>• Describe a system as a group of related parts that work together to achieve a desired result (e.g., digestive system).<br>• Explain the importance of order in a system.<br>• Distinguish between system inputs, system processes and system outputs.<br>• Distinguish between open loop and closed loop systems.<br>• Apply systems analysis to solve problems. | A. Discriminate among the concepts of systems, subsystems, feedback and control in solving technological problems.<br>• Identify the function of subsystems within a larger system (e.g., role of thermostat in an engine, pressure switch).<br>• Describe the interrelationships among inputs, processes, outputs, feedback and control in specific systems.<br>• Explain the concept of system redesign and apply it to improve technological systems.<br>• Apply the universal systems model to illustrate specific solutions and troubleshoot specific problems.<br>• Analyze and describe the effectiveness of systems to solve specific problems. | A. Apply concepts of systems, subsystems, feedback and control to solve complex technological problems.<br>• Apply knowledge of control systems concept by designing and modeling control systems that solve specific problems.<br>• Apply systems analysis to predict results.<br>• Analyze and describe the function, interaction and relationship among subsystems and the system itself.<br>• Compare and contrast several systems that could be applied to solve a single problem.<br>• Evaluate the causes of a system's inefficiency. |
| B. Know models as useful simplifications of objects or processes.<br>• Identify different types of models.<br>• Identify and apply models as tools for prediction and insight.<br>• Apply appropriate simple modeling tools and techniques.<br>• Identify theories that serve as models (e.g., molecules). | B. Describe the use of models as an application of scientific or technological concepts.<br>• Identify and describe different types of models and their functions.<br>• Apply models to predict specific results and observations (e.g., population growth, effects of infectious organisms). | B. Describe concepts of models as a way to predict and understand science and technology.<br>• Distinguish between different types of models and modeling techniques and apply their appropriate use in specific applications (e.g., kinetic gas theory, DNA).<br>• Examine the advantages of using models to demonstrate processes and outcomes (e.g., blue print analysis, structural stability). | B. Apply concepts of models as a method to predict and understand science and technology.<br>• Evaluate technological processes by collecting data and applying mathematical models (e.g., process control).<br>• Apply knowledge of complex physical models to interpret data and apply mathematical models. |

# Academic Standards for Science and Technology

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| | • Explain systems by outlining a system's relevant parts and its purpose and/or designing a model that illustrates its function. | • Apply mathematical models to science and technology. | • Appraise the importance of computer models in interpreting science and technological systems. |
| C. Illustrate patterns that regularly occur and reoccur in nature.<br>• Identify observable patterns (e.g., growth patterns in plants, crystal shapes in minerals, climate, structural patterns in bird feathers).<br>• Use knowledge of natural patterns to predict next occurrences (e.g., seasons, leaf patterns, lunar phases). | C. Identify patterns as repeated processes or recurring elements in science and technology.<br>• Identify different forms of patterns and use them to group and classify specific objects.<br>• Identify repeating structure patterns.<br>• Identify and describe patterns that occur in physical systems (e.g., construction, manufacturing, transportation), informational systems and biochemical-related systems. | C. Apply patterns as repeated processes or recurring elements in science and technology.<br>• Examine and describe recurring patterns that form the basis of biological classification, chemical periodicity, geological order and astronomical order.<br>• Examine and describe stationary physical patterns.<br>• Examine and describe physical patterns in motion. | C. Assess and apply patterns in science and technology.<br>• Assess and apply recurring patterns in natural and technological systems.<br>• Compare and contrast structure and function relationships as they relate to patterns.<br>• Assess patterns in nature using mathematical formulas. |
| D. Know that scale is an important attribute of natural and human made objects, events and phenomena.<br>• Identify the use of scale as it relates to the measurement of distance, volume and mass.<br>• Describe scale as a ratio (e.g., map scales).<br>• Explain the importance of scale in producing models and apply it to a model. | D. Explain scale as a way of relating concepts and ideas to one another by some measure.<br>• Apply various applications of size and dimensions of scale to scientific, mathematical, and technological applications.<br>• Describe scale as a form of ratio and apply to a life situation. | D. Apply scale as a way of relating concepts and ideas to one another by some measure.<br>• Apply dimensional analysis and scale as a ratio.<br>• Convert one scale to another. | D. Analyze scale as a way of relating concepts and ideas to one another by some measure.<br>• Compare and contrast various forms of dimensional analysis.<br>• Assess the use of several units of measurement to the same problem.<br>• Analyze and apply appropriate measurement scales when collecting data. |
| E. Recognize change in natural and physical systems.<br>• Recognize change as fundamental to science and technology concepts.<br>• Examine and explain change by using time and measurement.<br>• Describe relative motion. | E. Identify change as a variable in describing natural and physical systems.<br>• Describe fundamental science and technology concepts that could solve practical problems.<br>• Explain how ratio is used to describe change. | E. Describe patterns of change in nature, physical and man made systems.<br>• Describe how fundamental science and technology concepts are used to solve practical problems (e.g., momentum, Newton's laws of universal gravitation, tectonics, conservation of mass and energy, | E. Evaluate change in nature, physical systems and man made systems.<br>• Evaluate fundamental science and technology concepts and their development over time (e.g., DNA, cellular respiration, unified field theory, energy measurement, automation, |

# Academic Standards for Science and Technology

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| • Describe the change to objects caused by heat, cold, light or chemicals. | • Describe the effect of making a change in one part of a system on the system as a whole. | cell theory, theory of evolution, atomic theory, theory of relativity, Pasteur's germ theory, relativity, heliocentric theory, gas laws, feedback systems).<br>• Recognize that stable systems often involve underlying dynamic changes (e.g., a chemical reaction at equilibrium has molecules reforming continuously).<br>• Describe the effects of error in measurements.<br>• Describe changes to matter caused by heat, cold, light or chemicals using a rate function. | miniaturization, Copernican and Ptolemaic universe theories).<br>• Analyze how models, systems and technologies have changed over time (e.g., germ theory, theory of evolution, solar system, cause of fire).<br>• Explain how correlation of variables does not necessarily imply causation.<br>• Evaluate the patterns of change within a technology (e.g., changes in engineering in the automotive industry). |

# Academic Standards for Science and Technology

| **3.2. Inquiry and Design** | | | |
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| 3.2.4. **GRADE 4** | 3.2.7. **GRADE 7** | 3.2.10. **GRADE 10** | 3.2.12. **GRADE 12** |
| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Identify and use the nature of scientific and technological knowledge.<br>• Distinguish between a scientific fact and a belief.<br>• Provide clear explanations that account for observations and results.<br>• Relate how new information can change existing perceptions. | A. Explain and apply scientific and technological knowledge.<br>• Distinguish between a scientific theory and a belief.<br>• Answer "What if" questions based on observation, inference or prior knowledge or experience.<br>• Explain how skepticism about an accepted scientific explanation led to a new understanding.<br>• Explain how new information may change existing theories and practice. | A. Apply knowledge and understanding about the nature of scientific and technological knowledge.<br>• Compare and contrast scientific theories and beliefs.<br>• Know that science uses both direct and indirect observation means to study the world and the universe.<br>• Integrate new information into existing theories and explain implied results. | A. Evaluate the nature of scientific and technological knowledge.<br>• Know and use the ongoing scientific processes to continually improve and better understand how things work.<br>• Critically evaluate the status of existing theories (e.g., germ theory of disease, wave theory of light, classification of subatomic particles, theory of evolution, epidemiology of aids). |
| B. Describe objects in the world using the five senses.<br>• Recognize observational descriptors from each of the five senses (e.g., see-blue, feel-rough).<br>• Use observations to develop a descriptive vocabulary. | B. Apply process knowledge to make and interpret observations.<br>• Measure materials using a variety of scales.<br>• Describe relationships by making inferences and predictions.<br>• Communicate, use space / time relationships, define operationally, raise questions, formulate hypotheses, test and experiment,<br>• Design controlled experiments, recognize variables, and manipulate variables.<br>• Interpret data, formulate models, design models, and produce solutions. | B. Apply process knowledge and organize scientific and technological phenomena in varied ways.<br>• Describe materials using precise quantitative and qualitative skills based on observations.<br>• Develop appropriate scientific experiments: raising questions, formulating hypotheses, testing, controlled experiments, recognizing variables, manipulating variables, interpreting data, and producing solutions.<br>• Use process skills to make inferences and predictions using collected information and to communicate, using space / time relationships, defining operationally. | B. Evaluate experimental information for appropriateness and adherence to relevant science processes.<br>• Evaluate experimental data correctly within experimental limits.<br>• Judge that conclusions are consistent and logical with experimental conditions.<br>• Interpret results of experimental research to predict new information or improve a solution. |

# Academic Standards for Science and Technology

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| C. Recognize and use the elements of scientific inquiry to solve problems.<br>• Generate questions about objects, organisms and/or events that can be answered through scientific investigations.<br>• Design an investigation.<br>• Conduct an experiment.<br>• State a conclusion that is consistent with the information. | C. Identify and use the elements of scientific inquiry to solve problems.<br>• Generate questions about objects, organisms and/or events that can be answered through scientific investigations.<br>• Evaluate the appropriateness of questions.<br>• Design an investigation with limited variables to investigate a question.<br>• Conduct a two-part experiment.<br>• Judge the significance of experimental information in answering the question.<br>• Communicate appropriate conclusions from the experiment. | C. Apply the elements of scientific inquiry to solve problems.<br>• Generate questions about objects, organisms and/or events that can be answered through scientific investigations.<br>• Evaluate the appropriateness of questions.<br>• Design an investigation with adequate control and limited variables to investigate a question.<br>• Conduct a multiple step experiment.<br>• Organize experimental information using a variety of analytic methods.<br>• Judge the significance of experimental information in answering the question.<br>• Suggest additional steps that might be done experimentally. | C. Apply the elements of scientific inquiry to solve multi-step problems.<br>• Generate questions about objects, organisms and/or events that can be answered through scientific investigations.<br>• Evaluate the appropriateness of questions.<br>• Design an investigation with adequate control and limited variables to investigate a question.<br>• Organize experimental information using analytic and descriptive techniques.<br>• Evaluate the significance of experimental information in answering the question.<br>• Project additional questions from a research study that could be studied. |
| D. Recognize and use the technological design process to solve problems.<br>• Recognize and explain basic problems.<br>• Identify possible solutions and their course of action.<br>• Try a solution.<br>• Describe the solution, identify its impacts and modify if necessary.<br>• Show the steps taken and the results. | D. Know and use the technological design process to solve problems.<br>• Define different types of problems.<br>• Define all aspects of the problem, necessary information and questions that must be answered.<br>• Propose the best solution.<br>• Design and propose alternative methods to achieve solutions.<br>• Apply a solution.<br>• Explain the results, present improvements, identify and infer the impacts of the solution. | D. Identify and apply the technological design process to solve problems.<br>• Examine the problem, rank all necessary information and all questions that must be answered.<br>• Propose and analyze a solution.<br>• Implement the solution.<br>• Evaluate the solution, test, redesign and improve as necessary.<br>• Communicate the process and evaluate and present the impacts of the solution. | D. Analyze and use the technological design process to solve problems.<br>• Assess all aspects of the problem, prioritize the necessary information and formulate questions that must be answered.<br>• Propose, develop and appraise the best solution and develop alternative solutions.<br>• Implement and assess the solution.<br>• Evaluate and assess the solution, redesign and improve as necessary.<br>• Communicate and assess the process and evaluate and present the impacts of the solution. |

# Academic Standards for Science and Technology

| 3.3. Biological Sciences | | | |
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| 3.3.4. **GRADE 4** | 3.3.7. **GRADE 7** | 3.3.10. **GRADE 10** | 3.3.12. **GRADE 12** |
| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Know the similarities and differences of living things.<br>• Identify life processes of living things (e.g., growth, digestion, react to environment).<br>• Know that some organisms have similar external characteristics (e.g., anatomical characteristics; appendages, type of covering, body segments) and that similarities and differences are related to environmental habitat.<br>• Describe basic needs of plants and animals. | A. Describe the similarities and differences that characterize diverse living things.<br>• Describe how the structures of living things help them function in unique ways.<br>• Explain how to use a dichotomous key to identify plants and animals.<br>• Account for adaptations among organisms that live in a particular environment. | A. Explain the structural and functional similarities and differences found among living things.<br>• Identify and characterize major life forms according to their placement in existing classification groups.<br>• Explain the relationship between structure and function at the molecular and cellular levels.<br>• Describe organizing schemes of classification keys.<br>• Identify and characterize major life forms by kingdom, phyla, class and order. | A. Explain the relationship between structure and function at all levels of organization.<br>• Identify and explain interactions among organisms (e.g., mutually beneficial, harmful relationships).<br>• Explain and analyze the relationship between structure and function at the molecular, cellular and organ-system level.<br>• Describe and explain structural and functional relationships in each of the five (or six) kingdoms.<br>• Explain significant biological diversity found in each of the biomes. |
| B. Know that living things are made up of parts that have specific functions.<br>• Identify examples of unicellular and multicellular organisms.<br>• Determine how different parts of a living thing work together to make the organism function. | B. Describe the cell as the basic structural and functional unit of living things.<br>• Identify the levels of organization from cell to organism.<br>• Compare life processes at the organism level with life processes at the cell level.<br>• Explain that cells and organisms have particular structures that underlie their functions.<br>• Describe and distinguish among cell cycles, reproductive cycles and life cycles.<br>• Explain disease effects on structures or functions of an organism. | B. Describe and explain the chemical and structural basis of living organisms.<br>• Describe the relationship between the structure of organic molecules and the function they serve in living organisms.<br>• Identify the specialized structures and regions of the cell and the functions of each.<br>• Explain how cells store and use information to guide their functions.<br>• Explain cell functions and processes in terms of chemical reactions and energy changes. | B. Analyze the chemical and structural basis of living organisms.<br>• Identify and describe factors affecting metabolic function (e.g., temperature, acidity, hormones).<br>• Evaluate metabolic activities using experimental knowledge of enzymes.<br>• Evaluate relationships between structure and functions of different anatomical parts given their structure.<br>• Describe potential impact of genome research on the biochemistry and physiology of life. |

# Academic Standards for Science and Technology

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| C. Know that characteristics are inherited and, thus, offspring closely resemble their parents.<br>• Identify characteristics for animal and plant survival in different climates.<br>• identify physical characteristics that appear in both parents and offspring and differ between families, strains or species.<br><br>D. Identify changes in living things over time.<br>• Compare extinct life forms with living organisms. | C. Know that every organism has a set of genetic instructions that determines its inherited traits.<br>• Identify and explain inheritable characteristics.<br>• Identify that the gene is the basic unit of inheritance.<br>• Identify basic patterns of inheritance (e.g., dominance, recessive, co-dominance).<br>• Describe how traits are inherited.<br>• Distinguish how different living things reproduce (e.g., vegetative budding, sexual).<br>• recognize that mutations can alter a gene.<br>• Describe how selective breeding, natural selection and genetic technologies can change genetic makeup of organisms.<br><br>D. Explain basic concepts of natural selection.<br>• Identify adaptations that allow organisms to survive in their environment.<br>• Describe how an environmental change can affect the survival of organisms and entire species.<br>• know that differences in individuals of the same species may give some advantage in surviving and reproducing.<br>• recognize that populations of organisms can increase rapidly.<br>• Describe the role that fossils play in studying the past.<br>• Explain how biologic extinction is a natural process. | C. Describe how genetic information is inherited and expressed.<br>• Compare and contrast the function of mitosis and meiosis.<br>• Describe mutations' effects on a trait's expression.<br>• Distinguish different reproductive patterns in living things (e.g., budding, spores, fission).<br>• Compare random and selective breeding practices and their results (e.g., antibiotic resistant bacteria).<br>• Explain the relationship among DNA, genes and chromosomes.<br>• Explain different types of inheritance (e.g., multiple allele, sex-influenced traits).<br>• Describe the role of DNA in protein synthesis as it relates to gene expression.<br><br>D. Explain the mechanisms of the theory of evolution.<br>• analyze data from fossil records, similarities in anatomy and physiology, embryological studies and DNA studies that are relevant to the theory of evolution.<br>• Explain the role of mutations and gene recombination in changing a population of organisms.<br>• Compare modern day descendants of extinct species and propose possible scientific accounts for their present appearance.<br>• describe the factors (e.g., isolation, differential | C. Explain gene inheritance and expression at the molecular level.<br>• Analyze gene expression at the molecular level.<br>• Describe the roles of nucleic acids in cellular reproduction and protein synthesis.<br>• Describe genetic engineering techniques, applications and impacts.<br>• Explain birth defects from the standpoint of embryological development and/or changes in genetic makeup.<br><br>D. Analyze the theory of evolution.<br>• Examine human history by describing the progression from early hominids to modern humans.<br>• apply the concept of natural selection as a central concept in illustrating evolution theory. |

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| | | reproduction) affecting gene frequency in a population over time and their consequences.<br>• describe and differentiate between the roles of natural selection and genetic drift.<br>• Describe changes that illustrate major events in the earth's development based on a time line.<br>• explain why natural selection can act only on inherited traits.<br>• Apply the concept of natural selection to illustrate and account for a species' survival, extinction or change over time. | |
| **Ecosystem Standards are in the Environment and Ecology Standard Category (4.6).** | | | |

# Academic Standards for Science and Technology

| 3.4. Physical Science, Chemistry and Physics | | | |
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| 3.4.4. **GRADE 4** | 3.4.7. **GRADE 7** | 3.4.10. **GRADE 10** | 3.4.12. **GRADE 12** |
| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Recognize basic concepts about the structure and properties of matter.<br>• Describe properties of matter (e.g., hardness, reactions to simple chemical tests).<br>• Know that combining two or more substances can make new materials with different properties.<br>• Know different material characteristics (e.g., texture, state of matter, solubility). | A. Describe concepts about the structure and properties of matter.<br>• Identify elements as basic building blocks of matter that cannot be broken down chemically.<br>• Distinguish compounds from mixtures.<br>• Describe and conduct experiments that identify chemical and physical properties.<br>• Describe reactants and products of simple chemical reactions. | A. Explain concepts about the structure and properties of matter.<br>• Know that atoms are composed of even smaller sub-atomic structures whose properties are measurable.<br>• Explain the repeating pattern of chemical properties by using the repeating patterns of atomic structure within the periodic table.<br>• Predict the behavior of gases through the use of Boyle's, Charles' or the ideal gas law, in everyday situations.<br>• Describe phases of matter according to the Kinetic Molecular Theory.<br>• Explain the formation of compounds and their resulting properties using bonding theories (ionic and covalent).<br>• Recognize formulas for simple inorganic compounds.<br>• Describe various types of chemical reactions by applying the laws of conservation of mass and energy.<br>• Apply knowledge of mixtures to appropriate separation techniques.<br>• Understand that carbon can form several types of compounds. | A. Apply concepts about the structure and properties of matter.<br>• Apply rules of systematic nomenclature and formula writing to chemical substances.<br>• Classify and describe, in equation form, types of chemical and nuclear reactions.<br>• Explain how radioactive isotopes that are subject to decay can be used to estimate the age of materials.<br>• Explain how the forces that bind solids, liquids and gases affect their properties.<br>• Characterize and identify important classes of compounds (e.g., acids, bases, salts).<br>• Apply the conservation of energy concept to fields as diverse as mechanics, nuclear particles and studies of the origin of the universe.<br>• Apply the predictability of nuclear decay to estimate the age of materials that contain radioactive isotopes.<br>• Quantify the properties of matter (e.g., density, solubility coefficients) by applying mathematical formulas. |

# Academic Standards for Science and Technology

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| B. Know basic energy types, sources and conversions.<br>• Identify energy forms and examples (e.g., sunlight, heat, stored, motion).<br>• Know the concept of the flow of energy by measuring flow through an object or system.<br>• Describe static electricity in terms of attraction, repulsion and sparks.<br>• Apply knowledge of the basic electrical circuits to design and construction simple direct current circuits.<br>• Classify materials as conductors and nonconductors.<br>• Know and demonstrate the basic properties of heat by producing it in a variety of ways.<br>• Know the characteristics of light (e.g., reflection, refraction, absorption) and use them to produce heat, color or a virtual image. | B. Relate energy sources and transfers to heat and temperature.<br>• Identify and describe sound changes in moving objects.<br>• Know that the sun is a major source of energy that emits wavelengths of visible light, infrared and ultraviolet radiation.<br>• Explain the conversion of one form of energy to another by applying knowledge of each form of energy.<br>• Explain the parts and functions in an electrical circuit. | B. Analyze energy sources and transfers of heat.<br>• Determine the efficiency of chemical systems by applying mathematical formulas.<br>• Use knowledge of chemical reactions to generate an electrical current.<br>• Evaluate energy changes in chemical reactions.<br>• Use knowledge of conservation of energy and momentum to explain common phenomena (e.g., refrigeration system, rocket propulsion).<br>• Explain resistance, current and electro-motive force (Ohm's Law). | B. Apply and analyze energy sources and conversions and their relationship to heat and temperature.<br>• Determine the heat involved in illustrative chemical reactions.<br>• <br>Evaluate mathematical formulas that calculate the efficiency of specific chemical and mechanical systems.<br>• Use knowledge of oxidation and reduction to balance complex reactions<br>• Apply appropriate thermodynamic concepts (e.g., conservation, entropy) to solve problems relating to energy and heat. |
| C. Observe and describe different types of force and motion.<br>• Identify characteristics of sound (pitch, loudness and echoes)<br>• Recognize forces that attract or repel other objects and demonstrate them.<br>• Describe various types of motions.<br>• Compare the relative movement of objects and describe types of motion that are evident.<br>• Describe the position of an object by locating it relative to another object or the background (e.g., geographic direction, left, up). | C. Identify and explain the principles of force and motion.<br>• Describe the motion of an object based on its position, direction and speed.<br>• Classify fluid power systems according to fluid used or mode of power transmission (e.g., air, oil).<br>• Explain various motions using models.<br>• Explain how convex and concave mirrors and lens change light images.<br>• Explain how sound and light travel in waves of differing speeds, sizes and frequencies. | C. Distinguish among the principles of force and motion.<br>• Identify the relationship of electricity and magnetism as two aspects of a single electromagnetic force.<br>• Identify elements of simple machines in compound machines.<br>• Explain fluid power systems through the design and construction of appropriate models.<br>• Describe sound effects (e.g., Doppler effect, amplitude, frequency, reflection, refraction, absorption, sonar, seismic). | C. Apply the principles of motion and force.<br>• Evaluate wave properties of frequency, wavelength and speed as applied to sound and light through different media.<br>• Propose and produce modifications to specific mechanical power systems that will improve their efficiency.<br>• Analyze the principles of translational motion, velocity and acceleration as they relate to free fall and projectile motion. |

# Academic Standards for Science and Technology

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| | | • Describe light effects (e.g., Doppler effect, dispersion, absorption, emission spectra, polarization, interference).<br>• Describe and measure the motion of sound, light and other objects.<br>• Know Newton's laws of motion (including inertia, action and reaction) and gravity and apply them to solve problems related to forces and mass.<br>• Determine the efficiency of mechanical systems by applying mathematical formulas. | • Analyze the principles of rotational motion to solve problems relating to angular momentum, and torque.<br>• Interpret a model that illustrates circular motion and acceleration.<br>• Describe inertia, motion, equilibrium, and action/reaction concepts through words, models and mathematical symbols. |
| D. Describe the composition and structure of the universe and the earth's place in it.<br>• Recognize earth's place in the solar system.<br>• Explain and illustrate the causes of seasonal changes.<br>• Identify planets in our solar system and their general characteristics.<br>• Describe the solar system motions and use them to explain time (e.g., days, seasons), major lunar phases and eclipses. | D. Describe essential ideas about the composition and structure of the universe and the earth's place in it.<br>• Compare various planets' characteristics.<br>• Describe basic star types and identify the sun as a star type.<br>• Describe and differentiate comets, asteroids and meteors.<br>• Identify gravity as the force that keeps planets in orbit around the sun and governs the rest of the movement of the solar system and the universe.<br>• Illustrate how the positions of stars and constellations change in relation to the Earth during an evening and from month to month.<br>• Identify equipment and instruments that explore the universe.<br>• Identify the accomplishments and contributions provided by selected past and present scientists in the field of astronomy. | D. Explain essential ideas about the composition and structure of the universe.<br>• Compare the basic structures of the universe (e.g., galaxy types, nova, black holes, neutron stars).<br>• Describe the structure and life cycle of star, using the Hertzsprung-Russell diagram.<br>• Describe the nuclear processes involved in energy production in a star.<br>• Explain the "red-shift" and Hubble's use of it to determine stellar distance and movement.<br>• Compare absolute versus apparent star magnitude and their relation to stellar distance.<br>• Explain the impact of the Copernican and Newtonian thinking on man's view of the universe.<br>• Identify and analyze the findings of several space instruments in regard to the extent and composition of the | D. Analyze the essential ideas about the composition and structure of the universe.<br>• Analyze the Big Bang Theory's use of gravitation and nuclear reaction to explain a possible origin of the universe.<br>• Compare the use of visual, radio and x-ray telescopes to collect data regarding the structure and evolution of the universe.<br>• Correlate the use of the special theory of relativity and the life of a star. |

182

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| | • Identify and articulate space program efforts to investigate possibilities of living in space and on other planets. | solar system and universe. | |
| **Refer to Technology Standard Category 3.6 for applied uses of these concepts and principles.** | | | |

184

# Academic Standards for Science and Technology

| 3.5. Earth Sciences | | | |
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| 3.5.4. **GRADE 4** | 3.5.7. **GRADE 7** | 3.5.10. **GRADE 10** | 3.5.12. **GRADE 12** |
| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Know basic landforms and earth history.<br>• Describe earth processes (e.g., rusting, weathering, erosion) that have affected selected physical features in students' neighborhoods.<br>• Identify various earth structures (e.g., mountains, faults, drainage basins) through the use of models.<br>• Identify the composition of soil as weathered rock and decomposed organic remains.<br>• Describe fossils and the type of environment they lived in (e.g., tropical, aquatic, desert). | A. Describe earth features and processes.<br>• Describe major layers of the earth.<br>• Describe the processes involved in the creation of geologic features (e.g., folding, faulting, volcanism, sedimentation) and that these processes seen today (e.g., erosion, weathering crustal plate movement) are similar to those in the past.<br>• Describe the processes that formed Pennsylvania geologic structures and resources including mountains, glacial formations, water gaps and ridges.<br>• Explain how the rock cycle affected rock formations in the state of Pennsylvania.<br>• Distinguish between examples of rapid surface changes (e.g., landslides, earthquakes) and slow surface changes (e.g., weathering).<br>• Identify living plants and animals that are similar to fossil forms. | A. Relate earth features and processes that change the earth.<br>• Illustrate and explain plate tectonics as the mechanism of continental movement and sea floor changes.<br>• Compare examples of change to the earth's surface over time as they related to continental movement and ocean basin formation (e.g., Delaware, Susquehanna, Ohio Rivers system formations, dynamics).<br>• Interpret topographic maps to identify and describe significant geologic history/structures in Pennsylvania.<br>• Evaluate and interpret geologic history using geologic maps.<br>• Explain several methods of dating earth materials and structures.<br>• Correlate rock units with general geologic time periods in the history of the earth.<br>• Describe and identify major types of rocks and minerals. | A. Analyze and evaluate earth features and processes that change the earth.<br>• Apply knowledge of geophysical processes to explain the formation and degradation of earth structures (e.g., mineral deposition, cave formations, soil composition).<br>• Interpret geological evidence supporting evolution.<br>• Apply knowledge of radioactive decay to assess the age of various earth features and objects. |

# Academic Standards for Science and Technology

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| B. Know types and uses of earth materials.<br>• Identify uses of various earth materials (e.g., buildings, highways, fuels, growing plants).<br>• Identify and sort earth materials according to a classification key (e.g., soil/rock type). | B. Recognize earth resources and how they affect everyday life.<br>• Identify and locate significant earth resources (e.g., rock types, oil, gas, coal deposits) in Pennsylvania.<br>• Explain the processes involved in the formation of oil and coal in Pennsylvania.<br>• Explain the value and uses of different earth resources (e.g., selected minerals, ores, fuel sources, agricultural uses).<br>• Compare the locations of human settlements as related to available resources. | B. Explain sources and uses of earth resources.<br>• Compare the locations of strategic minerals and earth resources in the world with their geologic history using maps and global information systems.<br>• Demonstrate the effects of sedimentation and erosion before and after a conservation plan is implemented.<br>• Evaluate the impact of geologic activities/hazards (e.g., earthquakes, sinkholes, landslides).<br>• Evaluate land use (e.g., agricultural, recreational, residential, commercial) in Pennsylvania based upon soil characteristics. | B. Analyze the availability, location and extraction of earth resources.<br>• Describe how the location of earth's major resources has affected a country's strategic decisions.<br>• Compare locations of earth features and country boundaries.<br>• Analyze the impact of resources (e.g., coal deposits, rivers) on the life of Pennsylvania's settlements and cities. |
| C. Know basic weather elements.<br>• identify cloud types.<br>• Identify weather patterns from data charts (including temperature, wind direction and speed, precipitation) and graphs of the data.<br>• Explain how the different seasons effect plants, animals, food availability and daily human life. | C. Describe basic elements of meteorology.<br>• Explain weather forecasts by interpreting weather data and symbols.<br>• Explain the oceans' impact on local weather and the climate of a region.<br>• Identify how cloud types, wind directions and barometric pressure changes are associated with weather patterns in different regions of the country.<br>• Explain and illustrate the processes of cloud formation and precipitation.<br>• Describe and illustrate the major layers of the earth's atmosphere.<br>• Identify different air masses and global wind patterns and how they relate to the weather patterns in different regions of the U.S. | C. Interpret meteorological data.<br>• Analyze information from meteorological instruments and online sources to predict weather patterns.<br>• Describe weather and climate patterns on global levels.<br>• Evaluate specific adaptations plants and animals have made that enable them to survive in different climates. | C. Analyze atmospheric energy transfers.<br>• Describe how weather and climate involve the transfer of energy in and out of the atmosphere.<br>• Explain how unequal heating of the air, ocean and land produces wind and ocean currents.<br>• Analyze the energy transformations that occur during the greenhouse effect and predict the long-term effects of increased pollutant levels in the atmosphere.<br>• Analyze the mechanisms that drive a weather phenomena (e.g., El Nino, hurricane, tornado) using the correlation of three methods of heat energy transfer. |

# Academic Standards for Science and Technology

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| D. Recognize the earth's different water resources.<br>• Know that approximately three-fourths of the earth is covered by water.<br>• identify and describe types of fresh and salt-water bodies.<br>• Identify examples of water in the form of solid, liquid and gas on or near the surface of the earth.<br>• Explain and illustrate evaporation and condensation.<br>• Recognize other resources available from water (e.g., energy, transportation, minerals, food). | D. Explain the behavior and impact of the earth's water systems.<br>• Explain the water cycle using the processes of evaporation and condensation.<br>• Describe factors that affect evaporation and condensation.<br>• Distinguish salt from fresh water (e.g., density, electrical conduction).<br>• Compare the effect of water type (e.g., polluted, fresh, salt water) and the life contained in them.<br>• Identify ocean and shoreline features, (e.g., bays, inlets, spit, tidal marshes). | D. Assess the value of water as a resource.<br>• Compare specific sources of potable water (e.g., wells, public systems, rivers) used by people in Pennsylvania.<br>• Identify the components of a municipal/agricultural water supply system and a wastewater treatment system.<br>• Relate aquatic life to water conditions (e.g., turbidity, temperature, salinity, dissolved oxygen, nitrogen levels, pressure).<br>• Compare commercially important aquatic species in or near Pennsylvania.<br>• Identify economic resources found in marine areas.<br>• Assess the natural and man-made factors that affect the availability of clean water (e.g., rock and mineral deposits, man-made pollution). | D. Analyze the principles and history of hydrology.<br>• Analyze the operation and effectiveness of a water purification and desalination system.<br>• Evaluate the pros and cons of surface water appropriation for commercial and electrical use.<br>• Analyze the historical development of water use in Pennsylvania (e.g., recovery of Lake Erie).<br>• Compare the marine life and type of water found in the intertidal, neritic and bathyal zones. |
| **Refer to Environment and Ecology Standards Categories 4.1, 4.3, 4.8 for standards that deal with environmental impact of Earth structures and forces.** | | | |

# Academic Standards for Science and Technology

## 3.6. Technology Education

| 3.6.4. **GRADE 4** | 3.6.7. **GRADE 7** | 3.6.10. **GRADE 10** | 3.6.12. **GRADE 12** |
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| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.<br>• Identify agricultural and industrial production processes that involve plants and animals.<br>• Identify waste management treatment processes.<br>• Describe how knowledge of the human body influences or impacts ergonomic design.<br>• Describe how biotechnology has impacted various aspects of daily life (e.g., health care, agriculture, waste treatment). | A. Explain biotechnologies that relate to related technologies of propagating, growing, maintaining, adapting, treating and converting.<br>• Identify the environmental, societal and economic impacts that waste has in the environment.<br>• Identify and explain the impact that a specific medical advancement has had on society.<br>• Explain the factors that were taken into consideration when a specific object was designed.<br>• Define and describe how fuels and energy can be generated through the process of biomass conversion.<br>• Identify and group basic plant and animal production processes.<br>• explain the impact that agricultural science has had on biotechnology. | A. Apply biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.<br>• Apply knowledge of plant and animal production processes in designing an improvement to existing processes.<br>• Apply knowledge of biomedical technology applications in designing a solution to a simple medical problem (e.g., wheel chair design, artificial arteries).<br>• Apply knowledge of how biomedical technology affects waste products in designing a solution that will result in reduced waste.<br>• Apply ergonomic engineering factors when devising a solution to a specific problem.<br>• Describe various methods of biochemical conversion.<br>• describe specific examples that reflect the impact that agricultural science has had on biotechnology. | A. Analyze biotechnologies that relate to propagating, growing, maintaining, adapting, treating and converting.<br>• Analyze and solve a complex production process problem using biotechnologies (e.g., hydroponics, fish farming, crop propagation).<br>• Analyze specific examples where engineering has impacted society in protection, personal health application or physical enhancement.<br>• Appraise and evaluate the cause and effect and subsequent environmental, economic and societal impacts that result from biomass and biochemical conversion.<br>• Evaluate and apply biotechnical processes to complex plant and animal production methods.<br>• Apply knowledge of biochemical-related technologies to propose alternatives to hazardous waste treatment.<br>• apply knowledge of agricultural science to solve or improve a biochemical related problem. |

## Academic Standards for Science and Technology

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| B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Identify electronic communication methods that exist in the community (e.g., digital cameras, telephone, internet, television, fiber optics).<br>• Identify graphic reproduction methods.<br>• Describe appropriate image generating techniques (e.g., photography, video).<br>• Demonstrate the ability to communicate an idea by applying basic sketching and drawing techniques. | B. Explain information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Demonstrate the effectiveness of image generating technique to communicate a story (e.g., photography, video).<br>• Analyze and evaluate the effectiveness of a graphic object designed and produced to communicate a thought or concept.<br>• Apply basic technical drawing techniques to communicate an idea or solution to a problem.<br>• Apply the appropriate method of communications technology to communicate a thought. | B. Apply knowledge of information technologies of encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Describe the proper use of graphic and electronic communication systems.<br>• Apply a variety of advanced mechanical and electronic drafting methods to communicate a solution to a specific problem.<br>• Apply and analyze advanced communication techniques to produce an image that effectively conveys a message (e.g., desktop publishing, audio and/or video production).<br>• Illustrate an understanding of a computer network system by modeling, constructing or assembling its components. | B. Analyze knowledge of information technologies of processes encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Apply and analyze advanced information techniques to produce a complex image that effectively conveys a message (e.g., desktop publishing, audio and/or video production).<br>• Analyze and evaluate a message designed and produced using still, motion and animated communication techniques.<br>• Describe the operation of fiber optic, microwave and satellite informational systems.<br>• Apply various graphic and electronic information techniques to solve real world problems (e.g., data organization and analysis, forecasting, interpolation). |
| C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.<br>• Identify and group a variety of construction tasks.<br>• Identify the major construction systems present in a specific local building.<br>• Identify specific construction systems that depend on each other in order to complete a project.<br>• Know skills used in construction.<br>• Identify examples of manufactured goods present in the home and school. | C. Explain physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design.<br>• Use knowledge of material effectiveness to solve specific construction problems (e.g., steel vs. wood bridges).<br>• Differentiate among the different types of construction applications (e.g., microwave tower, power plants, aircrafts). | C. Apply physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.<br>• Describe and classify common construction by their characteristics and composition.<br>• Compare and contrast specific construction systems that depend on each other in order to complete a project.<br>• Evaluate material failure common to specific applications. | C. Analyze physical technologies of structural design, analysis and engineering, personnel relations, financial affairs, structural production, marketing, research and design to real world problems.<br>• Apply knowledge of construction technology by designing, planning and applying all the necessary resources to successfully solve a construction problem.<br>• Compare resource options in solving a specific manufacturing problem. |

## Academic Standards for Science and Technology

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| • Identify basic resources needed to produce a manufactured item.<br>• Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching).<br>• Identify waste and pollution resulting from a manufacturing enterprise.<br>• Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).<br>• Identify transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.<br>• Identify and experiment with simple machines used in transportation systems.<br>• Explain how improved transportation systems have changed society. | • Explain basic material processes that manufactured objects undergo during production. (e.g., separating, forming, combining).<br>• Evaluate a construction activity by specifying task analyses and necessary resources.<br>• Explain the relationships among the basic resources needed in the production process for a specific manufactured object.<br>• Explain the difference between design engineering and production engineering processes.<br>• Analyze manufacturing steps that affect waste and pollutants.<br>• Explain transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.<br>• Identify and explain the workings of several mechanical power systems.<br>• Model and explain examples of vehicular propulsion, control, guidance, structure and suspension systems.<br>• Explain the limitations of land, marine, air and space transportation systems. | • Demonstrate knowledge of various construction systems by building or interpreting models.<br>• Select and apply the necessary resources to successfully conduct a manufacturing enterprise.<br>• Apply concepts of design engineering and production engineering in the organization and application of a manufacturing activity.<br>• Apply the concepts of manufacturing by redesigning an enterprise to improve productivity or reduce or eliminate waste and/or pollution.<br>• Evaluate the interrelationship of various transportation systems in the community.<br>• Analyze the impacts that transportation systems have on a community. | • Analyze and apply complex skills needed to process materials in complex manufacturing enterprises.<br>• Apply advanced information collection and communication techniques to successfully convey solutions to specific construction problems.<br>• Assess the importance of capital on specific construction applications.<br>• Analyze the positive and negative qualities of several different types of materials as they would relate to specific construction applications.<br>• Analyze transportation technologies of propelling, structuring, suspending, guiding, controlling and supporting.<br>• Analyze the concepts of vehicular propulsion, guidance, control, suspension and structural systems while designing and producing specific complex transportation systems. |

189

# Academic Standards for Science and Technology

## 3.7. Technological Devices

| 3.7.4. **GRADE 4** | 3.7.7. **GRADE 7** | 3.7.10. **GRADE 10** | 3.7.12. **GRADE 12** |
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| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Explore the use of basic tools, simple materials and techniques to safely solve problems.<br>• Describe the scientific principles on which various tools are based.<br>• Group tools and machines by their function.<br>• Select and safely apply appropriate tools and materials to solve simple problems. | A. Describe the safe and appropriate use of tools, materials and techniques to answer questions and solve problems.<br>• Identify uses of tools, machines, materials, information, people, money, energy and time that meet specific design criteria.<br>• Describe safe procedures for using tools and materials.<br>• Assess materials for appropriateness of use. | A. Identify and safely use a variety of tools, basic machines, materials and techniques to solve problems and answer questions.<br>• Select and safely apply appropriate tools, materials and processes necessary to solve complex problems.<br>• Apply advanced tool and equipment manipulation techniques to solve problems. | A. Apply advanced tools, materials and techniques to answer complex questions.<br>• Demonstrate the safe use of complex tools and machines within their specifications.<br>• Select and safely apply appropriate tools, materials and processes necessary to solve complex problems that could result in more than one solution.<br>• Evaluate and use technological resources to solve complex multi-step problems. |
| B. Select appropriate instruments to study materials.<br>• Develop simple skills to measure, record, cut and fasten.<br>• Explain appropriate instrument selection for specific tasks. | B. Use appropriate instruments and apparatus to study materials.<br>• Select appropriate instruments to measure the size, weight, shape and temperature of living and non-living objects.<br>• Apply knowledge of different measurement systems to measure and record objects' properties. | B. Apply appropriate instruments and apparatus to examine a variety of objects and processes.<br>• Describe and use appropriate instruments to gather and analyze data.<br>• Compare and contrast different scientific measurement systems; select the best measurement system for a specific situation.<br>• Explain the need to estimate measurements within error of various instruments.<br>• Apply accurate measurement knowledge to solve everyday problems.<br>• Describe and demonstrate the | B. Evaluate appropriate instruments and apparatus to accurately measure materials and processes.<br>• Apply and evaluate the use of appropriate instruments to accurately measure scientific and technologic phenomena within the error limits of the equipment.<br>• Evaluate the appropriate use of different measurement scales (macro and micro).<br>• Evaluate the utility and advantages of a variety of absolute and relative measurement scales for their appropriate application. |

## Academic Standards for Science and Technology

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| | | operation and use of advanced instrumentation in evaluating material and chemical properties (e.g., scanning electron microscope, nuclear magnetic resonance machines). | |
| **Computer literacy, including the use of hardware and software in standard statements C, D, and E, should be integrated across all content areas.** | | | |
| C. Identify basic computer operations and concepts.<br>• Identify the major parts necessary for a computer to input and output data.<br>• Explain and demonstrate the basic use of input and output devices (e.g., keyboard, monitor, printer, mouse).<br>• Explain and demonstrate the use of external and internal storage devices (e.g., disk drive, CD drive). | C. Explain and demonstrate basic computer operations and concepts.<br>• Know specialized computer applications used in the community.<br>• Describe the function of advanced input and output devices (e.g., scanners, video images, plotters, projectors) and demonstrate their use.<br>• Demonstrate age appropriate keyboarding skills and techniques. | C. Apply basic computer operations and concepts.<br>• Identify solutions to basic hardware and software problems.<br>• Apply knowledge of advanced input devices.<br>• Apply knowledge of hardware setup.<br>• Describe the process for basic software installation and demonstrate it.<br>• Analyze and solve basic operating systems problems.<br>• Apply touch keyboarding skills and techniques at expectable speed and accuracy.<br>• Demonstrate the ability to perform basic software installation. | C. Evaluate computer operations and concepts as to their effectiveness to solve specific problems.<br>• Describe and demonstrate atypical software installation.<br>• Analyze and solve hardware and advanced software problems.<br>• Assess and apply multiple input and output devices to solve specific problems. |
| D. Use basic computer software.<br>• Apply operating system skills to perform basic computer tasks.<br>• Apply basic word processing skills.<br>• Identify and use simple graphic and presentation graphic materials generated by the computer.<br>• Apply specific instructional software. | D. Apply computer software to solve specific problems.<br>• Identify software designed to meet specific needs (e.g., Computer Aided Drafting, design software, tutorial, financial, presentation software).<br>• Identify and solve basic software problems relevant to specific software applications.<br>• Identify basic multimedia | D. Utilize computer software to solve specific problems.<br>• Identify legal restrictions in the use of software and the output of data.<br>• Apply advanced graphic manipulation and desktop publishing techniques.<br>• Apply basic multimedia applications.<br>• Apply advanced word processing, database and spreadsheet skills. | D. Evaluate the effectiveness of computer software to solve specific problems.<br>• Evaluate the effectiveness of software to produce an output and demonstrate the process.<br>• Design and apply advanced multimedia techniques.<br>• Analyze, select and apply the appropriate software to solve complex problems.<br>• Evaluate the effectiveness of the |

## Academic Standards for Science and Technology

192

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| | applications.<br>• Demonstrate a basic knowledge of desktop publishing applications.<br>• Apply intermediate skills in utilizing word processing, database and spreadsheet software.<br>• Apply basic graphic manipulation techniques. | • Describe and demonstrate how two or more software applications can be used to produce an output.<br>• Select and apply software designed to meet specific needs. | computer as a presentation tool.<br>• Analyze the legal responsibilities of computer users. |
| E. Identify basic computer communications systems.<br>• Apply a web browser.<br>• Apply basic electronic mail functions.<br>• Use on-line searches to answer age appropriate questions. | E. Explain basic computer communications systems.<br>• Describe the organization and functions of the basic parts that make up the World Wide Web.<br>• Apply advanced electronic mail functions.<br>• Apply basic on-line research techniques to solve a specific problem. | E. Apply basic computer communications systems.<br>• Identify and explain various types of on-line services.<br>• Identify and explain the function of the parts of a basic network.<br>• Describe and apply the components of a web page and their function.<br>• Explain and demonstrate file transfer within and out side of a computer network.<br>• Identify, describe and complete advanced on-line research. | E. Assess the effectiveness of computer communications systems.<br>• Assess the effectiveness of a computer based communications system.<br>• Transfer files among different computer platforms.<br>• Analyze the effectiveness of on-line information resources to meet the needs for collaboration, research, publications, communications and productivity.<br>• Apply knowledge of protocol standards to solve connectivity problems. |

# Academic Standards for Science and Technology

**3.8. Science, Technology and Human Endeavors**

| 3.8.4. **GRADE 4** | 3.8.7. **GRADE 7** | 3.8.10. **GRADE 10** | 3.8.12. **GRADE 12** |
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| ***Pennsylvania's public schools shall teach, challenge and support every student to realize his or her maximum potential and to acquire the knowledge and skills needed to . . .*** | | | |
| A. Know that people select, create and use science and technology and that they are limited by social and physical restraints.<br>• Identify and describe positive and negative impacts that influence or result from new tools and techniques.<br>• Identify how physical technology (e.g., construction, manufacturing, transportation), informational technology and biotechnology are used to meet human needs.<br>• Describe how scientific discoveries and technological advancements are related.<br>• Identify interrelationships among technology, people and their world.<br>• Apply the technological design process to solve a simple problem. | A. Explain how sciences and technologies are limited in their effects and influences on society.<br>• Identify and describe the unavoidable constraints of technological design.<br>• Identify changes in society as a result of a technological development.<br>• Identify and explain improvements in transportation, health, sanitation and communications as a result of advancements in science and technology and how they effect our lives. | A. Analyze the relationship between societal demands and scientific and technological enterprises.<br>• Identify past and current tradeoffs between increased production, environmental harm and social values (e.g., increased energy needs, power plants, automobiles).<br>• Compare technologies that are applied and accepted differently in various cultures (e.g., factory farming, nuclear power).<br>• Describe and evaluate social change as a result of technological developments.<br>• Assess the social impacts of a specific international environmental problem by designing a solution that applies the appropriate technologies and resources. | A. Synthesize and evaluate the interactions and constraints of science and technology on society.<br>• Compare and contrast how scientific and technological knowledge is both shared and protected.<br>• Evaluate technological developments that have changed the way humans do work and discuss their impacts (e.g., genetically engineered crops).<br>• Evaluate socially proposed limitations of scientific research and technological application. |
| B. Know how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.<br>• Identify and distinguish between human needs and improving the quality of life.<br>• Identify and distinguish between | B. Explain how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.<br>• Identify interrelationships between systems and resources.<br>• Identify and describe the resources necessary to solve a selected problem in a community and improve the quality of life. | B. Analyze how human ingenuity and technological resources satisfy specific human needs and improve the quality of life.<br>• Identify several problems and opportunities that exist in your community, apply various problem-solving methods to design and evaluate possible solutions.<br>• Analyze a recently invented item, | B. Apply the use of ingenuity and technological resources to solve specific societal needs and improve the quality of life.<br>• Apply appropriate tools, materials and processes to solve complex problems.<br>• Use knowledge of human abilities to design or modify technologies that extend and enhance human |

## Academic Standards for Science and Technology

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| natural and human-made resources.<br>• Describe a technological invention and the resources that were used to develop it. | • identify and explain specific examples of how agricultural science has met human needs and has improved the quality of life. | describing the human need that prompted its invention and the current and potential social impacts of the specific invention.<br>• Apply knowledge of oceanography, meteorology, geology and human anatomy to explain important considerations that need to be made for construction of homes, buildings and businesses in the United States.<br>• Assess the impacts that agricultural science has had on meeting human needs and improving the quality of life. | abilities.<br>• Apply appropriate tools, materials and processes to physical, informational or biotechnological systems to identify and recommend solutions to international problems.<br>• apply knowledge of agricultural science to develop a solution that will improve on a human need or want. |
| C. Know the pros and cons of possible solutions to scientific and technological problems in society.<br>• Compare the positive and negative expected and unexpected impacts of technological change.<br>• Identify and discuss examples of technological change in the community that have both positive and negative impacts. | C. Identify the pros and cons of applying technological and scientific solutions to address problems and the effect upon society.<br>• Describe the positive and negative expected and unexpected effects of specific technological developments.<br>• Describe ways technology extends and enhances human abilities. | C. Evaluate possibilities consequences and impacts of scientific and technological solutions.<br>• Relate scientific and technological advancements in terms of cause and effect.<br>• Describe and evaluate the impacts that financial considerations have had on specific scientific and technological applications.<br>• Compare and contrast potential solutions to technological, social, economic and environmental problems.<br>• Analyze the impacts on society of accepting or rejecting scientific and technological advances. | C. Evaluate the consequences and impacts of scientific and technological solutions.<br>• Propose solutions to specific scientific and technological applications, identifying possible financial considerations.<br>• Analyze scientific and technological solutions through the use of risk/benefit analysis.<br>• Analyze and communicate the positive or negative impacts that a recent technological invention had on society.<br>• Evaluate and describe potential impacts from emerging technologies and the consequences of not keeping abreast of technological advancements (e.g., assessment alternatives, risks, benefits, costs, economic impacts, constraints). |

## Academic Standards for Science and Technology

# IX. GLOSSARY

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| **Allele:** | Any of a set of possible forms of a gene. |
| **Biochemical conversion:** | The changing of organic matter into other chemical forms. |
| **Biomass conversion:** | The changing of organic matter that has been produced by photosynthesis into useful liquid, gas or fuel. |
| **Biomedical technology:** | The application of health care theories to develop methods, products and tools to maintain or improve homeostasis. |
| **Biomes:** | A community of living organisms of a single major ecological region. |
| **Biotechnology**: | The ways that humans apply biological concepts to produce products and provide services. |
| **Carbon chemistry:** | The science of the composition, structure, properties and reactions of carbon based matter, especially of atomic and molecular systems; sometimes referred to as organic chemistry. |
| **Construction technology**: | The ways that humans build structures on sites. |
| **Desalinization:** | To remove salts and other chemicals from sea or saline water. |
| **Dichotomous:** | Divided or dividing into two parts or classifications. |
| **Electronic communication:** | System for the transmission of information using electronic technology (e.g., digital cameras, cellular telephones, Internet, television, fiber optics). |
| **Embryology**: | The branch of biology dealing with the development of living things from fertilized egg to its developed state. |
| **Engineering:** | The application of scientific, physical, mechanical and mathematical principles to design processes, products and structures that improve the quality of life. |

# Academic Standards for Science and Technology

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| **Enzyme:** | A protein that increases the rate of a chemical reaction without being changed by the reaction; an organic catalyst. |
| **Ergonomical:** | Of or relating to the design of equipment or devices to fit the human body's control, position, movement and environment. |
| **Evolution:** | A process of change that explains why what we see today is different from what existed in the past; it includes changes in the galaxies, stars, solar system, earth and life on earth. biological evolution is a change in hereditary characteristics of groups of organisms over the course of generations. |
| **Fact:** | Information that has been objectively verified. |
| **Geologic hazard:** | A naturally occurring or man-made condition or phenomenon that presents a risk or is a potential danger to life and property (e.g., landslides, floods, earthquakes, ground subsidence, coastal and beach erosion, faulting, dam leakage and failure, mining disasters, pollution and waste disposal, sinkholes). |
| **Geologic map:** | A representation of a region on which is recorded earth information (e.g., the distribution, nature and age relationships of rock units and the occurrences of structural features, mineral deposits and fossil localities). |
| **Hydrology:** | The scientific study of the properties, distribution and effects of water on the earth's surface, in the soil and underlying rocks and in the atmosphere. |
| **Hypothesis:** | An assertion subject to verification or proof as a premise from which a conclusion is drawn. |
| **Information technology**: | The technical means that humans create to store and transmit information. |
| **Inquiry:** | A systematic process for using knowledge and skills to acquire and apply new knowledge. |
| **Instructional technology:** | Any mechanical aid (including computer technology) used to assist in or enhance the process of teaching and learning. |
| **Law:** | Summarizing statement of observed experimental facts that has been tested many times and is generally accepted as true. |

## Academic Standards for Science and Technology

**Manufacturing technology**: The ways that humans produce goods and products.

**Mitosis:** The sequential differentiation and segregation of replicated chromosomes in a cell's nucleus that precedes complete cell division.

**Model**: A description, analogy or a representation of something that helps us understand it better (e.g., a physical model, a conceptual model, a mathematical model).

**Nova:** A variable star that suddenly increases in brightness to several times its normal magnitude and returns to its original appearance in a few weeks to several months or years.

**Patterns**: Repeated processes that are exhibited in a wide variety of ways; identifiable recurrences of the element and/or the form.

**Physical technology:** The ways that humans construct, manufacture and transport products.

**Radioactive isotope:** An atom that gives off nuclear radiation and has the same number of protons (atomic number) as another atom but a different number of neutrons.

**Relationship between science and technology**: Science builds principles or theories while technology is the practical application of those principles or theories.

**Scale**: Relates concepts and ideas to one another by some measurement (e.g., quantitative, numeral, abstract, ideological); provides a measure of size and/or incremental change.

**Science:** Search for understanding the natural world using inquiry and experimentation.

**System**: A group of related objects that work together to achieve a desired result.

- **Open Loop system**: A group of related objects that do not have feedback and cannot modify themselves.
- **Closed Loop system:** A group of related objects that have feedback and can modify themselves.
- **Subsystem:** A group of related objects that make up a larger system (e.g., automobiles have electrical systems, fuel systems).

# Academic Standards for Science and Technology

| | |
|---|---|
| **Technology education**: | The application of tools, materials, processes and systems to solve problems and extend human capabilities. |
| **Technological design process:** | Recognizing the problem, proposing a solution, implementing the solution, evaluating the solution and communicating the problem, design and solution. |
| **Theory:** | Systematically organized knowledge applicable in a relatively wide variety of circumstances; especially, a system of assumptions, accepted principles and rules of procedure devised to analyze, predict or otherwise explain the nature or behavior of a specified set of phenomena. |
| **Theory of evolution:** | A theory that the various types of animals and plants have their origin in other preexisting types and that the distinguishable differences are due to modification in successive generations. |
| **Topographic map:** | A representation of a region on a sufficient scale to show detail, selected man-made and natural features of a portion of the land surface including its relief and certain physical and cultural features; the portrayal of the position, relation, size, shape and elevation of the area. |
| **Transportation systems:** | A group of related parts that function together to perform a major task in any form of transportation. |
| **Transportation technology**: | The physical ways humans move materials, goods and people. |
| **Tool**: | Any device used to extend human capability including computer-based tools. |

Appendix E

**2007 NATIONAL EDUCATIONAL TECHNOLOGY STANDARDS FOR STUDENTS (NETS)**

**National Educational Technology Standards for Students: The Next Generation**

**"What students should know and be able to do to learn effectively and live productively in an increasingly digital world …"**

**1. Creativity and Innovation**

Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:

a. apply existing knowledge to generate new ideas, products, or processes.
b. create original works as a means of personal or group expression.
c. use models and simulations to explore complex systems and issues.
d. identify trends and forecast possibilities.

**2. Communication and Collaboration**

Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:

a. interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media.
b. Communicate information and ideas effectively to multiple audiences using a variety of media and formats.
c. develop cultural understanding and global awareness by engaging with learners of other cultures.
d. contribute to project teams to produce original works or solve problems.

**3. Research and Information Fluency**

Students apply digital tools to gather, evaluate, and use information. Students:

a. plan strategies to guide inquiry.
b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
d. process data and report results.

**4. Critical Thinking, Problem-Solving & Decision-Making**

Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:

a. identify and define authentic problems and significant questions for investigation.
b. plan and manage activities to develop a solution or complete a project.
c. collect and analyze data to identify solutions and/or make informed decisions.
d. use multiple processes and diverse perspectives to explore alternative solutions.

**5. Digital Citizenship**

Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:

a. advocate and practice safe, legal, and responsible use of information and technology.
b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
c. demonstrate personal responsibility for lifelong learning.
d. exhibit leadership for digital citizenship.

**6. Technology Operations and Concepts**

Students demonstrate a sound understanding of technology concepts, systems and operations. Students:

a. understand and use technology systems.
b. select and use applications effectively and productively.
c. troubleshoot systems and applications.
d. transfer current knowledge to learning of new technologies.

Appendix F

**INITIAL CURRICULUM TEMPLATE USED BY THE WEST ALLEGHENY SCHOOL DISTRICT (SAMPLE)**

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| **Unit Content** | **Student Outcomes** | **Level of Proficiency** (I-Introduce, R-Review, M-Master) | **PDE Academic Standards for Science and Technology** | **International Society of Technology Education (NETS)** |
|---|---|---|---|---|
| | The student will: | | A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.<br>• Identify agricultural and industrial production processes that involve plants and animals.<br>• Identify waste management treatment processes.<br>• Describe how knowledge of the human body influences or impacts ergonomic design.<br>• Describe how biotechnology has impacted various aspects of daily life | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations. Students:<br>a. understand and use technology systems.<br>d. transfer current knowledge to learning of new |

ISTE Passed New NETS After Template Was Created

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | (e.g., health care, agriculture, waste treatment). | technologies. |
| | The student will: | | B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Identify electronic communication methods that exist in the community (e.g., digital cameras, telephone, internet, television, fiber optics).<br>• Identify graphic reproduction methods.<br>• Describe appropriate image generating techniques (e.g., photography, video).<br>• Demonstrate the ability to communicate an idea by applying basic sketching and | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.<br>Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**2. Communication and Collaboration**<br>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.<br>Students:<br>b. communicate information and ideas effectively to |

ISTE Passed New NETS After Template Was Created

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | drawing techniques. | multiple audiences using a variety of media and formats.<br>**3. Research and Information Fluency**<br>Students apply digital tools to gather, evaluate, and use information.<br>Students:<br>b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.<br>**4. Critical Thinking, Problem-Solving & Decision-Making**<br>Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources.<br>Students:<br>b. plan and manage activities to develop a solution or |

ISTE Passed New NETS After Template Was Created

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | | complete a project.<br>**5. Digital Citizenship**<br>Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:<br>a. advocate and practice safe, legal, and responsible use of information and technology.<br>b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations. Students:<br>a. understand and use technology systems.<br>b. select and use |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | | applications effectively and productively.<br>d. transfer current knowledge to learning of new technologies. |
| | The student will: | | C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.<br>• Identify and group a variety of construction tasks.<br>• Identify the major construction systems present in a specific local building.<br>• Identify specific construction systems that depend on each other in order to complete a project.<br>• Know skills used in construction.<br>• Identify examples | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.<br>Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**2. Communication and Collaboration**<br>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. |

ISTE Passed New NETS After Template Was Created

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | of manufactured goods present in the home and school.<br>• Identify basic resources needed to produce a manufactured item.<br>• Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching).<br>• Identify waste and pollution resulting from a manufacturing enterprise.<br>• Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).<br>• Identify transportation | Students:<br>b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.<br>**3. Research and Information Fluency**<br>Students apply digital tools to gather, evaluate, and use information.<br>Students:<br>b. locate, organize, analyze, evaluate, ~~synthesize, and~~ ethically use information from a variety of sources and media.<br>**4. Critical Thinking, Problem-Solving & Decision-Making**<br>Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. |

ISTE Passed New NETS After Template Was Created

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | technologies of propelling, structuring, suspending, guiding, controlling and supporting.<br>• Identify and experiment with simple machines used in transportation systems.<br>• Explain how improved transportation systems have changed society. | Students:<br>a. identify and define authentic problems and significant questions for investigation.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations.<br>Students:<br>a. understand and use technology systems.<br>d. transfer current knowledge to learning of new technologies. |

Appendix G

**FINAL CURRICULUM TEMPLATE USED BY THE WEST ALLEGHENY SCHOOL DISTRICT (SAMPLE)**

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | PDE Academic Standards for Science and Technology | International Society of Technology Education (NETS) |
|---|---|---|---|---|
| | The student will: | | A. Know that biotechnologies relate to propagating, growing, maintaining, adapting, treating and converting.<br>• Identify agricultural and industrial production processes that involve plants and animals.<br>• Identify waste management treatment processes.<br>• Describe how knowledge of the human body influences or impacts ergonomic design.<br>• Describe how biotechnology has impacted various aspects of daily life | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.<br>Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations.<br>Students:<br>a. understand and use technology systems.<br>d. transfer current knowledge to learning of new |

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | (e.g., health care, agriculture, waste treatment). | technologies. |
| | The student will: | | B. Know that information technologies involve encoding, transmitting, receiving, storing, retrieving and decoding.<br>• Identify electronic communication methods that exist in the community (e.g., digital cameras, telephone, internet, television, fiber optics).<br>• Identify graphic reproduction methods.<br>• Describe appropriate image generating techniques (e.g., photography, video).<br>• Demonstrate the ability to communicate an idea by applying basic sketching and | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.<br>Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**2. Communication and Collaboration**<br>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.<br>Students:<br>b. communicate information and ideas effectively to |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | drawing techniques. | multiple audiences using a variety of media and formats.<br>**3. Research and Information Fluency**<br>Students apply digital tools to gather, evaluate, and use information. Students:<br>b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.<br>**4. Critical Thinking, Problem-Solving & Decision-Making**<br>Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:<br>b. plan and manage activities to develop a solution or |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | | complete a project.<br>**5. Digital Citizenship**<br>Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:<br>a. advocate and practice safe, legal, and responsible use of information and technology.<br>b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations. Students:<br>a. understand and use technology systems.<br>b. select and use |

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | | applications effectively and productively.<br>d. transfer current knowledge to learning of new technologies. |
| | The student will: | | C. Know physical technologies of structural design, analysis and engineering, finance, production, marketing, research and design.<br>• Identify and group a variety of construction tasks.<br>• Identify the major construction systems present in a specific local building.<br>• Identify specific construction systems that depend on each other in order to complete a project.<br>• Know skills used in construction.<br>• Identify examples | **1. Creativity and Innovation**<br>Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.<br>Students:<br>a. apply existing knowledge to generate new ideas, products, or processes.<br>**2. Communication and Collaboration**<br>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | of manufactured goods present in the home and school.<br>• Identify basic resources needed to produce a manufactured item.<br>• Identify basic component operations in a specific manufacturing enterprise (e.g., cutting, shaping, attaching).<br>• Identify waste and pollution resulting from a manufacturing enterprise.<br>• Explain and demonstrate the concept of manufacturing (e.g., assemble a set of papers or ball point pens sequentially, mass produce an object).<br>• Identify transportation | Students:<br>b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.<br>**3. Research and Information Fluency**<br>Students apply digital tools to gather, evaluate, and use information.<br>Students:<br>b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.<br>**4. Critical Thinking, Problem-Solving & Decision-Making**<br>Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. |

STUDENT OUTCOME STATEMENTS – INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **GRADE/COURSE:** | 3.6.4 **(Revised with 2007 NETS)** |
| **INSTRUCTIONAL UNIT:** | |

| | | | | |
|---|---|---|---|---|
| | | | technologies of propelling, structuring, suspending, guiding, controlling and supporting.<br>• Identify and experiment with simple machines used in transportation systems.<br>• Explain how improved transportation systems have changed society. | Students:<br>a. identify and define authentic problems and significant questions for investigation.<br>**6. Technology Operations and Concepts**<br>Students demonstrate a sound understanding of technology concepts, systems and operations.<br>Students:<br>a. understand and use technology systems.<br>d. transfer current knowledge to learning of new technologies. |

Appendix H

**WEST ALLEGHENY SCHOOL DISTRICT NEEDS ASSESSMENT**

**West Allegheny School District**
**Needs Assessment: Technology**

Section 1: Where are we?

1. Where are we?

2. How many of your students would you estimate are performing at or above proficient in technological literacy?

3. Should we be doing better?

4. Do we have enough information to make a good assessment of our school?

5. How would you rate our school district compared to those around us?

6. What data do you feel are important for us to look at to see how we are doing?

Section 2: Where do we want to go?

7. What data would you like to have access to, to plan for the future?

8. What goals should we set for our students?

9. What technology skills should our students have upon graduation?

*Adapted from the North Central Regional Educational Laboratory's Data Use: Data Primer (www.ncrel.org/datause/dataprimer)
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10. What areas do you feel we need to improve upon?

11. What courses would you like us to add?

12. What courses should we modify?

13. Is one subject area, or grade level lacking in technology instruction?

14. What course of action should we take to meet this need?

15. Should we focus on subject area or grade level?

16. What would you consider a reasonable time period to fill this need(s)?

17. What factors do we need to consider to meet this need(s)?

18. What resources would we need to allocate to meet this need(s)?

19. How can we better meet the needs of our community?

20. Do you have any additional concerns or suggestions for technology improvement?

*Adapted from the North Central Regional Educational Laboratory's Data Use:  Data Primer (www.ncrel.org/datause/dataprimer)
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Section 3:  How fast are we moving and in what direction?

21. How do we know we're headed in the right direction?

22. Are we on target to meet the NCLB requirement for technological literacy by the end of eighth grade?

23. Are we on target and is our curriculum aligned with the PDE Academic Standards for Technology?

24. What can we do to align our technology curriculum with NCLB and the PDE Standards?

25. What kinds of targets should we establish?

26. What timeline should we set to meet these targets?

27. How can we verify that our strategy is working?

28. What measures might be useful?

*Adapted from the North Central Regional Educational Laboratory's Data Use:  Data Primer (www.ncrel.org/datause/dataprimer)
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Section 4: Are we leaving anyone behind?

29. Are we leaving anyone behind?

30. What are the characteristics of these students?

31. Do they fall into a distinct group?

32. What can we do to meet their needs and improve their performance?

*Adapted from the North Central Regional Educational Laboratory's Data Use: Data Primer (www.ncrel.org/datause/dataprimer)
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Appendix I

**WEST ALLEGHENY SCHOOL DISTRICT: COMPARISON OF**

**COMPARABLY SIZED SCHOOL DISTRICTS**

# West Allegheny School District
## District Comparison - Computer Technology
## Philosophy & Staffing

| School District | Philosophy | Scheduling | | |
|---|---|---|---|---|
| | | Elementary | Middle School | High School |
| Chartiers Valley | [Chartiers Valley Technology Philosophy] | 40 min./week Fundamentals | Embedded in curriculum/labs used by classroom teacher. Classes on rotation basis (6 or 9 weeks). | Course specific/no graduation requirement |
| Fox Chapel | Informal philosophy only - students should be technologically proficient. | Weekly | Keyboarding in 6th grade, technology integrated into all subject areas. Classes on 9-week rotation. | Course specific/1 full credit required for graduation (awaiting SB approval to implement 2007) |
| Gateway | No formal technology philosophy | K-4: 1 day a week for 6 weeks<br>5&6: Keyboarding - every day for 6 week/rotation | 7 & 8 weekly | 9th grade - required 1 semester of Information Technology (MS Office), other electives are course specific. |
| Hampton Township | Part of technology plan - "to use technology as a natural tool in school and society" | Min. once/week. Frequency determined by comfort level of classroom teacher. Increases with grade level. | 6th grade is a 6 week rotation, 7&8 receive 24 weeks of technology instruction. | Course specific/MS Office is a graduation requirement (to be dropped 2007, now that they require MS rotation). |
| Highlands | Part of technology plan | No formal Curriculum. Skills are integrated with classroom instruction. In computer lab weekly. | 6, 7 & 8 = Computer applications for 9 weeks each year. | Requirement in 9th or 10th grade = 1 year of Computer Applications. All others are course specific. |

# West Allegheny School District
## District Comparison - Computer Technology
## Philosophy & Staffing

| School District | Philosophy | Scheduling | | |
|---|---|---|---|---|
| | | Elementary | Middle School | High School |
| Montour | Nothing specific. General guidelines in their technology plan. | Weekly | 5&6 on a 9-week rotation/every other day, graded O, S or U. 7&8 on a 9-week rotation/every other day, graded A-F. | Course specific/No tech requirement for graduation. |
| Moon Area | Not formal - see Technology Education Introduction | Weekly, with Keyboarding by the end of grade 5 | 6 = Keyboarding for a 9-week rotation + Technology (some computing) for a 9-week rotation. 7 = Computer Science every other day for a 9-week rotation. 8 = Every day for 1 semester + Technology Education for 1 semester. | Course specific/No tech requirement for graduation. |
| Mount Lebanon | No response received after multiple e-mails and phone calls. | | | |
| North Allegheny | North Allegheny students will use current technological tools to interact effectively with global resources for learning. | Weekly | 6 = 12 week rotation. 7 = 6 week rotation. 8 = 12 week rotation | Course specific/No tech requirement for graduation. |
| North Hills | No formal technology philosophy | Weekly | 7=9 wks of keyboarding 8=Nothing 9=1 semester of keyboarding (elective) | Course specific/No tech requirement for graduation. |

# West Allegheny School District
## District Comparison - Computer Technology
## Philosophy & Staffing

| School District | Philosophy | Scheduling | | |
|---|---|---|---|---|
| | | Elementary | Middle School | High School |
| Quaker Valley | No specific technology philosophy. However, the impetus of the district is to be on the forefront of school districts with the use of educational technology in the classroom and to support this mission. | Weekly and throughout the curriculum | 6, 7, & 8 1/2 year | Course specific/No tech requirement for graduation. All students are given MAC laptops. |
| Upper Saint Clair | No technology philosophy | As used by the classroom teacher | As used by the classroom teacher | Course specific/No tech requirement for graduation. *It is possible to graduate with no keyboarding/limited tech skills. |
| West Jefferson Hills | Grades 6, 7 & 8 only | 40 min./week | 6, 7 & 8th grades have a 9-week rotation | Course specific/No tech requirement for graduation since MS Office is required in MS. |

## West Allegheny School District
### District Comparison - Computer Technology
### Staffing & Staff Technology Requirements

| School District | Staffing | | | Staff Technology Requirements |
|---|---|---|---|---|
| | Elementary | Middle School | High School | |
| Chartiers Valley | Classroom teacher/no computer teachers | Classroom teacher/no computer teachers | 2 Business Teachers, 1 physics teacher w/computers, 1 math teacher/C++ | All new teachers must be competent in MS office. |
| Fox Chapel | 4 Computer Resource teachers (1 @ each elementary school) + 5 Library/Media Specialists (1 @ each school + floater) | 1 Computer Resource Teacher, 1 Library/Media Specialist, 3 Technology Education Teachers, 1 Business Education Teacher | 5 Business Education Teachers, 5 Technology Education Teachers, 1 Library/Media Specialist, 2 Music Teachers, 3 Art Teachers | Experience with technology is a plus, but not required of new teachers. In-service training with technology is provided. |
| Gateway | 1 full-time Computer teacher (position to be eliminated next year). | 1 Technology Facilitator (Business certified) | 5 1/2 Business/Computer Teachers | No technology requirements for new teachers. |
| Hampton Township | Classroom teacher/no computer teachers | 1 Business Teacher + 1/2 time technology teacher | 2 Business Teachers + 1/2 time technology teacher | MS office competency for elementary teachers. Web page experience preferred for all teachers, training provided. They are moving to require every teacher to maintain their own web page. |
| Highlands | 2 of the 4 elementary schools have labs & a Technology Coach/Bus. Certified teacher that supports integration into classroom instruction. 2 schools do not have labs. | 3 Computer teachers/Business certified | 4 Computer/Business Teachers | No formal requirement. However, teachers are given additional points if their presented lesson uses instructional technology appropriately. |

# West Allegheny School District
## District Comparison - Computer Technology
## Staffing & Staff Technology Requirements

| School District | Staffing | | | Staff Technology Requirements |
|---|---|---|---|---|
| | **Elementary** | **Middle School** | **High School** | |
| Montour | 2 Computer Teachers (1 at each elementary school) | 1 Computer Teacher | 5 Business/Technology Teachers | No specific technology requirements. |
| Moon Area | 2 Computer Teachers that split their time between 4 elementary schools | 4 Business/Computer Teachers | 4 Business Teachers | MS Office proficiency required. Other software & technology skills enhanced through in-service training and workshops through RMU. |
| Mount Lebanon | | | | |
| North Allegheny | 7 librarians (1 @ each elementary school) teaches computers | 8 (3 specific to computers, 2 mixed with tech ed, 3 specific to tech ed). | Intermediate HS = 3 Business/Computer teachers. HS = 5 Business/Computer Teachers | New teachers must demonstrate a high skill level with best practices in use of classroom technology. Existing teachers are required 4 hours/year of tech training (in their Time Option Hours). |
| North Hills | Classroom teacher/no computer teachers | Info to be received by 1/19/07 per D. Clark @ NHSD. | | New teachers should have MS office skills, but not strictly enforced. |

# West Allegheny School District

## District Comparison - Computer Technology

## Staffing & Staff Technology Requirements

| School District | Staffing | | | Staff Technology Requirements |
|---|---|---|---|---|
| | Elementary | Middle School | High School | |
| Quaker Valley | 1 Technology Education teacher at each elementary school | 1 Technology Education teacher at the middle school, 1 Tech Ed (Ind. Arts) teacher | 2 Technology (computer) Education teachers at the high school, 1 Tech Ed (Ind Arts) teacher | New teachers must demonstrate a mastery of educational technology. All teachers use technology in the classroom and work with the tech ed teachers to integrate it into their classrooms. |
| Upper Saint Clair | Classroom teacher/no computer teachers. Up until this year they did have a separate computer teacher, but that position was eliminated due to budget cuts. | Classroom teacher/no computer teachers | 1 Computer teacher that is business certified. | New teachers should have computer skills, but not enforced. They offer a 3-year induction program that includes technology component. |
| West Jefferson Hills | Classroom teacher/no computer teachers | 1 Computer teacher | 2 Business Teachers, 1 Computer Teacher, 1 Computer/Math Teacher | MS Office proficiency required. Technology proficiency demonstrated by submission of electronic teaching portfolio. Additional technology training is provided in-service. |

Appendix J

## COMPUTER AND TECHNOLOGY CURRICULA BY SCHOOL DISTRICT FOR ALLEGHENY COUNTY, PENNSYLVANIA, PUBLIC SCHOOLS FOR THE 2006-2007 SCHOOL YEAR

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| | ELEMENTARY | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **School District** | **Kindergarten - Basic Computer Operations** | **Grade 1 - Basic Computer Operations** | **Grade 2 - Basic Computer Operations** | **Grade 3 - Basic Computer Operations** | **Grade 3 - Keyboarding** | **Grade 4 - Basic Computer Operations** | **Grade 4 - Keyboarding** | **Grade 5 - Basic Computer Operations** | **Grade 5 - Keyboarding** |
| Allegheny Valley | X | X | X | X | | X | X | X | X |
| Avonworth | X | X | X | X | | X | | X | |
| Baldwin-Whitehall | | | X | | X | X | X | X | X |
| Bethel Park | | | | | | | | | |
| Brentwood Borough | | | | | | | | | |
| Carlynton | | | | | | | | | |
| Chartiers Valley | X | X | X | X | | X | | X | |
| Clairton City | | | | | | | | | |
| Cornell | | | X | X | | X | | X | |
| Deer Lakes | X | X | X | X | | X | | X | |
| Duquesne | X | X | X | X | | X | | X | |
| East Allegheny | | | | | | | | | |
| Elizabeth Forward | X | X | X | X | | X | | X | |
| Fox Chapel Area | X | X | X | X | | X | | X | |
| Gateway | X | X | X | X | | | X | | X |
| Hampton Township | X | X | X | X | | X | | X | |
| Highlands | X | X | X | X | | X | | X | |
| Keystone Oaks | X | X | X | X | | X | X | X | X |
| McKeesport Area | X | X | X | X | | X | | X | |
| Montour | X | X | X | X | | X | X | X | X |
| Moon Area | X | X | X | X | | X | | X | X |
| Mount Lebanon | X | X | X | X | | X | | X | |
| North Allegheny | X | X | X | X | X | X | X | X | X |
| North Hills | X | X | X | X | | X | | X | |
| Northgate | | | | | X | | X | X | |
| Penn Hills | X | X | X | X | | X | | X | |
| Pine-Richland | X | X | X | X | | X | X | X | X |

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| | | ELEMENTARY | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| School District | | Kindergarten - Basic Computer Operations | Grade 1 - Basic Computer Operations | Grade 2 - Basic Computer Operations | Grade 3 - Basic Computer Operations | Grade 3 - Keyboarding | Grade 4 - Basic Computer Operations | Grade 4 - Keyboarding | Grade 5 - Basic Computer Operations | Grade 5 - Keyboarding |
| Pittsburgh Public Schools | Allderdice | X | X | X | X | | X | | X | |
| | Brashear | X | X | X | X | | X | | X | |
| | Carrick | X | X | X | X | | X | | X | |
| | Conroy | X | X | X | X | | X | | X | |
| | Langley | X | X | X | X | | X | | X | |
| | Letsche | X | X | X | X | | X | | X | |
| | Oliver | X | X | X | X | | X | | X | |
| | Peabody | X | X | X | X | | X | | X | |
| | Perry | X | X | X | X | | X | | X | |
| | Schenley | X | X | X | X | | X | | X | |
| | Langley Ann | X | X | X | X | | X | | X | |
| | Westinghous | X | X | X | X | | X | | X | |
| Plum Borough | | X | X | X | X | | X | | X | |
| Quaker Valley | | X | X | X | X | X | X | X | X | X |
| Riverview | | X | X | X | X | | X | | X | |
| Shaler Area | | X | X | X | X | | X | | X | |
| South Allegheny | | | | | X | | X | | X | |
| South Fayette | | X | X | X | X | | X | | X | |
| South Park | | | X | X | X | X | X | X | X | X |
| Steel Valley | | X | X | X | X | | X | | X | |
| Sto-Rox | | | | | | | | | | |
| Upper Saint Clair | | X | X | X | X | | X | | X | |
| West Allegheny | | X | X | X | X | | X | | X | |
| West Jefferson Hills | | X | X | X | X | X | X | X | X | X |
| West Mifflin Area | | X | X | X | X | | X | | X | |
| Wilkinsburg | | X | X | X | X | | X | | X | |
| Woodland Hills | | | | X | X | | X | | | |
| | | 42 | 43 | 46 | 46 | 6 | 46 | 11 | 46 | 11 |
| | | 78% | 80% | 85% | 85% | 11% | 85% | 20% | 85% | 20% |

233

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| | MIDDLE/JUNIOR HIGH SCHOOL | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **School District** | **Grade 6 - Basic Operations/ Ethics** | **Grade 6 - Keyboarding** | **Grade 6 - MS Office** | **Grade 7 - Keyboarding or Word Processing** | **Grade 7 - MS Office** | **Grade 8 - Keyboarding or Word Processing** | **Grade 8 - MS Office** | **Grade 8 - Web Design/ Desktop** |
| Allegheny Valley | X | X | X | X | | X | X | |
| Avonworth | | X | | | | | | |
| Baldwin-Whitehall | X | X | | X | X | X | X | |
| Bethel Park | | | | | | | | |
| Brentwood Borough | X | | X | | X | | X | |
| Carlynton | | | | X | | | X | |
| Chartiers Valley | X | X | X | | X | | X | |
| Clairton City | | | | | | | | |
| Cornell | | | | X | | X | | |
| Deer Lakes | | X | | | X | | X | |
| Duquesne | X | X | | X | X | X | X | |
| East Allegheny | | | | | | | | |
| Elizabeth Forward | | X | X | X | X | X | X | |
| Fox Chapel Area | X | X | | X | | | X | |
| Gateway | | X | | | X | | X | |
| Hampton Township | | X | | X | X | | X | |
| Highlands | | X | | X | | X | | |
| Keystone Oaks | X | | | | X | | X | |
| McKeesport Area | X | X | | X | | | X | |
| Montour | | | X | | X | | X | |
| Moon Area | | X | | X | X | X | X | |
| Mount Lebanon | X | | | X | X | X | X | |
| North Allegheny | X | X | | | X | | X | |
| North Hills | | | X | X | | | | |
| Northgate | | | X | | X | | X | |
| Penn Hills | X | | | | | | | |
| Pine-Richland | | X | | X | | | X | |

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| School District | | MIDDLE/JUNIOR HIGH SCHOOL | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **School District** | | **Grade 6 - Basic Operations/ Ethics** | **Grade 6 - Keyboarding** | **Grade 6 - MS Office** | **Grade 7 - Keyboarding or Word Processing** | **Grade 7 - MS Office** | **Grade 8 - Keyboarding or Word Processing** | **Grade 8 - MS Office** | **Grade 8 - Web Design/ Desktop** |
| Pittsburgh Public Schools | Allderdice | | X | | X | | X | | |
| | Brashear | | X | | X | | X | | |
| | Carrick | | X | | X | | X | | |
| | Conroy | | X | | X | | X | | |
| | Langley | | X | | X | | X | | |
| | Letsche | | X | | X | | X | | |
| | Oliver | | X | | X | | X | | |
| | Peabody | | X | | X | | X | | |
| | Perry | | X | | X | | X | | |
| | Schenley | | X | | X | | X | | |
| | Langley Annex | | X | | X | | X | | |
| | Westinghouse | | X | | X | | X | | |
| Plum Borough | | X | | | X | | X | | |
| Quaker Valley | | X | | | | | | | X |
| Riverview | | X | | | X | X | X | X | |
| Shaler Area | | X | | | X | | X | X | |
| South Allegheny | | | X | | X | | | | |
| South Fayette | | | X | X | X | | | X | |
| South Park | | | X | X | X | X | X | X | |
| Steel Valley | | X | | | X | | X | | |
| Sto-Rox | | | | | | | | X | |
| Upper Saint Clair | | X | | | | | | | |
| West Allegheny | | X | | X | | X | | X | |
| West Jefferson Hills | | | X | | X | | X | | |
| West Mifflin Area | | | X | | X | | X | | |
| Wilkinsburg | | | | X | | X | | X | |
| Woodland Hills | | X | | | X | X | X | X | |
| | | 19 | 32 | 11 | 36 | 19 | 28 | 27 | 1 |
| | | 35% | 59% | 20% | 67% | 35% | 52% | 50% | 2% |

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| | HIGH SCHOOL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| School District | Keyboarding | MS Office | Advanced MS Office | Desktop Publishing | MOS Certification or ICDL | CAD | Multimedia / Web Page Design | Computer Prog. I | > Computer Prog. II | CISCO or ORACLE Academy | A+ Cert/ Networks |
| Allegheny Valley | X | X | X | X | X | X | X | | | | |
| Avonworth | | X | X | | | | X | | | | |
| Baldwin-Whitehall | | X | X | | X | | X | | | | |
| Bethel Park | X | X | | | | | X | | | | |
| Brentwood Borough | X | X | X | | X | X | X | X | | | |
| Carlynton | X | X | | | | | | | | | |
| Chartiers Valley | X | X | | | | X | X | | | X | |
| Clairton City | X | X | | X | | X | X | | | | |
| Cornell | | X | | | | X | X | | | | |
| Deer Lakes | X | X | X | | | X | X | X | X | X | |
| Duquesne | X | X | | | | | | | | | |
| East Allegheny | X | X | X | | X | | X | X | X | | |
| Elizabeth Forward | X | X | | X | | | X | X | X | | |
| Fox Chapel Area | X | X | | X | | X | X | | | | X |
| Gateway | X | X | | X | | X | X | X | X | | |
| Hampton Township | X | X | | | | | X | X | X | | |
| Highlands | | X | | X | | X | X | X | X | | |
| Keystone Oaks | X | X | X | X | | | X | X | | | |
| McKeesport Area | X | X | X | X | | X | X | | | | |
| Montour | X | X | X | | | | X | X | X | | |
| Moon Area | X | X | | X | | X | X | X | X | X | |
| Mount Lebanon | X | X | X | X | X | X | X | X | X | X | |
| North Allegheny | X | X | X | | X | X | X | | | | |
| North Hills | X | X | X | X | X | X | X | X | | | |
| Northgate | | X | | | | | X | | | | |
| Penn Hills | X | X | | X | | X | X | X | X | | |
| Pine-Richland | X | X | X | X | | X | X | | | | |

**Computer & Technology Curriculum**
**By School District**
**For Allegheny County - Public Schools**
**2006-2007 School Year**

| | | HIGH SCHOOL | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **School District** | | **Keyboarding** | **MS Office** | **Advanced MS Office** | **Desktop Publishing** | **MOS Certification or ICDL** | **CAD** | **Multimedia / Web Page Design** | **Computer Prog. I** | **> Computer Prog. II** | **CISCO or ORACLE Academy** | **A+ Cert/ Networks** |
| Pittsburgh Public Schools | Allderdice | X | X | X | | | | X | | | | |
| | Brashear | X | X | X | | | | X | | | X | X |
| | Carrick | X | X | X | | | | X | | | X | X |
| | Conroy | | | | | | | | | | | |
| | Langley | X | X | X | | | | X | | | | |
| | Letsche | X | X | X | | | | X | | | | |
| | Oliver | X | X | X | | | | X | | | X | X |
| | Peabody | X | X | X | | | | X | | | X | X |
| | Perry | X | X | X | | | | X | | | | |
| | Schenley | X | X | X | | | | X | | | | |
| | Langley Annex | | | | | | | | | | | |
| | Westinghouse | X | X | X | | | | X | | | | |
| Plum Borough | | | X | X | | | X | X | X | X | | |
| Quaker Valley | | | X | | X | | X | X | | | X | |
| Riverview | | X | X | | X | | | X | X | X | | |
| Shaler Area | | X | X | | | X | | X | | | | X |
| South Allegheny | | X | X | | X | | | X | | | | |
| South Fayette | | | X | | X | X | X | X | X | X | | |
| South Park | | X | X | X | X | | X | X | X | | | |
| Steel Valley | | X | X | | X | | X | X | | | X | |
| Sto-Rox | | X | X | | | | | X | | | | |
| Upper Saint Clair | | X | X | | X | | X | X | X | X | | |
| West Allegheny | | X | X | X | X | | X | X | X | X | | X |
| West Jefferson Hills | | X | X | | X | | X | X | X | | | |
| West Mifflin Area | | | X | X | X | | X | X | | | | |
| Wilkinsburg | | | X | | | X | | | | | | |
| Woodland Hills | | X | X | X | X | | X | X | X | X | | X |
| | | 42 | 52 | 28 | 24 | 10 | 26 | 49 | 21 | 16 | 10 | 8 |
| | | 78% | 96% | 52% | 44% | 19% | 48% | 91% | 39% | 30% | 19% | 15% |

Appendix K

## [6]WEST ALLEGHENY SCHOOL DISTRICT INFORMATION AND COMMUNICATIONS TECHNOLOGY CURRICULUM FOR GRADES K-12

[6] Accounting is beyond the scope of this dissertation and is therefore not included in this appendix.

# WEST ALLEGHENY SCHOOL DISTRICT
# INFORMATION AND COMMUNICATIONS
# TECHNOLOGY CURRICULUM
# 2006-2007

## ACKNOWLEDGEMENTS

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## National Educational Technology Standards for Students: The Next Generation

**"What students should know and be able to do to learn effectively and live productively in an increasingly digital world ..."**

1. **Creativity and Innovation**
   Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. Students:
   a. apply existing knowledge to generate new ideas, products, or processes.
   b. create original works as a means of personal or group expression.
   c. use models and simulations to explore complex systems and issues.
   d. identify trends and forecast possibilities.

2. **Communication and Collaboration**
   Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others. Students:
   a. interact, collaborate, and publish with peers, experts or others employing a variety of digital environments and media.
   b. communicate information and ideas effectively to multiple audiences using a variety of media and formats.
   c. develop cultural understanding and global awareness by engaging with learners of other cultures.
   d. contribute to project teams to produce original works or solve problems.

3. **Research and Information Fluency**
   Students apply digital tools to gather, evaluate, and use information. Students:
   a. plan strategies to guide inquiry.
   b. locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media.
   c. evaluate and select information sources and digital tools based on the appropriateness to specific tasks.
   d. process data and report results.

4. **Critical Thinking, Problem-Solving & Decision-Making**
   Students use critical thinking skills to plan and conduct research, manage projects, solve problems and make informed decisions using appropriate digital tools and resources. Students:
   a. identify and define authentic problems and significant questions for investigation.
   b. plan and manage activities to develop a solution or complete a project.
   c. collect and analyze data to identify solutions and/or make informed decisions.
   d. use multiple processes and diverse perspectives to explore alternative solutions.

5. **Digital Citizenship**
   Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. Students:
   a. advocate and practice safe, legal, and responsible use of information and technology.
   b. exhibit a positive attitude toward using technology that supports collaboration, learning, and productivity.
   c. demonstrate personal responsibility for lifelong learning.
   d. exhibit leadership for digital citizenship.

6. **Technology Operations and Concepts**
   Students demonstrate a sound understanding of technology concepts, systems and operations. Students:
   a. understand and use technology systems.
   b. select and use applications effectively and productively.
   c. troubleshoot systems and applications.
   d. transfer current knowledge to learning of new technologies.

## Information and Communications Technology Curriculum
## Philosophical Orientation

The 2007 West Allegheny School District Information and Communications Technology Curriculum reflects the philosophical orientation and instructional recommendations advocated by the Computer Science Teachers Association (CSTA) and Partnership for 21st Century Skills and is aligned with the Pennsylvania Technology Standards and National Education Technology Standards (NETS). The goal of information and communications technology instruction is to develop skills and competencies necessary to be productive citizens in the evolving world of the 21st century. Access to information and technology literacy are necessary in order to function in today's society. This is evident through the management of personal affairs, financial decisions, workforce and business skill requirements, and a variety of media.

Information and Communications Technology encompasses a wide range of principles including: applications in information technology and information systems, graphics, databases, information retrieval, programming languages, logic, multi-media applications, and social issues such as Internet security and privacy. A basic understanding of these topics is essential in preparing and empowering students to become technologically literate and proficient in their everyday lives.

Technology instruction must begin at the elementary level to build a foundation for instruction at the middle school and high school levels. Specialized secondary level information and communication technology courses offer interested students the opportunity to study in depth specialized topics of interest that prepare them for entry into the work force or college. Students must demonstrate technology literacy to: communicate using media; access and exchange information; compile, organize, and synthesize; draw conclusions and make generalizations; engage in algorithmic thinking as well as different problem solving methods; understand content and locate information; become self-directed learners; collaborate and cooperate; and interact in ethical ways.

The thoughtful design and implementation of the K-12 District Information and Communications Technology Curriculum provides comprehensive experiences for West Allegheny students. The coordinated instructional efforts among all district teachers maximize students' technology literacy and promote successful student participation in a technological, innovative world.

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS**
**TECHNOLOGY CURRICULUM**

**INDEX**


**KINDERGARTEN** .......... 1
Academic Standards.......... 2
Level of Proficiency.......... 3
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems.......... 4
Keyboarding .......... 5
Word Processing .......... 6
Drawing and Painting .......... 7
Internet .......... 8
Ethics .......... 9

**FIRST GRADE**.......... 10
Academic Standards.......... 11
Level of Proficiency.......... 12
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems.......... 13
Keyboarding .......... 14
Word Processing .......... 15
Drawing and Painting .......... 16
Internet .......... 17
Ethics .......... 18

**SECOND GRADE** .......... 19
Academic Standards.......... 20
Level of Proficiency.......... 21
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems.......... 22
Keyboarding .......... 23
Word Processing .......... 24
Drawing and Painting .......... 25
Internet .......... 26
Ethics .......... 27

**THIRD GRADE**.......... 28
Academic Standards.......... 29
Level of Proficiency.......... 30
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems.......... 31
Keyboarding .......... 32
Word Processing .......... 33
Presentation Skills.......... 34
Internet .......... 35
Ethics .......... 36

**FOURTH GRADE** .... 37
Academic Standards .... 38
Level of Proficiency .... 39
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems .... 40
Keyboarding .... 41
Word Processing .... 42
Presentation Skills .... 43
Spreadsheets .... 44
Internet .... 45
Ethics .... 46

**FIFTH GRADE** .... 47
Academic Standards .... 48
Level of Proficiency .... 49
**INSTRUCTIONAL UNITS**
Hardware and Operating Systems .... 50
Keyboarding .... 51
Word Processing .... 52
Presentation Skills .... 53
Spreadsheets .... 54
Internet .... 55
Ethics .... 56

**GRADE 6** .... 57
Academic Standards .... 58
**INSTRUCTIONAL UNITS**
Unit 1 - Safety .... 59
Unit 2 - Basic Computer Literacy .... 60
Unit 3 - Introduction to Alphabetic Keyboarding .... 61
Unit 4 - Introduction to Word Processing .... 62

**GRADE 7** .... 63
Academic Standards .... 64
**INSTRUCTIONAL UNITS**
Unit 1 – Safety .... 65
Unit 2 – Basic Computer Literacy .... 66
Unit 3 – Alphabetic Keyboarding Review .... 67
Unit 4 – Basic MS Word Review .... 68
Unit 5 – Introduction to Power Point (Basic) .... 69
Unit 6 – Introduction to Power Point (Enhanced) .... 70
Unit 7 – Microsoft Word .... 71

**GRADE 8** .... 72
Academic Standards .... 73
**INSTRUCTIONAL UNITS**
Unit 1 – Safety .... 74
Unit 2 – Alphabetic Keyboarding Review .... 75
Unit 3 – Power Point (Basic) .... 76
Unit 4 – Power Point (Additional Concepts) .... 77
Unit 5 through 13 – Internet Basics .... 78

* ACCOUNTING I / 10-12 …… 87
Academic Standards 88
**INSTRUCTIONAL UNITS**
Safety Unit… . 89
Chapter 1 – Starting a Proprietorship
Cycle 1 – Accounting for a Service Business Organized as a Proprietorship 90
Chapter 2 – Starting a Proprietorship: Changes that Affect Owner's Equity 91
Chapter 3 – Analyzing Transactions into Debit and Credit Parts……… 92
Chapter 4 – Journalizing Transactions ……… 93
Chapter 5 – Posting to a General Ledger 95
Chapter 6 – Cash Control Systems 97
Reinforcement Activity 1 – Part A – The Fitness Center 98
Chapter 7 – Work Sheet for a Service Business 99
Chapter 8 – Financial Statements for a Proprietorship 100
Chapter 9 – Recording Adjusting and Closing Entries for a Service Business 101
Reinforcement Activity 1 – Part B – Fitness Center 102
Business Simulation – Foreign Exchange Translation 103
Chapter 10 – Journalizing Purchases and Cash Payments
Cycle 2 – Accounting for Merchandising Business Organized as a Partnership 104
Chapter 11 – Journalizing Sales and Cash Receipts 106
Chapter 12 – Posting to General and Subsidiary Ledgers 107
Chapter 13 – Preparing Payroll Records 108
Chapter 14 – Payroll Accounting, Taxes, and Reports 110
Chapter 15 – Work Sheet for a Merchandising Business 112
Chapter 16 – Financial Statements for a Partnership 113
Chapter 17 – Recording Adjusting and Closing Entries for a partnership 114
Reinforcement Activity 2, Part A and B – Clearview Optical 115
Business Simulation – Fitness Junction 116

* ACCOUNTING II / 11-12 117
Academic Standards 118
**INSTRUCTIONAL UNITS**
Safety Unit……. 119
Part 1 – Departmentalized Accounting, Introduction 120
Chapter 1 – Recording Departmental Purchases and Cash Payments 122
Chapter 2 – Recording Departmental Sales and Cash Receipts 123
Chapter 3 – Calculating and Recording Departmental Payroll Data 124
Chapter 4 – Financial Reporting for a Departmentalized Business 126
Reinforcement Activity 1 – Campus Books, Inc. 127
Business Simulation – Blue Skies Outfitter 128
Chapter 5 – A Voucher System
Part 2 – Accounting Control systems 129
Chapter 6 – Inventory Planning and Valuation 130
Chapter 7 – Accounting for Uncollectible Accounts 132
Part 3 – General Accounting Adjustments
Chapter 8 – Accounting for Plant Assets 133
Chapter 9 – Accounting for Notes Payable, Prepaid Expenses, and Accrued Expenses 135
Chapter 10 – Accounting for Notes Receivable, Unearned Revenues, and Accrued Revenue 136
Part 4 – Corporation Accounting 137
Chapter 11 – Organizing a Corporation and Paying Dividends 139
Chapter 12 – Acquiring Additional Capital for a Corporation 141
Chapter 13 – Financial Analysis and Reporting for a Corporation 142
Reinforcement Activity 2 – Whitehurst, Inc. 143
Business Simulation – Southgate Hardware 144

* Accounting is beyond the scope of this dissertation and is therefore not included in this appendix.

*ACCOUNTING III / 12 .... 145
Academic Standards .... 146
**INSTRUCTIONAL UNITS**
Safety Unit.... .... 147
Chapter 14 – Budgetary Planning and Control .... 148
Part 5 – Management Accounting
Chapter 15 – Accounting Information for Management Decisions .... 149
Chapter 16 – Financial Statement Analysis .... 151
Chapter 17 – Statement of Cash Flows .... 152
Chapter 18 – Cost Accounting for a Merchandising Business
Part 6 – Cost Accounting .... 154
Chapter 19 – Cost Accounting for a Manufacturing Business .... 155
Chapter 20 – Accounting Transactions and Financial Reporting 156
for a Manufacturing Business .... 156
Reinforcement Activity 3 – Processing and Reporting Cost Accounting Data for a
Manufacturing Business – Furniture Décor, Inc. .... 157
Business Simulation – The Valley Fan Center .... 158
Chapter 21 – Organizational Structure of a Partnership
Part 7 – Other Accounting Systems .... 159
Chapter 22 – Financial Reporting for a Partnership .... 160
Chapter 23 – Budgeting and Accounting for a Not-for-Profit Organization .... 162
Chapter 24 – Financial Reporting for a Not-for-Profit Organization .... 164

**ADVANCED COMPUTER TECHNOLOGY / 10-12** .... 165
Academic Standards .... 166
**INSTRUCTIONAL UNITS**
PC Software .... 167
Network Software .... 168
Network Design and Troubleshooting .... 169
Troubleshooting .... 170
Network Hardware .... 171
PC Hardware ..... .... 172

**BASIC TECHNOLOGY SKILLS / 9** .... 173
Academic Standards .... 174
**INSTRUCTIOINAL UNITS**
Safety Unit......... .... 175
Window Basics .... 176
Improving Keyboarding Skills .... 177
Microsoft Word .... 178
Microsoft Excel .... 179
Microsoft PowerPoint .... 182

**DATABASE / 9-12** .... 184
Academic Standards .... 185
**INSTRUCTIONAL UNITS**
Safety Unit...... .... 186
Project 1 – Creating a Database using Design and Datasheet Views .... 187
Project 2 – Querying a Database using the Select Query Window .... 188
Project 3 – Maintaining a Database using the Design and Update Features of Access .... 190
Data Access Pages .... 192
Project 4 – Reports, Forms, and Combo Boxes .... 193
Project 5 – Enhancing Forms with OLE Fields, Hyperlinks, and Subforms .... 195
Project 6 – Creating an Application System using Macros, Wizards, and the Switchboard
Manager.......... .... 197

* Accounting is beyond the scope of this dissertation and is therefore not included in this appendix.

**DESKTOP PUBLISHING I / 10-12** ........ 198
Academic Standards ........ 199
**INSTRUCTIONAL UNITS**
Safety Unit……. ........ 200
Pagewizard Designs ........ 201
Do's and Don'ts of Desktop Publishing ........ 202
Getting Started with Microsoft Publisher ........ 203
Advanced Features in Microsoft Publisher ........ 204
Creating publication for the "real world" ........ 205

**DESKTOP PUBLISHING II / Newspaper /11-12** ........ 206
Academic Standards ........ 207
**INSTRUCTIONAL UNITS**
Safety Unit…… ........ 208
Newspaper Illustration ........ 209
Outlining the different sections of creating an article ........ 210
Formatting the Layout of the Newspaper ........ 212
Newspaper Portfolio ........ 213
"Real World " Projects ........ 214

**MICROSOFT FRONTPAGE / 9-12** ........ 215
Academic Standards ........ 216
**INSTRUCTIONAL UNITS**
Safety Unit……… ........ 217
Project 1 – Creating a FrontPage Web using a Template ........ 218
Project 2 – Adding a New Web Page to a Web ........ 220
Project 3 – Customizing and Managing Web Pages and Images ........ 222
Project 4 – Creating and Using Interactive Forms on the Web ........ 224
Project 5 – Using Frames to Display Database Results on Web Pages ........ 225

**KEYBOARDING / 9-12** ........ 227
Academic Standards ........ 228
**INSTRUCTIONAL UNITS**
Safety Unit…… ........ 229
Computer Keyboarding: Reinforce and Apply ........ 230
Developing Research Papers ........ 231
Formatting Business Correspondences ........ 232
Enhancing Document Appearance ........ 233
Employment Documentation ........ 234

**POWERPOINT / 9-12** ........ 235
Academic Standards ........ 236
**INSTRUCTIONAL UNITS**
Safety Unit…… ........ 237
Project 1 – Using a Design Template and Text Slide Layout to Create a Presentation ........ 238
Project 2 – Using the Outline Tab and Clip Art to Create a Slide Show ........ 239
Project 3 – Using Visuals to Enhance a Slide Show ........ 240
Project 4 – Modifying Visual Elements and Presentation Formats ........ 241

PROGRAMMING I / INTRO TO PROGRAMMING / 9-12 ........ 243
Academic Standards ........ 244
INSTRUCTIONAL UNITS
Safety Unit……. ........ 245
An Introduction to Computers ........ 246
Unit 2 – Applets and Web Programming ........ 247
Unit 3 – Introducing Java ........ 248
Unit 4 – Variables and Constants ........ 249
Unit 5 – Conditional Control Structures ........ 250
Unit 6 – Loop Structures and Strings ........ 251
Unit 7 – Methods ........ 252
Unit 8 – Classes and Object-Oriented Development ........ 253
Unit 9 – Arrays………. ........ 254

PROGRAMMING II - ADVANCED / VisualBasic.Net / 10-12 ........ 255
Academic Standards ........ 256
INSTRUCTIONAL UNITS
Safety Unit………… ........ 257
Unit 1 – An Introduction to Computers and VB.Net ........ 258
Unit 2 – Problem Solving ........ 259
Unit 3 – Fundamentals of Programming in VB.Net ........ 260
Unit 4 – General Procedures ........ 261
Unit 5 – Decisions ........ 262
Unit 6 – Repetition ........ 263
Unit 7 – Arrays ........ 264
Unit 8 – Sequential Files ........ 265
Unit 9 – Additional Controls and Objects ........ 266

PROGRAMMING III / Advanced Programming / 11-12 ........ 267
Academic Standards ........ 268
INSTRUCTIONAL UNITS
Safety Unit………… ........ 269
Unit 1 – Introducing Java ........ 270
Unit 2 – Variables and Constants ........ 271
Unit 3 – Conditional Control Structures ........ 272
Unit 4 – Loop Structures and Strings ........ 273
Unit 5 – Top-down Design ........ 274
Unit 6 – Objects and Classes ........ 275
Unit 7 – Arrays ........ 276
Unit 8 – GUIs and Event-Driven Programming ........ 277
Unit 9 – Files and Exception Handling ........ 278

SPREADSHEETS / 9-12 ........ 279
Academic Standards ........ 280
INSTRUCTIONAL UNITS
Safety Unit…… ........ 281
Project 1 – Creating a Worksheet and Embedded Chart ........ 282
Project 2 – Formulas, Functions, Formatting, and Web Queries ........ 284
Project 3 – What-If Analysis, Charting, and Working with Large Worksheets ........ 287
Creating Static and Dynamic Web Pages using Excel ........ 290
Project 4 – Financial Functions, Data Tables, Amortization Schedules, and Hyperlinks ........ 291
Project 5 – Creating, Sorting, and Querying a Worksheet Database ........ 293
Project 6 – Creating Templates and Working with Multiple Worksheets and Workbooks ........ 295

**WEBPAGE DESIGN / MACROMEDIA SUITE / 9-12** ........ 297
Academic Standards ........ 298
**INSTRUCTIONAL UNITS**
Lesson 1 – Quick HTML Know-How ........ 299
Lesson 2 – HTML Organization Techniques ........ 300
Lesson 3 – HTML Power Techniques ........ 301
Lesson 4 – HTML Structural Design Techniques ........ 302
Lesson 5 – JavaScript/What is JavaScript? ........ 303
Lesson 6 – JavaScript/Using Images with JavaScript ........ 304
Lesson 7 – JavaScript/Creating Forms with JavaScript ........ 305
Lesson 8 – JavaScript/Using JavaScript with Frames ........ 306
Introduction – Web site Development and Macromedia Dreamweaver 8 ........ 307
Project 1 – Web site Development and Macromedia Dreamweaver 8 ........ 308
Project 2 – Adding Web Pages, Links, and Images ........ 309
Project 3 – Tables and Page Layout ........ 310
Project 4 – Forms ........ 311
Project 5 – Templates and Style Sheets ........ 312
Project 6 – Layers, Image Maps, and Navigation Bars ........ 313

**WORD PROCESSING / 9-12** ........ 314
Academic Standards ........ 315
**INSTRUCTIONAL UNITS**
Basic Skills ........ 316
Appearance Changes for Documents ........ 318
Editing Features ........ 319
Page Formatting ........ 320
Text Organization ........ 321
Advanced Topics ........ 322

**WORD PROCESSING II / 9-12** ........ 323
Academic Standards ........ 324
**INSTRUCTIONAL UNITS**
Safety Unit ........ 325
Tables ........ 326
Lesson 9 – Find and Replace ........ 327
Lesson 11 – Page and Section Breaks ........ 328
Lesson 12 – Page Numbers, Headers, and Footers ........ 329
Advanced Tables ........ 330
Lesson 14 – Columns ........ 331
Lesson 18 – Mail Merges ........ 332
Footnotes and Endnotes ........ 333
Fields ........ 334
Lesson 15 – Styles ........ 335
Lesson 16 – Templates and Wizards ........ 336
Charts ........ 337
Electronic Forms ........ 338
Outlines ........ 339
Indexes and Tables of Contents ........ 340
Master Documents ........ 341
Comments and Revision Marks ........ 342
Macros ........ 343
Portfolio Builder ........ 344
Business Simulation ........ 345

**YEARBOOK I AND II / 11-12**........................................................................................................ 346
.. ......................
Academic Standards.......................................................................................................................... 347
**INSTRUCTIONAL UNITS**
Safety Unit………… ......................................................................................................................... 348
Introduction ........................................................................................................................................ 349
Ethical and Legal Guidelines ............................................................................................................ 350
Photography and Scanning ............................................................................................................... 351
Photojournalism Writing................................................................................................................... 352
Journalism and Interviewing ............................................................................................................. 353
Computer Technology for Yearbook Publication ............................................................................... 354
Ad Campaign……. ........................................................................................................................... 356
Yearbook Spread Completion............................................................................................................. 357
Career Development .......................................................................................................................... 358

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

KINDERGARTEN

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Technology**

**Grade Level:** **Kindergarten**

**ACADEMIC STANDARDS:**

**PA:**
3.7.4 A, C, D, E
3.6.4 B

**NETS:**
1A, 2B, 3C, 4B, 5A, 5B, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This course is an introduction to basic computer skills. Students will learn about hardware and operating systems, drawing software, how to access the Internet, and to use computers in an ethical manner.

**ASSESSMENTS:**

Observation

**TECHNOLOGY USED:**

KidPix software
Teacher approved web sites

Technology Kindergarten

| | |
|---|---|
| | **Hardware and Operating Systems** |
| I | Recognize the following computer hardware: monitor/screen, keyboard, mouse, printer |
| I | Use the following input devices: mouse, keyboard |
| I | Use the following output devices: monitor, printer |
| I | Open and quit programs |
| I | Log on/off the computer with username (e.g. dgk, mgk or wgk) |
| | **Keyboarding** |
| I | Locate and use the following keys: Enter, spacebar, and backspace |
| I | Locate and use the letter and number keys |
| I | Locate the cursor on screen |
| | **Word Processing** |
| I | Type letters, numbers and simple words |
| I | Erase characters using backspace |
| | **Drawing and Painting** |
| I | Explore the basic tools and their uses |
| I | Create a picture using draw or paint |
| I | Draw lines and basic shapes |
| I | Open and use integrated paint program activities to enhance concepts/skills (e.g. Kidpix templates for math and reading) |
| | **Internet** |
| I | Explore teacher approved websites |
| | **Ethics** |
| I | Follow the District Acceptable Use Policy |
| I | Take care of resources |

I – Introduce R - Reinforce M - Master

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Information and Communications Technology** | **GRADE: Kindergarten** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware | recognize the following computer hardware: monitor/screen, keyboard, mouse, printer. | I | 3.7.4.C, D | 3C, 5A, 5B, 6A, 6B, 6D |
| | use the following input devices: mouse/keyboard. | I | | |
| | use the following output devices: printer. | I | | |
| File Management | open and exit programs. | I | | |
| Operating Systems | log on/off the computer with username. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Information and Communications Technology** | **GRADE: Kindergarten** |
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and use the following keys: enter, spacebar, backspace, ctrl, alt & del. | I | 3.7.4.C | 3C, 5A, 5B, 6A |
| | locate and use the letter and number keys. | I | | |
| | locate the cursor on screen. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Information and Communications Technology** | **GRADE: Kindergarten** |
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Using the keyboard | type letters and numbers. | I | 3.7.4.D | 3C, 5A, 5B, 6A |
| Editing | erase characters using the backspace key. | I | ⇩ | ⇩ |

256

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Information and Communications Technology** | **GRADE: Kindergarten** |
| **INSTRUCTIONAL UNIT: Drawing and Painting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Drawing Tools | explore the basic tools and their uses.<br>create a picture using draw tools.<br>draw lines and basic shapes. | I<br>I<br>I | 3.6.4.B | 1A, 1B, 2B, 4B, 5A, 5B, 6A, 6B, 6D |
| File Management/ Integration Activities | open and use integrated paint program activities to enhance concepts/skills (e.g Kidpix templates for math and reading). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Information and Communications Technology | GRADE: Kindergarten |
|---|---|
| INSTRUCTIONAL UNIT: Internet | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | I | 3.7.4.E | 1A, 2B, 5A, 6A |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Information and Communications Technology** | **GRADE: Kindergarten** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | follow the District Acceptable Use Policy. | I | 3.7.4.A | 5A |
| | take care of resources. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY**
**CURRICULUM**

**FIRST GRADE**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** Technology

**Grade Level:** First Grade

**ACADEMIC STANDARDS:**

**PA:**
3.7.4 A, C, D, E
3.6.4 B

**NETS:**
1A, 1B, 2B, 3C, 4B, 5A, 5B, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This course is an introduction and reinforcement of basic computer skills. Students will learn about hardware and operating systems, word processing and drawing software, how to access the Internet, and to use computers in an ethical manner.

**ASSESSMENTS:**

Observation

**TECHNOLOGY USED:**

KidPix software
Word Pad
Teacher approved web sites

Technology Grade 1

| | |
|---|---|
| | **Hardware and Operating Systems** |
| R | Recognize the following computer hardware: monitor/screen, keyboard, mouse, printer |
| R | Use the following input devices: mouse, keyboard |
| R | Use the following output devices: monitor, printer |
| R | Open and exit programs |
| I | Log on/off the computer using username and password |
| I | Access specific network drives |
| | **Keyboarding** |
| R | Locate and use the following keys: Enter, spacebar, Backspace, arrows, Shift, Ctrl, Alt, Delete |
| R | Locate and use the letter and number keys |
| M | Locate the cursor on screen |
| I | Use Shift to type uppercase letters |
| I | Demonstrate the function of Caps |
| I | Locate and use the period, apostrophe, question mark |
| | **Word Processing** |
| I/R | Type letters, numbers, and words |
| I | Type sentences |
| R | Erase characters using backspace and spacebar |
| I | Use Wordpad or Kidpix for word processing |
| | **Drawing and Painting** |
| R | Recognize the basic tools and their uses |
| I | Recognize advanced tools on the drop-down menus and their uses |
| R | Create a picture using draw or paint |
| I | Open and use integrated paint program activities to enhance concepts/skills (Kid Pix templates for math and reading, etc...) |
| | **Internet** |
| R | Explore teacher approved websites |
| | **Ethics** |
| R | Follow the District Acceptable Use Policy |
| R | Take care of resources |

I – Introduce R - Reinforce M - Master

262

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 1** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware | recognize the following computer hardware: monitor/screen, keyboard, mouse, printer. | R | 3.7.4.C, D | 3C, 5A, 5B, 6A |
| | use the following input devices: mouse/keyboard. | R | | |
| | use the following output devices: printer. | R | | |
| Software<br>Operating Systems | open and exit programs. | R | | |
| | log on/off the computer using username and password. | R | | |
| | access specific network drives. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 1** |
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and use the following keys: enter, spacebar, backspace, ctrl, alt & del and arrow keys. | R | 3.7.4.C | 3C, 5A, 5B, 6A |
| | locate and use Shift to type capital letters. | I | | |
| | locate and use the letter and number keys. | R | | |
| | locate the cursor on screen. | M | | |
| | demonstrate the function of Caps Lock. | I | | |
| | locate and use period, apostrophe, and question mark. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 1** |
|---|---|
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Using the keyboard | 1. type letters, numbers and words. | I/R | 3.7.4.D | 3C, 5A, 5B, 6A, 6B |
| Editing | 2. erase characters using the backspace key. | R | | |
| Using the keyboard | 3. type sentences. | I | | |
| | 4. use Wordpad or KidPix for word processing . | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 1** |
|---|---|
| **INSTRUCTIONAL UNIT: Drawing and Painting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Drawing Tools<br>Toolbars | recognize the basic tools and their uses.<br>recognize tools on the drop-down menus and their uses. | R<br>R | 3.6.4.B | 1A, 1B, 4B, 5A, 5B, 6A, 6B, 6D |
| Drawing Tools | create a picture using draw and paint tools. | I | | |
| File Management/ Integration Activities | open and use integrated paint program activities to enhance concepts/skills (e.g Kidpix templates for math and reading). | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Technology | GRADE: 1 |
|---|---|
| **INSTRUCTIONAL UNIT: Internet** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | R | 3.7.4.E | 1A, 2B, 5A, 6A |

266

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 1** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | follow the District Acceptable Use Policy. | R | 3.7.4.A | 5A |
| | take care of resources. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY**
**CURRICULUM**

**SECOND GRADE**

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Technology**

**Grade Level:** **Second Grade**

**ACADEMIC STANDARDS:**

**PA:**
3.7.4 A, C, D, E
3.6.4 B

**NETS:**
1A, 1B, 2B, 3C, 4B, 5A, 5B, 5C, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This course is an introduction and reinforcement of basic computer skills. Students will learn about hardware and operating systems, word processing and drawing software, how to access the Internet, and to use computers in an ethical manner.

**ASSESSMENTS:**

Observation

**TECHNOLOGY USED:**

KidPix software
Word Pad
Teacher approved web sites

Technology Grade 2

| | |
|---|---|
| | **Hardware and Operating Systems** |
| M | Identify and name the monitor/screen, keyboard, mouse, printer |
| M | Use the following input devices properly: mouse, keyboard |
| M | Use the following output devices: monitor, printer |
| R | Log on/off the computer using username and password |
| R | Access specific network drives |
| M | Open and exit a program |
| I | Open, close, and resize windows |
| | **Keyboarding** |
| M | Locate and use the following keys: Enter, spacebar, Backspace, arrows, Shift, Ctrl, Alt, Delete |
| R | Locate and use the letter and number keys |
| M | Locate the cursor on screen |
| I | Use Shift to type uppercase letters |
| I/R | Demonstrate the function of Caps and Num Lock |
| I | Locate and use all punctuation keys and Tab |
| I | Insert cursor to edit text |
| | **Word Processing** |
| R | Type words, sentences and paragraphs |
| I | Erase characters using backspace |
| I | Select and modify text by highlighting |
| I | Use Wordpad and Kidpix for word processing |
| I | Format fonts, text size, alignment and color |
| I | Print a document in portrait or landscape |
| I/R | Save and retrieve files |
| | **Drawing and Painting** |
| M | Recognize the tools and their uses |
| R | Recognize advanced tools on the drop-down menus and their uses |
| M | Create a picture using draw and paint tools |
| I/R | Insert, move and delete objects on a page |
| R/M | Open and use integrated paint program activities to enhance concepts/skills (Kid Pix math/reading templates) |
| R | Save and retrieve files |
| | **Internet** |
| R | Explore teacher approved websites |
| I | Using a web page, find and record basic information (basic web searching) |
| | **Ethics** |
| R | Follow the District Acceptable Use Policy |
| I | Respect the work of others |
| R | Take care of resources |

I – Introduce R - Reinforce M - Master

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 2** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware | identify and name the following computer hardware: monitor/screen, keyboard, mouse, printer. | M | 3.7.4.C, D | 3C, 5A, 5B, 6A |
| | use the following input devices: mouse/keyboard. | M | | |
| | use the following output devices: printer. | M | | |
| File Management | open and exit programs. | M | | |
| Operating Systems | log on/off the computer using username and password. | M | | |
| File Management | access specific network drives. | R | | |
| | open, close, and resize windows. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 2** |
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and use the following : enter, spacebar, backspace, ctrl, alt & del and arrow keys. | M | 3.7.4.C | 3C, 5A, 5B, 6A |
| | locate and use Shift to type capital letters. | R | | |
| | locate and use the letter and number keys. | R | | |
| | locate the cursor on screen. | M | | |
| | demonstrate the function of Caps Lock and Num Lock. | I/R | | |
| | locate and use all punctuation keys and Tab. | R | | |
| | insert the cursor to edit text. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 2** |
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Word Processing | type words, sentences, and paragraphs.<br>erase characters using the backspace key.<br>use Wordpad or KidPix for word processing. | I/R<br>M<br>R | 3.7.4.D | 3C, 5A, 5B, 6A, 6B |
| Formatting | select and modify text by highlighting.<br>format fonts, text size, alignment and color.<br>print a document in portrait and landscape orientation. | I<br>I<br>I | | |
| File Management | save and retrieve files. | I/R | | |

274

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 2** |
|---|---|
| **INSTRUCTIONAL UNIT: Drawing and Painting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Drawing Tools | recognize the basic tools and their uses. | M | 3.6.4.B | 1A, 1B, 4B, 5A, 5B, 6A, 6B |
| Toolbars | recognize tools on the drop-down menus and their uses. | M | | |
| | | M | | |
| Drawing Tools | create a picture using draw and paint tools. | | | |
| Editing | insert, move and delete objects on a page. | I | | |
| File Management | open and use integrated paint program activities to enhance concepts/skills (e.g Kidpix templates for math and reading). | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 2** |
| **INSTRUCTIONAL UNIT: Internet** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | R | 3.7.4.E | 1A, 3B, 5A, 6A |
| Research | using a web page, find and record basic information (basic web research). | I | ⇩ | ⇩ |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 2** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | follow the District Acceptable Use Policy. | R | 3.7.4.A | 5A, 5C |
| | respect the work of others. | I | ⇩ | ⇩ |
| | take care of resources. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY**
**CURRICULUM**

**THIRD GRADE**

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Technology**

**Grade Level:** **Third Grade**

**ACADEMIC STANDARDS:**

**PA:**
3.7.4 A, C, D, E
3.6.4 B
3.8.4 A,B

**NETS:**
1A, 1B, 2B, 3B, 3C, 4B, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This course is a reinforcement of basic computer skills. Students will learn about hardware and operating systems, utilize typing and presentation software, how to access the Internet, and to use computers in an ethical manner.

**ASSESSMENTS:**

Observation

**TECHNOLOGY USED:**

Type to Learn software
Microsoft Word
Microsoft PowerPoint
Teacher approved web sites
Search Engines

Technology Grade 3

| | |
|---|---|
| | **Hardware and Operating Systems:** |
| M | Identify the various input and output devices |
| I | Explore the history of the computer and technology |
| R | Open, close and resize windows |
| R | Access specific network drives |
| R | Locate, open, save and close files from various sources |
| I | Work with more than one software application at a time (having multiple windows open and being able to toggle between those applications) |
| I | Use menu options and commands |
| I | Use the arrow keys or mouse to relocate the cursor quickly |
| | **Keyboarding** |
| M | Locate and use Shift and arrow keys |
| M | Locate and use the letter and number keys |
| M | Demonstrate the function of Caps and Num Lock |
| I | Locate and use all punctuation keys and Tab |
| I | Locate and insert special characters ($, #, &, *, (), %, <, >, @) |
| I | Use Type to Learn to practice keyboarding (using home row position: asdf jkl; spacebar) |
| | **Word Processing** |
| R | Type paragraphs in Microsoft Word |
| R | Select and modify text by highlighting |
| R | Format fonts, text size, alignment and color |
| R | Understand word wrap |
| R | Print a document in portrait and landscape |
| R | Save and retrieve files |
| I | Insert and manipulate graphics from the Clip Art Gallery or Internet |
| I | Use Spell Check and Grammar Check and understand its limitation |
| R | Edit using arrow keys |
| I | Use print preview |
| | Presentation Skills |
| I | Create a presentation with multiple slides |
| I | Format backgrounds on slides |
| I | Insert and format text boxes and Word Art |
| I | Insert and manipulate graphics from the Clip Art Gallery and the Internet |
| | Internet |
| R | Explore teacher approved websites |
| I | Enter the URL to access websites |
| I | Use toolbar buttons to navigate websites |
| R | Use a web page, find and record basic information (basic web searching) |
| R | Use search engines to find information (e.g. NetTrekker) |
| I | Cite online sources (name of site, web address, date accessed) |
| | **Ethics** |
| R | Follow the District Acceptable Use Policy |
| R | Respect the work of others |
| I | Respect copyright laws |
| R | Take care of resources |

I – Introduce R - Reinforce M - Master

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 3** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware | identify various input/output devices. | M | 3.7.4.C, D | 3C, 5A, 5B, 6A |
| | explore the history of the computer and technology. | I | 3.8.4.A, B | |
| File Management | access specific network drives. | R | | |
| | open, close, and resize windows. | R | | |
| | locate open, save and close files from various sources. | I | | |
| | work with more than one software application at a time (having multiple windows open and being able to toggle between those applications). | I | | |
| Toolbars | use menu options and commands. | I | | |
| Hardware | use the arrow keys or mouse to relocate the cursor quickly. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Technology | GRADE: 3 |
|---|---|
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and use the shift and arrow keys. | M | 3.7.4.C | 3C, 5A, 5B, 6A |
| | locate and use the letter and number keys. | M | | |
| | Demonstrate the function of caps lock and num lock. | M | | |
| | locate and use all punctuation keys and tab. | M | | |
| | locate and insert special characters ($, #, &, *, (), %, <, >, @). | I | | |
| | insert the cursor to edit text. | R | | |
| | use <u>type to learn</u> to practice keyboarding (using home row position: asdf jkl; spacebar). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 3** |
|---|---|
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Word Processing Formatting | type words, sentences, and paragraphs in Microsoft Word. | R | 3.7.4.D | 3B, 3C, 5A, 5B, 6A, 6B |
| | select and modify text by highlighting. | R | | |
| | format fonts, text size, alignment and color. | R | | |
| | understand word wrap. | R | | |
| | print a document in portrait and landscape orientation. | R | | |
| File Management | save and retrieve files. | R | | |
| Graphics | insert and manipulate graphics from Clip Art or the Internet. | I | | |
| Editing | use Spell Check and understand its limitation. | I | | |
| Editing/Formatting | edit using arrow keys. | R | | |
| | use print preview. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 3** |
| **INSTRUCTIONAL UNIT: Presentation Skills** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Presentation basics | create a presentation with multiple slides. | I | 3.7.4.B, D | 2B, 5A, 5B, 6A, 6B, 6D |
| Formatting | format backgrounds. | I | | |
| | insert and format text boxes and Word Art. | I | | |
| | insert and manipulate graphics. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 3** |
| **INSTRUCTIONAL UNIT: Internet** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | R | 3.7.4.A | 1A, 3B, 3C, |
| | enter the URL to access websites. | I | 3.7.4.E | 5A, 5B, 6A |
| Toolbars | use toolbar buttons to navigate websites. | I | | |
| Research | use a web page, find and record basic information (basic web research). | R | | |
| | use search engines to find information (e.g. NetTrekker). | I | | |
| | cite online sources (name of site, web address, date accessed). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 3** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | follow the District Acceptable Use Policy. | R | 3.7.4.A | 5A, 5D |
| | respect the work of others. | R | | |
| | respect copyright laws. | I | | |
| | take care of resources. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY CURRICULUM**

**FOURTH GRADE**

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Technology**

**Grade Level:** **Fourth Grade**

## ACADEMIC STANDARDS:

**PA:**
3.7.4 A, C, D, E
3.6.4 B
3.8.4 A,B

**NETS:**
1A, 1B, 2B, 3B, 3C, 4B, 5A, 5B, 5C, 5D, 6A, 6B, 6D

## COURSE DESCRIPTION:

This course is a reinforcement of basic computer skills. Students will learn about hardware and operating systems, utilize typing, spreadsheet and presentation software, how to access the Internet, and to use computers in an ethical manner.

## ASSESSMENTS:

Observation

## TECHNOLOGY USED:

Type to Learn software
Microsoft Word
Microsoft PowerPoint
Teacher approved web sites
Search Engines

## Technology Grade 4

| | |
|---|---|
| | **Hardware and Operating Systems** |
| I | Explore the history of the computer and technology |
| R | Open, close and resize windows |
| R | Locate, open, save and close files from various sources |
| I | Work with more than one software application at a time (having multiple windows open and being able to toggle between those applications) |
| I | Use menu options and commands |
| I | Use the arrow keys or mouse to relocate the cursor quickly |
| | **Keyboarding** |
| R | Locate and insert special characters ($, #, &, *, (), %, <, >, @) |
| R | Use <u>Type to Learn</u> to practice keyboarding (using home row position: asdf jkl; spacebar) |
| | **Word Processing** |
| R | Type paragraphs in Microsoft Word |
| R | Select and modify text by highlighting |
| R | Format fonts, text size, alignment and color |
| R | Understand word wrap |
| R | Print a document in portrait and landscape orientation |
| R | Save and retrieve files |
| R | Insert and manipulate graphics from the Clip Art Gallery or Internet |
| I | Insert Word Art into a document |
| I | Insert a text box to a document |
| R | Use spell check |
| M | Use print preview |
| | **Presentation Skills** |
| R | Create a presentation with multiple slides |
| R | Format backgrounds on slides |
| R | Insert and format text boxes and Word Art |
| R | Insert and manipulate graphics from the Clip Art Gallery and the Internet |
| I | Insert custom animation and slide transitions |
| | **Spreadsheets** |
| I | Locate a cell by column and row |
| I | Move through cells using the mouse and keyboard |
| I | Select cells, columns and rows |
| I | Enter data or text into a cell |
| I | Create a simple graph or chart using the Chart Wizard |
| I | Modify column width and row height |
| I | Format text within cells |
| I | Use the fill tool to color cells |
| | **Internet** |
| R | Explore teacher approved websites |
| R | Enter the URL to access websites |
| R | Use toolbar buttons to navigate websites |
| R | Use a web page, find and record basic information (basic web research) |
| R | Use search engines to find information (e.g. NetTrekker) |
| R | Cite online sources (name of site, web address, date accessed) |
| | **Ethics** |
| R | Follow the District Acceptable Use Policy |
| R | Respect the work of others |
| R | Respect copyrights on created work |
| | Take care of resources |
| I | Understand Internet/Online personal safety issues |

I – Introduce R - Reinforce M - Master

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Operating Systems | open, close, and resize windows. | M | 3.7.4.C | 3C, 5A, 5B, |
| Hardware | explore the history of the computer and technology. | R | 3.8.4.A, B | 6A |
| File Management | locate open, save and close files from various sources. | R | | |
| | work with more than one software application at a time (having multiple windows open and being able to toggle between those applications). | R | | |
| Operating Systems | use menu options and commands. | R | | |
| Hardware | use the arrow keys or mouse to relocate the cursor quickly. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and insert special characters ($, #, &, *, (), %, <, >, @). | R | 3.7.4.C | 3C, 5A, 5B, 6A, 6B |
| | use <u>Type to Learn</u> to practice keyboarding (using home row position: asdf jkl; spacebar). | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 4** |
|---|---|
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Word Processing | type words, sentences, and paragraphs in Microsoft Word. | R | 3.7.4.D | 3B, 3C, 5A, 5B, 6A, 6B |
| Formatting | select and modify text by highlighting. | R | | |
| | format fonts, text size, alignment and color. | R | | |
| File Management | print a document in portrait and landscape orientation. | R | | |
| | save and retrieve files. | R | | |
| Inserting | insert and manipulate graphics from Clip Art or the Internet. | R | | |
| Editing | insert Word Art in a document. | I | | |
| Editing/Formatting | insert a text box into a document . | I | | |
| | use Spell Check. | R | | |
| | use print preview. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Presentation Skills** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Presentation basics | create a presentation with multiple slides. | R | 3.7.4.B, D | 2B, 5A, 5B, |
| Formatting | format backgrounds. | R | | 6A, 6B, 6D |
| | insert and format text boxes and Word Art. | R | | |
| | insert and manipulate graphics. | R | | |
| | insert custom animation and slide transitions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Spreadsheets** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Spreadsheet Basics | locate a cell by column and row. | I | 3.7.4.B, D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | select cells, columns and rows. | I | | |
| | move through cells using the mouse and keyboard. | I | | |
| | enter data or text into a cell. | I | | |
| Graphing | create a simple graph or chart. | I | | |
| | modify column width or row height. | I | | |
| Formatting | format text within cells. | I | | |
| | use the fill tool to color cells. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Internet** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | R | 3.7.4.A | 1A, 3B, 3C, |
| | enter the URL to access websites. | R | 3.7.4.E | 5A, 5B, 6A |
| Toolbars | use toolbar buttons to navigate websites. | R | | |
| Research | using a web page, find and record basic information (basic web research). | R | | |
| | use search engines to find information (e.g. NetTrekker). | R | | |
| | cite online sources (name of site, web address, date accessed). | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 4** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | Follow the District Acceptable Use Policy. | R | 3.7.4.A | 5A, 5D |
| | respect the work of others. | R | | |
| | respect copyright laws. | R | | |
| | take care of resources. | R | | |
| | understand Internet/Online personal safety issues. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS TECHNOLOGY
CURRICULUM

FIFTH GRADE

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Technology**

**Grade Level:** **Fifth Grade**

## ACADEMIC STANDARDS:

**PA:**
3.7.7 A, C, D, E
3.8.7 A, B

**NETS:**
1A, 1B, 2B, 3B, 3C, 4B, 5A, 5B, 5C, 5D, 6A, 6B, 6D

## COURSE DESCRIPTION:

This course is a reinforcement of basic computer skills. Students will learn about hardware and operating systems, utilize typing, spreadsheet and presentation software, how to access the Internet, and to use computers in an ethical manner.

## ASSESSMENTS:

Observation

## TECHNOLOGY USED:

Type to Learn software
Microsoft Word
Microsoft PowerPoint
Microsoft Excel
Teacher approved web sites
Search Engines

## Technology Grade 5

| | |
|---|---|
| | **Hardware and Operating Systems** |
| R | Work with more than one software application at a time (having multiple windows open and being able to toggle between those applications) |
| R | Explore the history of the computer and technology |
| R | Use menu options and commands |
| | **Keyboarding** |
| M | Locate and insert special characters ($, #, &, *, (), %, <, >, @) |
| R | Use <u>Type to Learn</u> to practice keyboarding (using home row position: asdf jkl; spacebar) |
| | **Word Processing** |
| R | Type paragraphs in Microsoft Word |
| R | Select and modify text by highlighting |
| R | Format fonts, text size, alignment and color |
| R | Understand word wrap |
| R | Print a document in portrait and landscape orientation |
| R | Save and retrieve files |
| R | Insert and manipulate graphics from the Clip Art Gallery or Internet |
| I | Insert Word Art in a document |
| I | Insert a text box into a document |
| R | Use spell check |
| | **Presentation Skills** |
| R | Create a presentation with multiple slides |
| R | Format backgrounds of slides |
| R | Insert and format text boxes and Word Art |
| R | Insert and manipulate graphics from the Clip Art Gallery and the Internet |
| R | Insert custom animation and slide transitions |
| | **Spreadsheets** |
| R | Locate a cell by column and row |
| R | Move through cells using the mouse and keyboard |
| R | Select cells, columns and rows |
| R | Enter data or text into a cell |
| R | Create a simple graph or chart using the Chart Wizard |
| R | Modify column width and row height |
| R | Format text within cells |
| R | Use the fill tool to color cells |
| I | Use the SUM function |
| | **Internet** |
| R | Explore teacher approved websites |
| R | Enter the URL to access websites |
| R | Use toolbar buttons to navigate websites |
| R | Use a web page, find and record basic information (basic web research) |
| R | Use search engines to find information (e.g. NetTrekker) |
| R | Cite online sources (name of site, web address, date accessed) |
| | **Ethics** |
| R | Follow the District Acceptable Use Policy |
| R | Respect the work of others |
| R | Respect copyrights on created work |
| R | Take care of resources |
| R | Distinguish fact from opinion |
| R | Understand Internet/Online personal safety issues |

I – Introduce R - Reinforce M – Master

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Hardware and Operating Systems** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| File Management | work with more than one software application at a time (having multiple windows open and being able to toggle between those applications). | R | 3.7.7.C, D<br>3.8.7.A, B | 3C, 5A, 5B, 6A |
| Hardware | explore the history of the computer and technology. | R | | |
| Toolbars | use menu options and commands. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Keyboarding** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | locate and insert special characters ($, #, &, *, (), %, <, >, @). | M | 3.7.7.C, D | 3C, 5A, 5B, 6A, 6B |
| | use <u>Type to Learn</u> to practice keyboarding (using home row position: asdf jkl; spacebar). | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Word Processing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Word Processing | type words, sentences, and paragraphs in Microsoft Word. | R | 3.7.7.D | 3B, 3C, 5A, 5B, 6A |
| | select and modify text by highlighting. | R | | |
| Formatting | format fonts, text size, alignment and color. | R | | |
| File Management | print a document in portrait and landscape orientation. | R | | |
| | save and retrieve files. | R | | |
| Inserting | insert and manipulate graphics from Clip Art or the Internet. | R | | |
| | insert Word Art in a document. | R | | |
| | insert a text box into a document. | R | | |
| Editing | use Spell Check. | R | | |

302

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Technology** | **GRADE: 5** |
|---|---|
| **INSTRUCTIONAL UNIT: Presentation Skills** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Presentation basics | create a presentation with multiple slides. | R | 3.7.7.B,.D | 2B, 5A, 5B, 6A, 6B |
| Formatting | format backgrounds. | R | | |
| | insert and format text boxes and Word Art. | R | | |
| | insert and manipulate graphics. | R | | |
| | insert custom animation and slide transitions. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Spreadsheets** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Spreadsheet Basics | locate a cell by column and row. | R | 3.7.7.B, D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | select cells, columns and rows. | R | | |
| | move through cells using the mouse and keyboard. | R | | |
| | enter data or text into a cell. | R | | |
| Graphing | create a simple graph or chart. | R | | |
| | modify column width or row height. | R | | |
| Formatting | format text within cells. | R | | |
| | use the fill tool to color cells. | R | | |
| | use the SUM function | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Internet** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web browsing | explore teacher approved websites. | M | 3.7.7.A | 1A, 3B, 3C, 5A, 5B, 6A |
| | enter the URL to access websites. | M | 3.7.7.E | |
| Toolbars | use toolbar buttons to navigate websites. | M | | |
| Research | using a web page, find and record basic information (basic web research). | R | | |
| | use search engines to find information (e.g. NetTrekker). | R | | |
| | cite online sources (name of site, web address, date accessed). | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Technology** | **GRADE: 5** |
| **INSTRUCTIONAL UNIT: Ethics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application of Ethical Code | follow the District Acceptable Use Policy. | R | 3.7.7.A | 5A, 5D |
| | respect the work of others. | R | ↓ | ↓ |
| | respect copyright laws. | R | ↓ | ↓ |
| | take care of resources. | R | ↓ | ↓ |
| | distinguish fact from opinion. | I | ↓ | ↓ |
| | understand Internet/Online personal safety issues. | R | ↓ | ↓ |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY CURRICULUM**

**SIXTH GRADE**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **6th Grade Computers**

**Grade Level:** **6**

**ACADEMIC STANDARDS:**

**PA:**
3.6.7.B
3.7.7.A,C,D
3.8.7.C

**NETS:**
3C, 5A, 5B, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This is a basic computer course with an overall focus of correct keyboarding technique and practice. Students will use the Typing Time software for the keyboarding section and then move on to Microsoft Word for additional word processing features.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Typing Time software
MSWord

**ASSESSMENTS:**

Visual observation, written worksheets, projects

**TECHNOLOGY USED:**

Typing Time software, MSWord

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 6th Grade Computers** | **GRADE: 6** |
| **INSTRUCTIONAL UNIT: Safety Unit 1** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | be able to identify the safety procedures for using the computer. | R | 3.7.7.A | 5A, 5B, 5D |
| Lab usage | be able to identify proper lab usage. | R | 3.7.7.A | |
| Environment usage | be able to identify environmental problems that might cause computer malfunction. | R | 3.7.7.A | |
| Ethical issues | be able to identify ethical concerns with software usage. | R | 3.8.7.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 6th Grade Computers** | **GRADE: 6** |
| **INSTRUCTIONAL UNIT: Basic Computer Literacy Unit 2** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware and Operating Systems | log on and off. | M | 3.7.7.C | 3C, 5A, 5B, 6A |
| | identify and use parts of a computer. | M | | |
| | recognize desktop icons and their functions. | M | | |
| | open, close, minimize, maximize, and restore windows. | M | | |
| | create, name, and save files. | M | | |
| | create and delete folders. | I | | |

**<u>WEST ALLEGHENY SCHOOL DISTRICT</u>**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 6th Grade Computers** | **GRADE: 6** |
| **INSTRUCTIONAL UNIT: Introduction to Alphabetic Keyboarding Unit 3** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | demonstrate proper hand, finger, & body position. | I | 3.6.7.B<br>3.7.7.C<br>3.7.7.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | use correct finger reaches from home row to top/bottom row learning the alphabetic keys. | I | | |
| | operate the spacebar, enter key, shift keys, caps lock and tab key with proper technique. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 6th Grade Computers** | **GRADE: 6** |
| **INSTRUCTIONAL UNIT: Introduction to Word Processing Unit 4** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Basic Word Processing Concepts | identify parts of the word screen. | I | 3.7.7.C<br>3.7.7.D | 3C, 5A, 5B, 6A, 6B |
| | create a document, name, save, close a document, and exit word. | I | | |
| | perform basic text editing. | I | | |
| | use cut, copy and paste. | I | | |
| | format font styles, colors and size. | I | | |
| | use spell check, find and replace. | I | | |
| | format paragraphs. | I | | |
| | understand word wrap. | I | | |
| | format a personal letter. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS TECHNOLOGY CURRICULUM

SEVENTH GRADE

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** __7th Grade Computers__

**Grade Level:** __7__

**ACADEMIC STANDARDS:**

**PA:**
3.6.7.B
3.7.7.A,C,D
3.8.7.C

**NETS:**
1A, 2B, 3C, 5A, 5B, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This class is designed to expand and develop basic computer skills. Students will review correct keyboarding technique and basic word processing features using the Typing Time software and Microsoft Word. The course will also cover basic PowerPoint and additional word processing features.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Typing Time software
MS Word
MS PowerPoint

**ASSESSMENTS:**

Visual observation
Written worksheets
Projects

**TECHNOLOGY USED:**

Typing Time software
MS Word
MS PowerPoint

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Safety Unit 1** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | be able to identify the safety procedures for using the computer. | R | 3.7.7.A | 5A, 5B, 5D |
| Lab usage | be able to identify proper lab usage. | R | 3.7.7.A | |
| Environment usage | be able to identify environmental problems that might cause computer malfunction. | R | 3.7.7.A | |
| Ethical issues | be able to identify ethical concerns with software usage. | R | 3.8.7.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Basic Computer Literacy Unit 2** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware and Operating Systems | log on and off. | M | 3.7.7.C | 3C, 5A, 5B, 6A |
| | identify and use parts of a computer. | M | | |
| | recognize desktop icons and their functions. | M | | |
| | open, close, minimize, maximize, and restore windows. | M | | |
| | create, name, and save files. | M | | |
| | create and delete folders. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Alphabetic Keyboarding Review Unit 3** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | demonstrate proper hand, finger, & body position. | R | 3.6.7.B<br>3.7.7.C<br>3.7.7.D | 3C, 5A, 5B, 6A, 6B |
| | use correct finger reaches from home row to top/bottom row keys. | R | | |
| | operate the spacebar, enter key, shift keys, caps lock and tab key with proper technique. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Basic MS Word Review Unit 4** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Basic Word Review concepts | identify parts of the Word screen. | R | 3.7.7.C<br>3.7.7.D | 3C, 5A, 5B, 6A, 6B |
| | create a document, name, save, close a document, and exit Word. | R | | |
| | perform basic text editing. | R | | |
| | format font styles, colors and size. | R | | |
| | use spelling and grammar check. | R | | |
| | change page orientation and margins. | R | | |
| | understand word wrap. | R | | |
| | format paragraphs. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Introduction to PowerPoint Unit 5** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Basic PowerPoint concepts | identify parts of the PowerPoint window. | I | 3.7.7.D | 1A, 2B, 3C, 5A, 5B, 6A, 6B, 6D |
| | create a document, name, save, close a document, and exit PowerPoint. | I | | |
| | perform basic text editing. | I | | |
| | add, manipulate and delete slides. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Introduction to PowerPoint Unit 6** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Enhancing Presentations | format font styles, colors and size. | I | 3.7.7.D | 1A, 2B, 3C, 5A, 5B, 6A, 6B, 6D |
| | apply a design template. | I | | |
| | insert and resize clip art and pictures. | I | | |
| | format bulleted and numbered lists. | I | | |
| | apply animations and transitions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 7th Grade Computer** | **GRADE: 7** |
| **INSTRUCTIONAL UNIT: Microsoft Word Unit 7** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Advanced Word Processing | set tabs. | I | 3.7.7.C 3.7.7.D | 1A, 2B, 3C, 5A, 5B, 6A, 6B, 6D |
| | format Bulleted and Numbered Lists. | I | | |
| | create tables. | I | | |
| | format letters, reports, cover sheets. | I | | |
| | insert page numbers, headers, and footers. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS TECHNOLOGY**
**CURRICULUM**

**EIGHTH GRADE**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **8th Grade Computers**

**Grade Level:** **8**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.A,C,D, E
3.8.10.C

**NETS:**
1A, 2B, 3C, 5A, 5B, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This class is designed to expand and develop basic computer skills. The student will review correct keyboarding technique and basic PowerPoint features. The course will also cover Internet basics and additional presentation software features.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Typing Time software
MS PowerPoint
Internet Explorer

**ASSESSMENTS:**

Visual observation
Written worksheets
Projects

**TECHNOLOGY USED:**

Typing Time software
MS PowerPoint
Internet Explorer

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: 8th Grade Computers** | **GRADE: 8** |
|---|---|
| **INSTRUCTIONAL UNIT: Safety Unit 1** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | be able to identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5D |
| Lab usage | be able to identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | be able to identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | be able to identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Alphabetic Keyboarding Review Unit 2** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | demonstrate proper hand, finger, & body position. | R | 3.6.10.B<br>3.7.10.C<br>3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| | use correct finger reaches from home row to top/bottom row keys. | R | | |
| | operate the spacebar, enter key, shift keys, caps lock and tab key with proper technique. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: PowerPoint Unit 3** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Basic PowerPoint Concepts | identify parts of the PowerPoint window. | R | 3.7.10.D | 1A, 2B, 3C, 5A, 5B, 6A, 6B |
| | create a document, name, save, close a document, and exit PowerPoint. | R | | |
| | perform basic text editing. | R | | |
| | add, manipulate and delete slides. | R | | |
| | format font styles, colors and size. | R | | |
| | apply a design template. | R | | |
| | insert and resize clip art and pictures. | R | | |
| | apply animations and transitions. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: PowerPoint Unit 4** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Additional PowerPoint Concepts | use the AutoContent Wizard. | I | 3.7.10.D | 1A, 2B, 3C, 5A, 5B, 6A, 6B, 6D |
| | format bulleted and numbered lists. | I | | |
| | add charts, diagrams and tables. | | | |
| | add AutoShapes, WordArt and hyperlinks. | I | | |
| | create a slide master. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 5** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| What is the Internet? | briefly explain a short history of the Internet, Local Area Networks (LAN), Wide Area Networks (WAN), servers, and clients. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | understand how the Internet works on a basic level. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 6** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| What is the World Wide Web? | briefly explain the World Wide Web. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | define web-related terms. | I | | |

329

## WEST ALLEGHENY SCHOOL DISTRICT

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 7** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Modems, Browsers, and ISPs | list the four requirements necessary to access the Internet. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | define a modem. | I | | |
| | define a web browser. | I | | |
| | understand the function of an Internet Service Provider (ISP). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 8** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Bandwidth | discuss the need for speed. | I | 3.7.10.E ⇩ | 3C, 5A, 5B, 6A, 6B, 6D ⇩ |
| | discuss bandwidth. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 9** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Types of Internet Access | discuss the different methods of Internet access available. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | research the methods of access in your living area. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 10** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Surfing Strategies | review web browser basics. | R | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | discuss cached web pages. | I | | |
| | refresh and stop web pages. | I | | |
| | define a search engine and provide an example. | I | | |
| | demonstrate effective searching techniques. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 11** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Internet Explorer: Customizing your Browser | identify IE's toolbars, Status bar, and Explorer bar | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | show and hide toolbars, Status bar, and Explorer bar. | I | | |
| | move and resize toolbars. | I | | |
| | customize the Standard toolbar. | I | | |
| | set a home page. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 12** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Internet Explorer: Favorites | access Favorites. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | add to Favorites. | I | | |
| | organize Favorites. | I | | |
| | rename and delete Favorites. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: 8th Grade Computers** | **GRADE: 8** |
| **INSTRUCTIONAL UNIT: Internet Basics Unit 13** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Internet Explorer: History and Search | access History. | I | 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | customize History. | I | | |
| | search using Internet Explorer. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

ADVANCED COMPUTER TECHNOLOGY
10 - 12

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Advanced Computer Technology**

**Grade Level:** **10-12**

## ACADEMIC STANDARDS:

**PA:**
3.6.10B
3.710A,C,D,E
3.7.12C,D,E
3.8.12A

**NETS:**
1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D

## COURSE DESCRIPTION:

Students learn the fundamentals of PC hardware and software in a hands-on environment. Computers are rebuilt from the major parts into functioning computers and in the second half of the year construct a network. Students will gain knowledge of Personal Computers, Operating Systems, Networks and troubleshooting.

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

Enhanced A+ Guide to Managing an Maintaining your PC
3rd Edition Course Technology

Guide to Networking Essentials
4th Edition Course Technology

## ASSESSMENTS:

Verbal and written questions
Quizzes
Tests
Textbook projects
Observation
Teacher created projects

## TECHNOLOGY USED:

Recently "retired" Personal Computers with Operating System and components intact
Network routers, cables and connections.

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Advanced Computer Technology** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: PC Software** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| BIOS | demonstrate how to access and adjust the BIOS settings of a PC. | M | 3.7.10.C | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D |
| Operating systems | learn the basic functions of an operating system. | I | 3.7.10.C, 3.8.12.A | |
| DOS/Windows | identify the core functions and structure of the DOS/Windows 3.0 OS. | I | 3.7.10.D, 3.8.12.A | |
| Windows 9.X | identify the major improvements in the Windows 9.X OS platform. | I | 3.8.10.C, 3.8.12.A | |
| Windows NT | identify the major the improvements in the Windows NT OS platform. | I | 3.8.10.C, 3.8.12.A | |
| Windows XP | identify the major components of the Windows XP OS. | M | 3.8.10.C, 3.8.12.A | |
| Multimedia | identify the various types of multimedia by groups and functions. | M | 3.6.12.B, 3.7.12.D 3.8.12.A | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Advanced Computer Technology** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Network Software** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Protocols | explain the role of protocols in Networking. | M | 3.6.10.B, 3.7.12.E | 1A, 1C, 5A, 5B, 6A, 6B, 6C, 6D |
| TCP | identify the functions of TCP. | M | | |
| IP | identify the functions of IP. | M | | |
| 802.3 standards | learn the 802.3 standards and their keys. | I | 3.7.10.E, 3.7.12.E | |
| Wireless protocols | identify the various standards and their differences. | M | 3.7.10.C, 3.7.12.E | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Advanced Computer Technology** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Network Design and Troubleshooting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Network architecture | identify and learn the various architectures to network computers. | I | 3.6.10.B | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D |
| Client/Server Network | identify and learn to design the most common network setup. | M | 3.7.10.E | |
| Peer-to-Peer Network | identify and describe situations to use the Peer-to-Peer network setup. | M | | |
| Physical Network layout | identify the line, star and ring designs. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Advanced Computer Technology** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: PC Troubleshooting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Safety | identify and practice safety procedures. | M | 3.7.10.A, 3.7.10.C | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D |
| Troubleshooting fundamentals | learn the proper procedures to identify, isolate and correct various PC problems. | M | 3.7.10.A | |
| Installation fundamentals | learn the proper installation procedures for various components. | M | 3.7.10.C | |
| Electricity | identify the various problems that electricity can cause in PCs. | M | 3.7.10.A | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: **Advanced Computer Technology** | GRADE: **10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Network Hardware** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Network Interface Card | identify the NIC and define the purpose. | I | 3.6.10.B | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D |
| UTP/Cat 5 cabling | identify the most common cabling medium and demonstrate how to install the cables. | M | 3.7.12.C | |
| Coaxial cables | identify coaxial cables and learn their use in networking. | M | | |
| Wireless Networks | identify wireless NIC cards and routers. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Advanced Computer Technology** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT:PC Hardware** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Motherboards | identify the components of the motherboard . | M | 3.7.12.C | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6C, 6D |
| CPUs | identify the major chip makers and demonstrate how to install chips on a board. | M | | |
| Computer Memory (RAM) | learn how to properly install RAM. | M | | |
| Hard drives | learn how data is stored and organized. | M | | |
| Peripherals | identify the various devices and their uses such as printers, monitors, mice and scanners. | M | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

BASIC TECHNOLOGY SKILLS
**GRADE 9**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Basic Technology Skills**

**Grade Level:** **9**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10 B
3.7.10 A, B, C, D, E

**NETS:**
3B, 3C, 3D, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

This course will help prepare students for higher education and the workforce by enhancing basic technology skills. Students tap into the latest keyboarding technology, learn to master computer applications, and increase communication skills with proper presentation. Students will be proficient in keyboarding, Microsoft Word, Excel, and PowerPoint.

This is a mandatory technology course for all incoming freshmen. This class will be taken in conjunction with Study Skills.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

8th Edition Century 21 Computer Applications and Keyboarding

MicroType Software
Microsoft Word, Excel, and PowerPoint Software

**ASSESSMENTS:**

Observation
Typing Software
Projects (individual and group)
Textbook exercises
Tests
Verbal question and answer sessions
Presentations

**TECHNOLOGY USED:**

MicroType Software
Microsoft Word, Excel, and PowerPoint software
Internet
LCD projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | be able to identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | be able to identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | be able to identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | be able to identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Window Basics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Parts of Window | describe parts of window (title bar, menu bar, standard toolbar, formatting toolbar, status bar, and task bar). | M | 3.7.10.C, D, E | 3B, 3C, 5A, 5B, 6A, 6B, 6D |
| File Management | describe and demonstrate how to manage files (creating folders, copying, cutting, and pasting files and folders, renaming files and folders, and organizing files and folders). | M | | |
| Help Features | describe and demonstrate how to use the software help features. | I | | |
| | demonstrate how to use the pop-up description and assistant or expert features. | I | | |
| | demonstrate how to access additional software support on the Internet. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Improving Keyboarding Skills** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Work Area | describe how to arrange the work area. | M | 3.7.10.C, E | 3C, 5A, 5B, 6A, 6B, 6D |
| Keying Position | describe and demonstrate proper keying position and overall technique. | M | | |
| Review Letter Keys | demonstrate proper keying position while using correct reach technique to key all letters in the alphabet and common symbols. | M | | |
| Improve speed and accuracy | use proper response patterns to increase speed and accuracy. | M | | |
| Review Figure Keys | demonstrate the correct reach technique for numeric keys while improving skill on straight-copy using the alphabetic keys. | M | | |
| Review Symbol Keys | demonstrate the correct reach technique for symbol keys while improving skill on straight-copy with the alphabetic and numeric keys. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Microsoft Word** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Unbound Reports | describe and demonstrate the format features of unbound reports (margins, internal spacing, page numbers, headings, textual citations, and reference lists). | I | 3.7.10.A, C, D, E | 3C, 5A, 5B, 6A, 6B, 6D |
| Personal-Business Letters | describe and demonstrate how to format personal-business letters in block format (margins, return address, date, letter address, salutation, body, complimentary close, reference initials, and attachment/enclosure notations). | I | | |
| MLA Formatting Style | describe and demonstrate how to format reports using MLA style (outlines, title pages, works cited, long quotations, and inserted tables). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Microsoft Excel** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Worksheets and Workbooks | describe the difference between worksheets and workbooks. | I | 3.6.10.B<br>3.7.10.A, B, C, D,E | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| Basic Parts of worksheets | describe the basic parts of worksheets (cells, columns, and rows). | I | | |
| Editing Worksheets | demonstrate how to enter data, move around in a worksheets, and print a worksheet. | I | | |
| Editing Cells | demonstrate how to select a range of cells and edit, clear, copy, and move information in a worksheet. | I | | |
| Editing columns and rows | demonstrate how to format cell contents, adjust column width, and insert/delete columns and rows. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Basic Technology Skills** | **GRADE: 9** |
|---|---|
| **INSTRUCTIONAL UNIT: Microsoft Excel (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formulas and Functions | demonstrate how to perform worksheet calculations using formulas and functions. | I | 3.6.10.B<br>3.7.10.A, B, C, D,E | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| Bar and Pie Charts | demonstrate how to prepare embedded columns, bar and pie charts using worksheet data. | I | | |
| Merging cells | demonstrate how to merge cells, wrap and indent text in cells, and specify column widths. | I | | |
| Printing | demonstrate how to select a print area, set page breaks, and check spelling. | I | | |
| Visual Enhancements | utilize fill, rotate text in column headings, and changing row heights to make worksheets more visually appealing. | I | | |
| Worksheet Tabs | demonstrate how to rename, format, and reposition worksheet tabs. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Microsoft Excel (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hiding Columns and Rows | demonstrate how to freeze and hide columns and rows. | I | 3.6.10.B<br>3.7.10.A, B, C, D,E | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| Sorting information | demonstrate how to sort worksheet information alphabetically and numerically. | I | | |
| Cell References | demonstrate how to use relative, absolute, mixed cell references, and apply the autoformat feature. | I | | |
| IF Function and Conditional Formatting | demonstrate how to use the IF function and conditional formatting. | I | | |
| Linking Worksheets | demonstrate how to copy and link a worksheet to a word processing document. | I | | |
| Converting Documents to Worksheets | demonstrate how to convert word processing documents to worksheets and use worksheets as Web pages. | I | | |
| Creating and Enhancing Charts | demonstrate how to create a line chart and chart sheet, use 3-D effects, and edit charts. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Basic Technology Skills | GRADE: 9 |
|---|---|
| **INSTRUCTIONAL UNIT: Microsoft PowerPoint** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Electronic Presentations | describe what an electronic presentation is. | M | 3.6.10.B | 3C, 5A, 5B, 6A, 6B, 6D |
| Key Features in PowerPoint | describe the key features in PowerPoint (design templates, slide layout, and view options). | M | 3.7.10.A, B, C, D,E | |
| Navigation | demonstrate how to navigate through an existing electronic presentation. | M | | |
| Title Slides | demonstrate how to create a title slide. | M | | |
| Bulleted Slides | demonstrate how to create a bulleted list. | M | | |
| Pictures and Graphics | demonstrate how to utilize, insert, and edit graphic images, lines, and boxes. | I | | |
| Diagrams and Tables | utilize diagrams and tables to enhance presentations. | I | | |
| Graphs and Charts | demonstrate how to create graphs, various graph elements, and learn which graph or chart to use. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Basic Technology Skills** | **GRADE: 9** |
| **INSTRUCTIONAL UNIT: Microsoft PowerPoint** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Enhance Presentations | describe and demonstrate how to enhance electronic presentation skills (slide animations, slide transitions, hyperlinks, pictures, sound, and timing). | I | 3.6.10.B<br>3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Internet Pictures | demonstrate how to copy and paste pictures from the internet into a presentation. | I | | |
| Printing | demonstrate how to print speaker notes. | I | | |
| Sound | demonstrate how to insert sound, record sound, and play an audio track during a presentation. | I | | |
| Outlining Information | describe and demonstrate how to outline information and plan an electronic presentation. | I | | |
| Planning and Actually Presenting Presentations | demonstrate how to plan, create and present using an electronic presentation. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

DATABASE
GRADES 9-12

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Database**

**Grade Level** **9 – 12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10 B
3.7.10 A, C, D, E
3.8.10.C

**NETS:**
3C, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

Students will learn how to use a current database software package to create, enhance, design, and print database files. Updating, searching, editing, indexing, and sorting are basic concepts that will be taught. More advanced concepts of reports, letters, labels, custom screens and queries will also be explored.

Keyboarding experience is helpful, but not required.

**This course must be taken with Spreadsheets. Students MUST REGISTER for both courses.**

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Microsoft Access 2002, Comprehensive Concepts and Techniques
Thomson Learning

**ASSESSMENTS:**

Verbal and written questions
Lesson Applications
Tests
Textbook projects
Observation

**TECHNOLOGY USED:**

Microsoft Access
Internet
LCD Projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare student for: | | | | |
| Equipment usage | identify the safety procedures for using a computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environmental usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Database** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 1 – Creating a Database Using Design and Datasheet Views** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Databases | describe databases and database management systems. | I | 3.6.10.B | 3C, 5A, 5B, 6A, 6B, 6D |
| | describe the features of the access desktop. | I | | |
| | create a database. | I | 3.7.10.C, 3.7.10.D | |
| | create a table and define the fields in a table. | I | | |
| | add records to a table. | I | | |
| | print the contents of a table. | I | | |
| | use a form to view data. | I | | |
| | create a custom report. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 – Querying a Database Using the Select Query Window** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Queries | state the purpose of queries. | I | 3.6.10.B | 3C, 5A, 5B, 6A, 6B, 6D |
| | create a new query. | I | 3.7.10.C, 3.7.10.D | |
| | use a query to display all records and all fields. | I | | |
| | run a query. | I | | |
| | print, close and clear a query. | I | | |
| | use a query to display selected fields. | I | | |
| | use text data and wildcards as criteria in a query. | I | | |
| | use numeric data and comparison operators as criteria. | I | | |

360

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Database | Grade: 9 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Project 2 – Querying a Database Using the Select Query Window (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Queries | use compound criteria. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | sort the answer to a query. | I | | |
| | join tables in a query and restrict the records in a join. | I | | |
| | use calculated fields in a query. | I | | |
| | calculate statistics in a query. | I | | |
| | save a query and use a saved query. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 – Maintaining a Database Using the Design and Update Features of Access** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Maintain a database | add, locate and filter records. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | change the contents of records and delete records. | I | | |
| | restructure a table. | I | | |
| | change field characteristics and add fields. | I | | |
| | save changes to the structure. | I | | |
| Use update features | update the contents of a single field. | I | | |
| | make changes to and delete groups of records. | I | | |
| Validation rules | create validation rules. | I | | |
| | update a table with validation rules. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 – Maintaining a Database Using the Design and Update Features of Access (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Validation rules | specify referential integrity. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | use subdatasheets. | I | | |
| | order records. | I | | |
| | create single-field and multiple-field indexes. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Database** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Data Access Pages** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Data Access pages | create a Data Access page. | I | 3.7.10.C, 3.7.10.D 3.7.10.E | 3C, 5A, 5B, 6A, 6B, 6D |
| | view and use a Data Access page. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Database** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 4 - Reports, Forms, and Combo Boxes** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Reports | create a query for a report. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | use the Report Wizard to create a report. | I | | |
| | use the Report window to modify a report design. | I | | |
| | move between Design view and Print Preview. | I | 3.6.10.B | |
| | recognize sections in a report. | I | | |
| | save, close and print a report. | I | 3.6.10.B, 3.7.10.C, 3.7.10.D | |
| Forms | create a report with grouping and subtotals. | I | 3.7.10.C, 3.7.10.D | |
| | use the Form Wizard to create an initial form. | I | | |
| | use the Form window to modify a form design. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 4 - Reports, Forms, and Combo Boxes (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Forms | place a calculated field on a form. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | place a combo box on a form. | I | | |
| | place a title on a form. | I | | |
| | view data using a form. | I | 3.6.10.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 5 – Enhancing Forms with OLE Fields, Hyperlinks, and Subforms** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Enhancing Forms | add, update, and use date, memo, OLE, and hyperlink fields. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | change the row and column spacing in tables. | I | | |
| | save table properties. | I | | |
| Subforms | create a form with a subform. | I | | |
| | modify the subform design. | I | | |
| | move and resize fields on a form. | I | | |
| | change properties on a form. | I | | |
| | add a title to a form. | I | | |
| | use a form that contains a subform. | I | | |
| | use date and memo fields in a query. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 5 – Enhancing Forms with OLE Fields, Hyperlinks, and Subforms (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Compact a database | compact and repair a database. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Database** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 6 – Creating an Application System Using Macros, Wizards, and the Switchboard Manager** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Application Systems | create and use lookup fields. | I | 3.7.10.C, 3.7.10.D | 3C, 5A, 5B, 6A, 6B, 6D |
| | create and use input masks. | I | | |
| | add single-field controls to reports and forms. | I | | |
| | add calculated controls to reports. | I | | |
| Macros | create, modify and run macros. | I | | |
| | create a copy of a macro. | I | | |
| Switchboards | create and use a switchboard. | I | | |
| | modify switchboard pages and items. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

DESKTOP PUBLISHING I
GRADE 10-12

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Desktop Publishing I**

**Grade Level:** **10-12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.A, B, C, D, E
3.8.10.C

**NETS:**
1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

Students will learn how to design flyers, newsletters, programs, certificates and brochures using Microsoft Publisher. Students will be able to create a newspaper as part of this course.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

1. Microsoft Office Publisher 2003 – Illustrated Introductory (Thomson, Course Technology)
   (This textbook is used for introducing what Publisher is and the basics involved. – Textbook is used for the first nine weeks)
2. The Do's and Don'ts of Desktop Publishing (J. Weston Walch, Publisher)
   (This textbook is used for the terminology and the proper process of designing a publication. – Textbook is used for the next three weeks)
3. Microsoft Publisher 2000 (South-Western Educational Publishing)
   (This textbook is used for the reminder of the year, used for learning how to create a publication from scratch.)

**ASSESSMENTS:**

Projects producing publication, created by the teacher
Verbal and written questions
Quizzes
Tests
Textbook projects

**TECHNOLOGY USED:**

Microsoft Publisher
Internet
Microsoft Word, Microsoft PowerPoint, Paint (Software is used for integration)

371

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing I** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Desktop Publishing I | GRADE: 10 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: Pagewizard Designs | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Wizards the students learn how to create | design a Job Portfolio Packet<br>Resume<br>Letterhead<br>Cover Letter<br>Envelope and Labels<br>Follow-up Letter<br>Interview Tips | I | 3.6.10.B | 1A, 1B, 1C, 2A, 2B, 3A, 3B, 3C, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| | design a Personal Portfolio Packet<br>Postcards<br>Invitation Cards<br>Greeting Cards<br>Award Certificates | I | | |
| | design an Advertising/Business Portfolio Packet<br>Signs<br>Flyers<br>Advertisements<br>Gift Certificates<br>Business Forms | I | | |
| | design Individual Projects<br>Menus<br>Program<br>Catalogs | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing I** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Do's and Don'ts of Desktop Publishing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware/Software | identify hardware and software needed for desktop publishing. | I | 3.7.10.D | 4A, 5A, 5B, 6A, 6B, 6D |
| DTP at a Glance Understanding Type | identify the rules for typesetting. | I | 3.7.10.B | |
| Elements of Design DTP Hazards and Preparing own Publications | identify the rules for elements of design, hazards, and preparing publications. | I | 3.7.10.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Desktop Publishing I** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Getting Started with Microsoft Publisher** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Page layouts, commands and the different frames | identify the Microsoft Publisher screen and the different options needed to layout a publication. | M | 3.6.10.B | 1A, 3A, 3B, 3C, 4B, 4C, 5A, 5B, 6A, 6B |
| | create a text frame and demonstrate text formatting skills with special functions. | M<br>R | 3.6.10.B<br>3.7.10 C | |
| | create a table, edit it, and work with the special features. | M | 3.6.10.B | |
| | create fancy title using the WordArt feature | M | 3.6.10.B | |
| | demonstrate working with graphics and images using the clip art gallery, pictures from files, digital camera, scanner, and other applications; such as, paint, Internet, and PowerPoint. | M | 3.6.10.B<br>3.7.10.D<br>3.7.10.E | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Desktop Publishing I** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Advanced Features in Microsoft Publisher** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Working with special features | create graphic objects using the drawing tools. | M | 3.6.10.B | 1A, 1B, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, |
| | create graphic background pages. | M | | |
| | create a Webpage using Microsoft . | M | | |
| | create a Brochure. | M | | |
| | create a Mail Merge publication. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Desktop Publishing I** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Creating publication for the "real world"** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Entrepreneurship Project | create a final project producing publications integrating everything that he/she has learned. | M | 3.6.10.B<br>3.7.10.D | 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4B, 4C, 5A, 5B, 6A, 6B |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

DESKTOP PUBLISHING II
NEWSPAPER
GRADE 11-12

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Desktop Publishing II/Newspaper**

**Grade Level:** **11-12**

## ACADEMIC STANDARDS:

**PA:**
Technology Standards:
 3.6.12.B
 3.7.12.D, E
Reading, Writing, Speaking, and Listening Standards:
 1.2.11.A
 1.3.11.E
 1.5.11.A, B, C, D, E, F, G
 1.8.11.A

**NETS:**
1A, 1B, 1C, 2A, 2B, 2D, 3A, 3B, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 6A, 6B

## COURSE DESCRIPTION:

Students will create in-house publications such as programs, flyers, brochures, schedules, invitations, advertisements, newsletters, etc. Students will also create and publish a newspaper for distribution to High School students as part of this course.

**Prerequisite**: Completion of Desktop Publishing I with a minimum of a "B" average or Teacher permission.

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

Manual created by instructor

## ASSESSMENTS:

- Evaluations/Critique
- Quizzes
- Outlining
- Articles, graded with rubrics
- Layouts, graded with rubrics
- Publications, graded with rubrics
- End of Year Portfolio

## TECHNOLOGY USED:

- Microsoft Publisher
- Microsoft Word
- Internet

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Newspaper Illustration** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Critique of Newspapers | evaluate the Indian Enterprise and other school districts' newspapers to identify the pros and cons; then develop ideas for the new school year. | R | 1.3.11.E | 4A, 4B |
| Parts of the Newspaper | identify the different parts of the newspaper, creating a sample newspaper layout labeling the parts. | M | 3.6.12.B | 1A, 1B, 1C, 2A, 2B, 2D, 3A, 3B, 3C, 4B, 4C, 5A, 5B, 6A, 6B |

381

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Outlining the different sections of creating an article** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Storyboard | develop an outline of ideas that need to be addressed by the class for possible style angles. | M | 1.8.11.A | 4A, 4B, 4C |
| Assignment sheet | create a document with a list of information pertaining to the assigned article from the storyboard. | M | 1.5.11.A | 3C |
| Beginning Reporting/ Interviewing | create a document with information dealing with the interview. | M | 1.5.11.B | 2A, 3A, 3B, 3C |
| | learn the guidelines used by journalists, the interviewing process, and interview tips. | M | 1.5.11.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Outlining the different sections of creating an article (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Writing | learn how to gather the material for their story, organize the information with order and focus. | M | 1.5.11.B<br>3.7.12.E | 1A, 2A, 2B, 3A, 3B, 4A, 4B |
| | learn how to write a rough draft with a strong lead, good story structure with background material, examples, quotes, definitions, and observations. | M | 1.5.11.C | N/A |
| | learn how to revise/rewrite the article and learn the editing guidelines that need to be followed for final write-up. | M | 1.5.11.D, E, F | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Formatting the Layout of the Newspaper** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Graphic Style Sheet for Word Formatting | create a final version of their article to be laid out in Publisher. | M | 1.5.11.G | 2A, 2B, 2D |
| Graphic Style Sheet for Publisher Formatting | create a layout of their article in Publisher to be imported into the newspaper layout for the layout editor. | M | 3.6.12.B | 1A, 1B, 2A, 2B, 3A, 3B, 3C, 4B, 5A, 5B, 6A, 6B |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Newspaper Portfolio** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will | | | |
| End of Year Portfolio | develop a self-check critique of all their articles, and complete a one page write-up about their critique with guidelines. | I | 1.2.11.A | 4C |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Desktop Publishing II/Newspaper** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: "Real World" Projects** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Class Requirement | produce publications that will be created for the "real world", such as publications for booster organizations, clubs, teachers, community, etc…. | M | 3.6.12.B<br>3.7.12.D, E | 1A, 1B, 2A, 2B, 3B, 3C, 4B, 5A, 5B, 6A, 6B |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

MICROSOFT FRONT PAGE
**9-12**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Microsoft FrontPage**

**Grade Level:** **9-12**

## ACADEMIC STANDARDS:

**PA:**
3.6.10 B
3.7.10 A, B, C, D, and E
3.8.10 C

**NETS:**
2A, 2B, 3C, 5A, 5B, 5C, 5D, 6A, 6B, 6D

## COURSE DESCRIPTION:

Students in this course will use FrontPage software to create web pages. Topics will include: planning and creating Web pages, adding and formatting content, creating forms, creating lists with numbers and bullets, incorporating images, creating hypertext links between and within pages, and applying themes.

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

FrontPage 2002 Complete Concepts and Techniques
Thomson Learning Course Technology

Microsoft FrontPage software

## ASSESSMENTS:

Observation
Projects (individual and group)
Textbook exercises
Tests
Verbal question and answer sessions
Presentations

## TECHNOLOGY USED:

Microsoft FrontPage software
Internet
LCD projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 1 - Creating a FrontPage Web Using a Template** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Key Features of FrontPage | explain key features of FrontPage. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Basic Components of the World Wide Web | explain basic components of the World Wide Web. | I | | |
| New Web | create a new FrontPage web using a template. | I | | |
| Theme | demonstrate how to apply a theme to a FrontPage web. | I | | |
| Text Elements | demonstrate how to add and modify text elements on a Web page. | I | | |
| Save and Preview | demonstrate how to save and preview a Web page. | I | | |
| Deleting Web Pages | demonstrate how to delete a Web page from a FrontPage web. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Microsoft FrontPage | GRADE: 9 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Project 1 - Creating a FrontPage Web Using a Template (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hyperlinks | demonstrate how to add and modify hyperlinks on a Web page. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Printing a Web | demonstrate how to print a Web page. | I | | |
| Publishing a Web | demonstrate how to publish a Web page. | I | | |
| FrontPage Help | utilize the FrontPage Help feature to troubleshoot problems or answer questions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 – Adding a New Web Page to a Web** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web Page design | explain Web page design criteria. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Add new Web | demonstrate how to add a new Web page to an existing FrontPage web. | I | | |
| Change title | demonstrate how to change the title of a Web page. | I | | |
| Change label | demonstrate how to change the label of a Web page. | I | | |
| Change theme | demonstrate how to change the theme for a single Web page. | I | | |
| Background color | demonstrate how to set the background color for a Web page. | I | | |
| Table | demonstrate how to insert a table and change table properties. | I | | |
| Cells | demonstrate how to merge cells in a table. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 – Adding a New Web Page to a Web (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Undo and Redo Actions | utilize the undo and redo features in FrontPage. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Clip Art | demonstrate how to insert Clip Art. | I | | |
| Images | demonstrate how to replace an image and modify image properties on a Web page. | I | | |
| Horizontal Rule | demonstrate how to insert a horizontal rule in a Web page. | I | | |
| Photo Gallery component | demonstrate how to add a Photo Gallery component. | I | | |
| Link bars | demonstrate how to insert Link bars on a Web page. | I | | |
| Embedded Images | demonstrate how to save a Web page with embedded images. | I | | |
| Personal Web | demonstrate how to create a Personal Web using all objectives learned in projects 1 and 2. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 – Customizing and Managing Web Pages and Images** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Types of Images | explain the different types of images used on the Web. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Custom Theme | demonstrate how to create and apply a custom theme. | I | | |
| Expand a Table | demonstrate how to expand an existing table. | I | | |
| Hit Counter | demonstrate how to add a hit counter. | I | | |
| Shared Border | demonstrate how to add a shared border. | I | | |
| Navigation Structure | demonstrate how to change the navigation structure of a Web. | I | | |
| Copy and Paste | demonstrate how to copy and paste from a Word document. | I | | |
| Bookmarks | demonstrate how to insert bookmarks into a Web page. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 – Customizing and Managing Web Pages and Images (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Picture Toolbar | demonstrate how to display the Picture toolbar. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Image Properties | demonstrate how to modify image properties. | I | | |
| AutoShapes | demonstrate how to insert an AutoShapes drawing object in FrontPage. | I | | |
| Image Map Hotspot | demonstrate how to create an image map hotspot. | I | | |
| Graphic Image Hyperlink | demonstrate how to use a graphic image as a hyperlink. | I | | |
| Reporting Features | utilize the reporting features of FrontPage to troubleshoot problems. | I | | |
| Verify Hyperlinks | demonstrate how to verify the hyperlinks in a FrontPage web. | I | | |
| Friends and Family Web | demonstrate how to create a Friends and Family Web using features learned in projects 1, 2, and 3. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 4 – Creating and Using Interactive Forms on the Web** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Forms and Form Fields | describe forms and types of form fields. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Form Handlers | describe available form handlers. | I | | |
| Sending Form Data | describe the methods and format used to send form data. | | | |
| Managing Files | demonstrate how to manage files in folders view. | I | | |
| Parts of Forms | demonstrate how to insert a table, text box, check box, drop-down list, group box, option button, and a text area into a form. | I | | |
| Nested Table | demonstrate how to create a nested table. | I | | |
| HTML code | demonstrate how to modify HTML code in FrontPage. | I | | |
| Personal Web | demonstrate how to add and modify a Personal Web created after Project 2 using features learned in previous lessons. | I<br>R | | |

396

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Microsoft FrontPage | GRADE: 9 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: Project 5 – Using Frames to Display Database Results in Web Pages | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Frame Pages | describe frames pages and explain how they work. | I | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B, 6D |
| Importing Files | demonstrate how to import files into an existing FrontPage web. | I | | |
| Database Results Wizard | demonstrate how to use the Database Results Wizard. | I | | |
| Custom SQL Query | demonstrate how to use a custom SQL query. | I | | |
| Frames Page Template | demonstrate how to use a frames page template. | I | | |
| Initial Page in a Frame | demonstrate how to set an existing Web page as the initial page in a frame. | I | | |
| Size of Frames | demonstrate how to modify the size of a frame. | I | | |
| Properties of Frames | demonstrate how to modify the properties of a frame and frames page. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Microsoft FrontPage** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 5 – Using Frames to Display Database Results in Web Pages (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hyperlinks | demonstrate how to create hyperlinks to pages in a frame and to a web page. | I | 3.7.10.A, B, C, D,E | 2B, 3C, 5A, 5B, 6A, 6B, 6D |
| No Frames View | demonstrate how to display the No Frames view. | I | | |
| Printing | demonstrate how to print framed Web pages. | I | | |
| Persuasive Web | demonstrate how to create a Persuasive Web and present it to the class using features learned in the previous 5 projects and PowerPoint. | R | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

KEYBOARDING
GRADE 9-12

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Keyboarding**

**Grade Level:** **9-12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.A, C, D
3.8.10.C

**NETS:**
3C, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

Students will learn to type using the touch type method on personal computers using Microsoft Office Word software. They will learn to set-up documents that include letters, envelopes, reports, and simple tables. Development of good work habits is emphasized.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Computer Applications & Keyboarding, Century 21 Seventh Edition
South-Western, Thomson Learning

**ASSESSMENTS:**

Technique Evaluation Forms, used for grading proper keyboarding technique
Projects producing documents, created by teacher
Graded exercises

**TECHNOLOGY USED:**

Microsoft Word
Internet
LCD Projector

400

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Keyboarding** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Keyboarding | GRADE: 9 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Computer Keyboarding: Reinforce and Apply** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Keyboarding | demonstrate proper hand, finger, & body position. | M | 3.7.10. C | 3C, 5A, 5B, 6A, 6B, 6D |
| | use correct finger reaches from home row and spacebar to the top and bottom row keys, while learning the alphabetic keys. | M | | |
| | operate the enter key, shift keys, caps lock, and tab key with proper technique. | M | | |
| | learn how to compose at the computer, transfer information from rough draft, and use script copy with proofreading marks. | M | 3.7.10.D | |
| | use correct finger reaches from home row to number keys. | M | 3.7.10.C | |
| | use correct finger reaches for special symbols. | M | | |
| | use correct finger reaches for the numeric key pad. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Keyboarding** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Developing Research Papers** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Unbound Report | learn how to create unbound reports with Textual Citations (Within Text) with page numbers and a reference list. | M | 3.6.10.B<br>3.7.10.C | 3C, 5A, 5B, 6A, 6B, 6D |
| Footnote Reports | learn how to create footnote reports with a title page, long quotation, enumerated items, headings, and a reference page. | M | | |
| Endnote Reports | learn how to create endnote reports with a title page, long quotation, enumerated items, heading, endnote page, and a reference page. | M | | |
| Extended Report Formatting Skills | learn how to create table of contents and an outline. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Keyboarding** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Formatting Business Correspondences** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Memo | learn how to set-up a standard format for interoffice memos. | M | 3.6.10.B<br>3.7.10.C | 3C, 5A, 5B, 6A, 6B, 6D |
| E-mail | demonstrate the correct format and wording for business emails . | M | | |
| Personal-Business Letters | learn how to format a personal-to-business letter in block style . | M | | |
| Envelopes | learn how to properly format an envelope with a return address and a receiver's address using the USPS (postal service) style. | M | | |
| Business Letters | learn how to format a business-to-business letter in block style with open punctuation. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Keyboarding** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Enhancing Document Appearance** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Create and format tables | learn to create a table that is easy to read and attractive. | M | 3.6.10.B | 3C, 5A, 5B, 6A, 6B, 6D |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Keyboarding** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Employment Documentation** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Creating Employment Documents | learn how to create a resume.<br>• print resume<br>• electronic resume<br>• resume using the templates | M | 3.6.10.B | 3C, 5A, 5B, 6A, 6B, 6D |
| | learn how to create a reference list. | M | | |
| | learn how to complete an application letter (cover letter). | M | | |
| | learn how to complete an application form. | M | | |
| | learn how to complete an interview follow-up letter. | M | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

POWERPOINT
9-12

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **PowerPoint**

**Grade Level:** **9-12**

## ACADEMIC STANDARDS:

**PA:**
3.7.10 A, B, C, D, and E

**NETS:**
1A, 2B, 3B, 3C, 5A, 5B, 5C, 5D, 6A, 6B, 6D

## COURSE DESCRIPTION:

Students will learn advanced Microsoft PowerPoint features to enhance their presentation skills. This course will enable students to give a presentation in a professional manner, and enable the student to gain valuable experience with public speaking. These are valuable skills in higher education and the business world.

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

PowerPoint 2002 Complete Concepts and Techniques
Thomson Learning Course Technology

Microsoft PowerPoint

## ASSESSMENTS:

Observation
Projects (individual and group)
Textbook exercises
Tests
Verbal question and answer sessions
Presentations

## TECHNOLOGY USED:

Microsoft PowerPoint
Internet
LCD projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: PowerPoint** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: PowerPoint** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 1 - Using a Design Template and Text Slide Layout to Create a Presentation** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| PowerPoint window<br>Toolbars | describe the PowerPoint window and toolbars. | M | 3.7.10.A, C, D, E | 1A, 3C, 5A, 5B, 6A, 6B |
| Basic menu functions | demonstrate basic menu functions | M | | |
| Insert new slides<br>Slide layout<br>Outlining | create a new presentation using an outline format and choose a design template. | M | | |
| Word processing features | demonstrate word processing features when creating a presentation. | M | | |
| PowerPoint Help feature | demonstrate how to obtain help using the Help feature. | M | | |
| Different Views | describe the different views in PowerPoint and demonstrate how to switch between views. | M | | |
| “How To” Project | demonstrate how to create and present a “How To” Project using features learned in Project 1. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: PowerPoint** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 - Using the Outline Tab and Clip Art to Create a Slide Show** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will : | | | |
| Using the Outline Tab Outlining | demonstrate how to create and edit a presentation using the outline tab. | M | 3.7.10.A, B, C, D,E | 1A, 2B , 3C, 5A, 5B, 6A, 6B |
| Clip Art and Pictures | demonstrate how to add, edit, and customize clip art and pictures. | M | | |
| Animation | demonstrate how to add animation to slide elements. | M | | |
| Header and Footers | utilize headers and footers to add additional information to presentations and outlines. | M | | |
| E-Mailing Presentations | demonstrate how to email a presentation. | M | | |
| Vacation Project | demonstrate how to create and present a Vacation Project using features learned in Projects 1 and 2. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: PowerPoint | GRADE: 9 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: Project 3 - Using Visuals to Enhance a Slide Show | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Importing Text | create a new presentation by importing text from other applications. | M | 3.7.10.A, B, C, D,E | 3B, 3C, 5A, 5B, 6A, 6B, 6D |
| Customizing Bullets | demonstrate how to customize bullets. | M | | |
| Slide Master | describe and demonstrate how to use the slide master. | M | | |
| Table | create and format tables. | M | | |
| Organization Chart | create and format organization charts. | M | | |

412

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: PowerPoint** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 4 - Modifying Visual Elements and Presentation Formats** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will be able to: | | | |
| AutoContent Wizard | create a presentation using the AutoContent Wizard. | M | 3.7.10.A, B, C, D,E | 3B, 3C, 5A, 5B, 6A, 6B |
| Modifying Presentation Elements | demonstrate how to modify a presentation design templates and the slide master. | M | | |
| Customize Backgrounds | demonstrate how to customize a background by using pictures, colors, and other fill effects. | M | | |
| Using WordArt | utilize WordArt to add visual appeal to a presentation. | M | | |
| Sound | demonstrate how to add sound to a presentation. | M | | |
| Charts | demonstrate how to add charts to visually represent statistics in a presentation. | M | | |
| Inserting objects from other applications | demonstrate how to insert objects from applications such as Word and Excel. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: PowerPoint** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 4 - Modifying Visual Elements and Presentation Formats (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hyperlinks | utilize hyperlinks to link to websites, other documents, and other slides within the presentations. | M | 3.7.10.A, B, C, D,E | 3C, 5A, 5B, 6A, 6B |
| Embedding fonts | demonstrate how to embed fonts when saving presentations. | M | | |
| Timings | utilize timings in preparing and presenting presentations. | M | | |
| Notes | demonstrate how to utilize the notes feature. | M | | |
| Group Project | demonstrate how to create and present a persuasive project as a group using features learned in Projects 1, 2, 3, and 4 | R | | |
| Career Project | demonstrate how to create and present a Career Project using features learned in Projects 1, 2, 3, and 4. | R | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

PROGRAMMING I
INTRO TO PROGRAMMING
**9-12**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** <u>**Programming I**</u>
<u>**Intro to Programming**</u>

**Grade Level:** <u>**9 - 12**</u>

## <u>ACADEMIC STANDARDS:</u>

**<u>PA:</u>**
3.6.10.B, C
3.7.10.A, B, C, D, E
3.8.10.B, C

**<u>NETS:</u>**
1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D

## <u>COURSE DESCRIPTION:</u>

This hands-on course provides a comprehensive introduction to programming and builds a solid foundation of programming skills that can be used with any programming language. Students will write, compile, and debug programs in JAVA. Topics include: data types and variables, operators and expressions, input/output, programming logic, functions, and introduction to object-oriented programming.

<u>Note</u>: Great language for the following majors in college: Business/Computer Science/Engineering.

***Prerequisite for students in 9th Grade: Must be enrolled in Honors Geometry.***
No prerequisite for 10, 11, 12

## <u>BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:</u>

A Guide to Programming in Java 5
Lawrenceville Press

Jcreator software
Jdk Java software

## <u>ASSESSMENTS:</u>

Verbal and written questions
Quizzes
Tests
Textbook projects
Observation
Teacher created projects

## <u>TECHNOLOGY USED:</u>

Jcreator software
Jdk Java software

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: An Introduction to Computers** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Hardware<br>Software<br>History of programming<br>Languages<br>Data Storage | demonstrate knowledge of hardware and software. | I | 3.7.10.C | 5A, 5B, 6A |
| Binary numbering system | demonstrate converting binary to decimal and decimal to binary. | I | 3.7.10.A | |
| Network/Internet etiquette | demonstrate proper etiquette and knowledge of acceptable use policies. | I | 3.7.10.E | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 2 - Applets and Web Programming** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| World Wide Web | define terminology associated with WWW. | I | 3.7.10.C | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Hypertext markup language | create HTML documents. | I | 3.7.10.A | |
| JavaScript | create a web page using JavaScript. | I | 3.7.10.E | |
| Applets | create a simple Java applet. | I | | |
| Style sheets | apply a style sheet to an HTML document. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 3 - Introducing Java** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Define and understand application | create a Java project and application. | I | 3.7.10.A | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Executing an application | run a Java project and print results. | I | | |
| Formatting output | output the solution incorporating formatting features. | I | | |
| Coding conventions | demonstrate proper coding conventions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 4 - Variables and Constants** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Declare and initialize variables | demonstrate declaring and initializing variables and constants. | I | 3.7.10.A ,B, C | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Input streams | create an application using input from the keyboard. | I | | |
| Numeric expressions | create numeric expressions in an application to solve a problem. | I | | |
| Programming errors | identify and modify errors in an application | I | | |
| Steps in problem solving | read and understand a problem description, purpose and goals, and create a program to solve. | I | 3.6.10.B, C<br>3.7.10.A, B, C<br>3.8.10.B, C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 5 - Conditional Control Structures** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Decision structures | create syntactically correct code using decision structures. | I | 3.7.10.A, B, C, D | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Boolean expressions | complete a truth table and construct a compound Boolean expression. | I | | |
| Math class | import the Math class and create an object to send messages to the class. | I | | |
| Problem solving process | create a chart displaying the goal, the input and the algorithm to solve a problem. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 6 - Loop Structures and Strings** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Repetition control structures | create syntactically correct code using repetition structures. | I | 3.7.10.A, B, C | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Counters/Accumulators | differentiate between counters and accumulators in a program. | I | | |
| Debugging techniques | use various tools to debug an application | I | | |
| String class | import the String class and manipulate and compare strings. | I | | |
| Problem solving process | apply problem solving strategies. | R | 3.6.10.B, C<br>3.7.10.A, B, C<br>3.8.10.B, C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 7 - Methods** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Top-down development | develop problem solutions using top-down, psuedocode and flowcharting. | I | 3.7.10.A, B, C, D | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Methods | write methods utilizing parameters, overloading, and returning values. | I | | |
| Method documentation | write appropriate method documentation. | I | | |
| Testing data | identify boundary cases and generate appropriate test data. | I | | |
| Coding conventions | describe code conventions that apply to methods. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 8 Classes and Object-Oriented Development** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Define objects | create/instantiate objects. | I | 3.7.10.A, B, C, D | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Define class | design and implement a class. | I | | |
| Types of methods | explain the difference between accessor, modifier, and helper method. | I | | |
| Constructors | define and write a constructor. | R | | |
| Encapsulation | define and apply encapsulation. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming I - Introduction to Programming** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Unit 9 Arrays** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Define Array | describe types of problems that benefit from using arrays. | I | 3.7.10.A, B, C, D | 1A, 1B, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| | create one and two-dimensional arrays. | | | |
| | implement arrays with meaningful indexes. | | | |
| Strings | manipulate characters in a string. | R | | |
| Searching | apply searching algorithms to an array. | M | | |
| Unicode | understand and implement digital code. | R | | |
| ArrayList Class | implement methods in the ArrayList Class. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

ADVANCED PROGRAMMING II
VISUALBASIC.NET
**10 - 12**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Advanced Programming II**
**VisualBasic.Net**

**Grade Level:** **10 - 12**

## ACADEMIC STANDARDS:

**PA:**
3.6.12 B
3.7.10.A, B, C, D, 3.7.12 A, B, C, D, E
3.8.10.C, 3.8.12 C

**NETS:**
1A, 2B, 3A, 3C, 4A, 4B, 4C, 4D,
5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D

## COURSE DESCRIPTION:

This course is designed to introduce the student to object-oriented programming. Students will be introduced to all the major features of Visual Basic (designing a User Interface, creating fancy pull-down menus within the Windows environment). This will enable students to write programs within the Windows environment utilizing pull-down menus, dialog boxes, and scrollable windows. Students will be able to draw the appearance of their program first in windows, and focus on making the program perform to solve problems in a graphic form.

***Prerequisite: "B" or higher in Computer Programming I or Teacher permission***

*CAN BE TAKEN FOR 3 CREDITS FROM THE UNIVERSITY OF PITTSBURGH, COLLEGE IN HIGH SCHOOL PROGRAM.*

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

An Introduction To Programming Using Visual Basic .Net Fifth Edition
David I. Schneider
Prentice Hall Publishers

## ASSESSMENTS:

Verbal and written questions
Quizzes
Exams
Textbook projects
Observation
Teacher created projects

## TECHNOLOGY USED:

Microsoft Visual Studio VB.Net
Internet

428

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming II Visual Basic.NET | GRADE: 10 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: Safety Unit | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 1 - An Introduction to Computers and VB.Net** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Windows | demonstrate knowledge of using the Windows environment, Files, and Folders. | M | 3.7.12.C | 1A, 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| Visual basic | develop a project and identify the parts of the VB.Net window. | I | 3.7.12.A | |
| History | describe the history of computing through the centuries. | M | 3.7.12.C | |

<u>**WEST ALLEGHENY SCHOOL DISTRICT**</u>

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 2 - Problem Solving** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Problem solving | list and apply the 6 steps to solve a problem. | R | 3.6.12.B<br>3.7.12.A<br>3.8.12.C | 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B |
| Program development | create solutions to problems using flowcharts, pseudocode, and hierarchy charts. | R | 3.6.12.B<br>3.7.12.A<br>3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 3 - Fundamentals of Programming in VB.NET** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| VB Controls | create and distinguish between textboxes, labels, buttons, and list boxes. | I | 3.7.12.A, B, C, D | 1A, 2B, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6C, 6D |
| VB Events | define and write code for an Event | I | | |
| Numbers | use arithmetic operators, and built-in functions to solve problems. | I | | |
| Strings | create and customize controls using the properties value and internal documentation. | I | | |
| Input/Output | use data files for input. | I | 3.7.12.A, B, C, D,E | |
| | format output with zones and use the input box and msg box to enhance a program. | | 3.6.12.B<br>3.8.12C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 4 - General Procedures** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Sub procedures | create a procedure using arguments and demonstrate how to invoke a procedure.<br><br>distinguish between passing value and reference with arguments. | I | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Function procedures | create a function procedure and describe the appropriate use and difference between a sub procedure and function. | I | | |
| Modular design | design a project using the top-down method, and discuss the advantages of structured programming | R | 3.7.12.A, B, C<br>3.6.12.B<br>3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming II Visual Basic.NET | GRADE: 10 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 5 - Decisions** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Decision structures | create syntactically correct code using Decision Structures, If blocks, and Select Case Blocks. | R | 3.7.12.A, B, C, D | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Boolean expressions | complete a truth table and construct a compound Boolean expression using relational and logical operators. | R | | |
| Projects | create an algorithm and the actual application to solve a problem. | R | 3.7.12.A, B, C, D<br>3.6.12.B<br>3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 6 - Repetition** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Repetition control structures | create syntactically correct code using Do loops and For…Next loops. | R | 3.7.10.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Counters and accumulators | differentiate between counters and accumulators in a program. | R | | |
| File processing | utilize inputting and determining EOF. | I | | |
| Problem solving process | solve a problem by creating an algorithm and application. | R | 3.7.10.A, B, C<br>3.6.12.B<br>3.8.12C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 7 Arrays** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Arrays | create and access an array.<br>use a portion of an array and merge 2 ordered arrays. | R | 3.7.12.A, B, C, D | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Control Arrays | create control arrays and be able to distinguish between simple array and control array. | R | | |
| Structures | create data structures and identify when to use an array or structure .<br>create an array structure. | R | | |
| Sorting and Searching | write a Bubble sort and Shell sort to order information.<br>explain and implement searching. | R | | |
| Two-Dimensional Array | create a two-dimensional array. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming II Visual Basic.NET** | **GRADE: 10 - 12** |
| **INSTRUCTIONAL UNIT: Unit 8 Sequential Files** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Sequential files | create a Sequential File and incorporate exception handling.<br>sort a file. | I | 3.7.12.A, B, C, D | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| CSV | create a file with all information on one line. | I | | |
| Project | solve a project by incorporating an algorithm and creating a VB application. | R | 3.7.12.A, B, C, D<br>3.6.12.B<br>3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming II Visual Basic.NET | GRADE: 10 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 9 Additional Controls and Objects** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| 7 Elementary controls | create a group box, checkbox, Radio button, timer, picture box, and scroll bars on a form. write code for events on controls. | I | 3.7.10.A, B, C, D | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Other controls | create a list box, combo boxes, and the open file dialog control. | I | | |
| Additional objects | create a project using the following objects: Clipboard object, Random class, Main menu and Multiple forms. | I | 3.7.10.A, B, C, D<br>3.6.12.B<br>3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**
**INFORMATION AND COMMUNICATIONS**
**TECHNOLOGY CURRICULUM**

**PROGRAMMING III**
**ADVANCED PROGRAMMING**
**11-12**

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Programming III**
**Advanced Programming**

**Grade Level:** **11 - 12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.12 B
3.7.12 A, B, C, D, E
3.8.12 B, C

**NETS:**
1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 5C, 5D, 6A, 6B, 6C, 6D

**COURSE DESCRIPTION:**

**Java Object Oriented Programming**

This course is a continuation of Programming I and II. The students will gain a solid grasp of the object oriented features of Java programming. Topics include: classes, arrays and recursion. Course material covers AP compliant information for the A level testing.
Note: A must for college bound Computer Science/Engineering Majors.

*CAN BE TAKEN FOR 3 CREDITS FROM THE UNIVERSITY OF PITTSBURGH COLLEGE IN HIGH SCHOOL PROGRAM.*

***Prerequisites: Programming I and II or Teacher permission***

**Note:** Great language for the following majors in college: Business/Computer Science/Engineering.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

A Guide to Programming in Java 5
Lawrenceville Press

Jcreator software
Jdk Java software

**ASSESSMENTS:**
Verbal and written questions
Quizzes
Tests
Textbook projects
Observation
Teacher created projects

**TECHNOLOGY USED:**
Jcreator software
Jdk Java software

440

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming III | GRADE: 11 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using the computer. | R | 3.7.12.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.12.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.12.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.12.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming III** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Unit 1 - Introducing Java** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Define and understand application | create a Java project and application. | I | 3.7.12.A | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Executing an application | run a Java project and print results. | I | | |
| Formatting Output | output a solution incorporating formatting features. | I | | |
| Coding conventions | demonstrate proper coding conventions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Programming III** | **GRADE: 11 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 2 - Variables and Constants** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Declare and initialize variables | demonstrate declaring and initializing variables and constants. | M | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Input streams | create an application using input from the keyboard. | M | | |
| Numeric expressions | create numeric expressions in an application to solve a problem. | M | | |
| Programming errors | identify and correct errors in an application. | M | | |
| Steps in problem solving | read and understand a problem description, purpose and goals, and create a program to solve the problem. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Programming III** | **GRADE: 11 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 3 - Conditional Control Structures** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Decision structures | create syntactically correct code using Decision structures. | M | 3.7.12.A, B, C, D | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Boolean expressions | complete a truth table and construct a compound Boolean expression. | M | | |
| Math class | import the Math class and create an object to send messages to the class. | M | | |
| Problem solving process | create a chart displaying the goal, the input, and algorithm to solve a problem. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming III** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Unit 4 - Loop Structures and Strings** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Repetition control structures | create syntactically correct code using repetition structures. | M | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Counters/Accumulators | differentiate between counters and accumulators in a program. | M | | |
| Debugging techniques | use various tools to debug an application. | M | | |
| String class | import the String class and manipulate and compare strings. | M | | |
| Problem solving process | apply problem solving strategies. | R | 3.7.12.A, B, C<br>3.8.12.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Programming III** | **GRADE: 11 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 5 - Top-down Design** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Designing methods | create a flowchart utilizing the top down method. | M | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Methods | create and identify the parts of a method. | M | | |
| Parameters | explain the use and incorporate parameters into the method and call statements. | M | | |
| Problem solving process | apply problem solving strategies. | R | 3.6.12.B<br>3.7.12.A,.B, C<br>3.8.12.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming III | GRADE: 11 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 6 - Objects and Classes** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Client and server | identify and define the difference between the sender and receiver. | M | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Parts of class | define the constructor, instance variables, and methods. | M | | |
| | distinguish between the accessor and mutator methods. | M | | |
| Problem solving process | apply problem solving strategies. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Programming III | GRADE: 11 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Unit 7 - Arrays** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Array | declare and use arrays in java programs (read, output, and manipulate). | I | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Searching | traverse through an array. | I | | |
| Array List class / Wrapper class | define and incorporate the classes using arrays. | I | | |
| Case Study | create an application incorporating arrays. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming III** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Unit 8 - GUIs and Event-Driven Programming** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| GUI | define a GUI environment. | I | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| Swing package | create buttons, labels, panels, textfield, and frames. | I | | |
| Events | define an event and add code to a user event. | I | | |
| Layout manager | explain the difference between a Box Layout, Grid Layout, and Flow Layout. | I | | |
| Case study | create an application incorporating the GUI environment. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Programming III** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Unit 9 Files and Exception Handling** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| File | define and utilize files. | I | 3.7.12.A, B, C | 1A, 3A, 3C, 4A, 4B, 4C, 4D, 5A, 5B, 6A, 6B, 6D |
| File Classes | incorporate FileReader, BufferedReader classes, and file exception handling in an application. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

SPREADSHEETS
GRADES 9-12

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Spreadsheets**

**Grade Level:** **9 - 12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.A, 3.7.10.C, 3.7.10.D, 3.7.10.E
3.8.10.C

**NETS:**
3C, 3D, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**COURSE DESCRIPTION:**

Students will learn how to use a current software package to create, enhance, design and print spreadsheets. Functions, advanced formulas, charts and maps are other topics taught. This one semester course is recommended for any student planning to attend college.

Keyboarding experience is helpful, but not required.

**This course must be taken with Database. Students MUST REGISTER for both courses.**

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Microsoft Excel 2002, Comprehensive Concepts and Techniques
Thomson Learning

**ASSESSMENTS:**

Verbal and written questions
Lesson Applications
Tests
Textbook projects
Observation

**TECHNOLOGY USED:**

Microsoft Excel
Internet
LCD Projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare student for: | | | | |
| Equipment usage | identify the safety procedures for using a computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environmental usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 1 - Creating a Worksheet and Embedded Chart** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Worksheets | describe the Excel worksheet. | I | 3.6.10.B | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | select a cell or range of cells. | I | 3.6.10.B | |
| | enter text and numbers. | I | 3.7.10.C, 3.7.10.D | |
| | use the AutoSum button to sum a range of cells. | I | | |
| | copy a cell to a range of cells using the fill handle. | I | | |
| | bold font, change font size, and change font color. | R | | |
| | center cell contents across a series of columns. | I | | |
| | apply the AutoFormat command to format a range. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 1 - Creating a Worksheet and Embedded Chart (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Worksheets | use the Name box to select a cell. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | create a Column chart using the Chart Wizard. | I | | |
| | save and print a workbook. | I | | |
| | use the AutoCalculate area to determine totals. | I | | |
| | correct errors on a worksheet. | I | | |
| | use the Excel Help system to answer questions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 - Formulas, Functions, Formatting, and Web Queries** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formatting | enter multiple lines of text in the same cell. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | recognize smart tags. | I | | |
| | change the font of a cell. | R | | |
| | change the font color and background of a cell. | R | | |
| | add borders to a range. | R | | |
| | format numbers using the Format Cells dialog box. | I | | |
| | add conditional formatting to a range of cells. | I | | |
| | align text in cells. | R | | |
| | change the width of a column and height of a row. | I | | |

456

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 2 - Formulas, Functions, Formatting, and Web Queries (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formatting | check the spelling of a worksheet. | M | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| ↓ | use print preview . | R | ↓ | ↓ |
| | distinguish between portrait and landscape orientation. | M | | |
| | print a partial or complete worksheet. | I | | |
| | display and print the formulas version of a worksheet. | I | | |
| | change the print scaling to fit to one page. | I | | |
| | rename sheets. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 2 - Formulas, Functions, Formatting, and Web Queries (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formulas | enter a formula using the keyboard. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | enter formulas using point mode. | I | | |
| | identify the arithmetic operators +, -, *, /, %, and ^. | I | | |
| | determine a percentage. | I | | |
| | verify a formula using Range Finder. | I | | |
| | display and print the formulas version of a worksheet. | I | | |
| Functions | apply the AVERAGE, MAX, and MIN functions. | I | | |
| Web Queries | use a Web query to get real-time data from a Web site. | I | 3.7.10C, 3.7.10D, 3.7.10E | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 - What-If Analysis, Charting, and Working with Large Worksheets** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Working with Large Worksheets | rotate text in a cell. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | create a series of month names. | I | | |
| | use the format painter button to format cells. | R | | |
| | copy and paste, insert and delete cells. | R | | |
| | use smart tags. | I | | |
| | format numbers using format symbols. | I | | |
| | freeze titles. | I | | |
| | display and format the system date. | I | | |
| | use and copy absolute cell references in a formula. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 - What-If Analysis, Charting, and Working with Large Worksheets (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Working with Large Worksheets | display and dock toolbars. | R | 3.6.10.B | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | add a drop shadow to a range of cells. | I | 3.7.10.C, 3.7.10.D | |
| | color worksheet tabs and rearrange sheets in a workbook. | I | | |
| | preview and print multiple sheets. | I | | |
| | use the Zoom box to change the worksheet view. | I | 3.6.10.B, 3.7.10.C, 3.7.10.D | |
| | view different parts of the worksheet through window panes. | I | 3.7.10.C, 3.7.10.D | |
| What-If Analysis | use the IF function to perform a logical test. | I | | |
| | use Excel to answer what-if questions. | I | | |
| | use the goal seek command. | I | | |

460

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 3 - What-If Analysis, Charting, and Working with Large Worksheets (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Charting | create a 3-D Pie chart on a separate chart sheet. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Creating Static and Dynamic Web Pages Using Excel** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Static Web Pages | preview a workbook as a Web page. | I | 3.7.10.C, 3.7.10.D, 3.7.10.E | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | save a workbook as a static Web page. | I | | |
| | view and manipulate the static Web page using your browser. | I | | |
| Dynamic Web Pages | save an Excel chart as a dynamic Web page. | I | | |
| | view and manipulate a dynamic Web page using your browser. | I | | |
| | modify a worksheet on a dynamic Web page. | I | | |

**<u>WEST ALLEGHENY SCHOOL DISTRICT</u>**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 4 – Financial Functions, Data Tables, Amortization Schedules, and Hyperlinks** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Amortization Schedules | control the color and thickness of outlines and borders. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | assign a name to a cell and refer to the cell in a formula using the assigned name. | I | | |
| | create an amortization schedule. | I | | |
| | analyze worksheet data by changing values. | I | | |
| | use names and the Set Print Area command to print sections of a worksheet. | I | | |
| | set print options. | I | | |
| | protect and unprotect cells in a worksheet. | I | | |
| | use the formula checking features of Excel. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 4 - Financial Functions, Data Tables, Amortization Schedules, and Hyperlinks (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Financial Functions | determine the monthly payment of a loan using the financial function PMT. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | determine a present value of a loan using the PV function. | I | | |
| Data Tables | create a data table to analyze data in a worksheet. | I | | |
| | add a pointer to a data table. | I | | |
| Hyperlinks | add a hyperlink to a worksheet element. | I | 3.7.10C, 3.7.10D, 3.7.10E | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 5 - Creating, Sorting, and Querying a Worksheet Database** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Worksheet database | create a worksheet database. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | add computational fields to a database. | I | | |
| | use the VLOOKUP function to look up a value in a table. | I | | |
| | change the range assigned to a named database. | I | | |
| | use a data form to display, add, and delete records and change field values. | I | | |
| Sorting a database | sort a worksheet database using one field or multiple fields. | I | | |
| | display automatic subtotals. | I | | |

465

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| --- | --- |
| **INSTRUCTIONAL UNIT: Project 5 - Creating, Sorting, and Querying a Worksheet Database (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
| --- | --- | --- | --- | --- |
| | The student will: | | | |
| Querying a database | use a data form to find records that meet comparison criteria. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | filter data to display records that meet comparison criteria. | I | | |
| | use the advanced filtering features to display records that meet comparison criteria. | I | | |
| | apply database functions to generate information about a worksheet database. | I | | |
| | print a database. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 6 - Creating Templates and Working with Multiple Worksheets and Workbooks** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Templates | create and use a template. | I | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | utilize custom format codes. | I | | |
| | define, apply, and remove a style. | I | | |
| | create formulas that use 3-D references. | I | | |
| | draw a 3-D Cylinder chart. | I | | |
| | use WordArt to create a title. | R | | |
| | create and modify lines and objects. | I | | |
| | add comments to cells. | I | | |
| | add a header or footer to a workbook. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Spreadsheets** | **Grade: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 6 - Creating Templates and Working with Multiple Worksheets and Workbooks (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Working with Multiple Worksheets and Workbooks | consolidate data within the same workbook. | R | 3.7.10.C, 3.7.10.D | 3C, 3D, 5A, 5B, 6A, 6B, 6D |
| | change the page margins. | R | | |
| | insert a page break. | R | | |
| | use the Find and Replace commands. | R | | |
| | search for files on disk. | R | | |
| | create and use a workspace file. | I | | |
| | consolidate data by linking workbooks. | I | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

WEBPAGE DESIGN
MACROMEDIA SUITE
9 - 12

297

**WEST ALLEGHENY SCHOOL DISTRICT**

**Subject:** **Webpage Design – Macromedia Suite**

**Grade Level:** **9 - 12**

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.A, B, C, D, E
3.8.10.C

**NETS:**
1A, 2A, 2B, 3A, 3B, 3C, 4A, 4B, 4C, 5A, 5B, 6A, 6B, 6C, 6D

**COURSE DESCRIPTION:**
This hands-on course provides a comprehensive introduction to Macromedia Suite MX 2004. Students will create web applications and sites. Students will become familiar with Flash and Dreamweaver and create highly integrated and creative solutions for web sites and applications.

**No prerequisite.**

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Macromedia Dreamweaver 8 complete Concepts and Techniques
Thomson/Southwestern Publishing

**ASSESSMENTS:**

Verbal and written questions
Quizzes
Tests
Textbook projects
Observation
Teacher created projects

**TECHNOLOGY USED:**

Macromedia Suite MX 2004
Internet

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: HTML Lesson 1 – Quick HTML Know-How** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Basic HTML Tags | demonstrate how to use basic HTML tags. | I | 3.7.10.A, C, D, E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Saving Web pages | demonstrate how to save web pages. | I | | |
| Heading Tags | utilize heading tags to make text stand out. | I | | |
| Unordered, ordered, and embedded lists | demonstrate how to create lists (unordered, ordered and embedded lists). | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: HTML Lesson 2 – HTML Organization Techniques** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web page spacing | utilize single and double spacing to organize page information. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Lines | utilize lines to organize page information. | I | | |
| Attributes and Values | demonstrate how to implement attributes and values. | I | | |
| Web page text colors | demonstrate how to alter web page text colors. | I | | |
| Hyperlinks | demonstrate how to create hyperlinks within a web page, to another URL on the World Wide Web, and to another file. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Webpage Design – Macromedia Suite | GRADE: 9 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: HTML Lesson 3 – HTML Power Techniques | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Fonts (size, style and color) | demonstrate how to control the size, style, and color of fonts. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3B, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Pictures | demonstrate how to download pictures from the web and insert them into web pages. | I | | |
| Graphics | demonstrate how to change the size of graphics. | I | | |
| Tables | utilize tables to organize information on web pages. | I | | |
| Data input options | demonstrate how to insert a variety of data into a web page. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: HTML Lesson 4 – HTML Structural Design Techniques** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Frame Sets | demonstrate how to create a frame set. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Navigation Bar | demonstrate how to add a navigation bar to a web page. | I | | |
| Welcome Page | demonstrate how to create a welcome page. | I | | |
| Nested Frame Set | demonstrate how to create a nested frame set. | I | | |
| Title Bar | demonstrate how to include a title bar frame and page. | I | | |
| Frame and Frame Set Options | utilize frame and frame set options. | I | | |

474

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: JavaScript Lesson 5 – What is JavaScript?** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Purpose of JavaScript | utilize the purpose of JavaScript to enhance Web pages. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| <SCRIPT> Tags | demonstrate how to use Script tags. | I | | |
| JavaScript Objects | demonstrate how to use JavaScript objects. | I | | |
| JavaScript Methods | demonstrate how to use JavaScript methods. | I | | |
| JavaScript Syntax | utilize JavaScript syntax to effectively create Web pages. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: JavaScript Lesson 6 – Using Images with JavaScript** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| JavaScript Events | utilize JavaScript events to enhance web pages. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Image Rollovers | demonstrate how to create an image rollover. | I | | |
| Hyperlink Rollovers | demonstrate how to make a hyperlink rollover. | I | | |
| Cycling Banners | demonstrate how to build a cycling banner. | I | | |
| Random Images | demonstrate how to display random images. | I | | |
| JavaScript Slide Show | demonstrate how to create a JavaScript slide show. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: JavaScript Lesson 7 – Creating Forms with JavaScript** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| JavaScript Input Controls | utilize JavaScript Input Controls to send and receive information from HTML forms. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| Data Validation | utilize data validation to ensure all information is complete on HTML forms. | I | | |
| HTML Forms with JavaScript | utilize JavaScript to enhance the functionality of HTML forms. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: JavaScript Lesson 8 – Using JavaScript with Frames** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| JavaScript Parameter Lists | demonstrate how to create a JavaScript function with a parameter list. | I | 3.6.10.B<br>3.7.10.A, B,C, D,E<br>3.8.10.C | 1A, 2A, 2B, 3A, 3C, 4B, 5A, 5B, 6A, 6B, 6C, 6D |
| JavaScript-enabled Hyperlinks | demonstrate how to create JavaScript-enabled hyperlinks that affect frames. | I | | |
| JavaScript-enabled buttons | demonstrate how to create JavaScript-enabled buttons that affect frames. | I | | |
| JavaScript functions | demonstrate how to create top-level JavaScript functions. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Introduction – Web site Development and Macromedia Dreamweaver 8** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Internet Basics | describe the significance of the Internet. | I | 3.6.10.B | 1A, 3A, 4A, 5A, 5B |
| | identify the difference between the Internet and the WWW. | | | |
| | specify the difference between a web page and web site. | | | |
| | define web browsers and identify their main features. | | | |
| Web page basics | identify the nine types of web sites. | I | 3.7.10.A | |
| | identify the various methods and tools used to create a web page and a web site. | | | |
| | recognize the basic elements within XHTML. | | | |
| | discuss advantages of using web page authoring programs such as Dreamweaver. | | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 1 - Web Site development and Macromedia Dreamweaver 8** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Dreamweaver parts | identify window parts and workspace. | I | 3.7.10.B, C, D | 1A, 3A, 3B, 4B, 4C, 5A, 5B, 6A, 6B, 6D |
| Dreamweaver basics | define a local site. | I | | |
| | create and save a web page. | | | |
| | add a background image. | | | |
| | describe the Property Inspector. | | | |
| | format and modify text elements. | | | |
| | define and insert a line break. | | | |
| | preview in Web browser. | | | |
| | demonstrate how to start and close dreamweaver. | | | |
| Help | use the help screen. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 2 – Adding Web Pages, Links, and Images** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Web pages | define and set a home page. | I | 3.7.10.B, C, D | 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| | add pages to a Web site. | | | |
| | describe image file formats. | | | |
| | insert, resize, and align images within a Web page. | | | |
| Links | describe the different types of links. | I | | |
| | create relative, absolute, and e-mail links. | | | |
| | demonstrate how to change the color of links. | | | |
| | edit and delete links. | | | |
| Site Map | describe and display a Site Map. | I | | |
| Views | describe Code view, Split view, and Design view. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 3 - Tables and Page Layout** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Layout | understand and plan page layout. | I | 3.7.10.B, C, D | 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| | describe standard mode and layout mode. | | | |
| Tables | design a web page using tables in standard mode and layout mode. | I | | |
| | modify a table structure. | | | |
| | add content to a table. | | | |
| | format table content. | | | |
| | format a table. | | | |
| | create head content. | | | |
| Project Review | create a website. | R | | |

482

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Webpage Design – Macromedia Suite | GRADE: 9 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Project 4 - Forms** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Forms | discuss form processing. | I | 3.7.10.C<br>3.7.10.D | 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| | distinguish between client-side and server-side form processing. | | | |
| | create a form. | | | |
| | insert a table into a form. | | | |
| | describe form objects. | | | |
| | add and edit objects within a form (text fields and areas, check boxes, radio buttons, lists, menus and buttons). | I | | |
| Events | apply behaviors to a form. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Project 5 Templates and Style Sheets** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Templates | describe a template. | I | 3.7.10.C, D, E | 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| | create a template. | | | |
| | create a Web page from a template. | | | |
| | describe the different types of style sheets. | | | |
| | create a Cascading Style Sheet. | | | |
| Style Sheets | apply Cascading Style Sheet attributes to a template. | I | | |
| Web Design Project | develop a website. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Webpage Design – Macromedia Suite** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Project 6 - Layers, Image Maps, and Navigation Bars** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Layers | explain the concept of layers. | I | 3.7.10.C, D, E | 3C, 4A, 4B, 5A, 5B, 6A, 6B, 6D |
| | insert, select, resize and move a layer. | | | |
| | name a layer. | | | |
| | align layers. | | | |
| | create a web page from a template. | | | |
| Image maps | create an image map. | I | | |
| | add and edit behaviors. | | | |
| Navigation bar | describe and create a navigation bar. | I | | |
| Web Design Project | develop a website. | R | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

WORD PROCESSING
GRADE 9-12

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** Word Processing

**Grade Level:** 9-12

**ACADEMIC STANDARDS:**

**PA:**
3.6.10.B
3.7.10.C, D

**NETS:**
3C, 5A, 5B, 6A, 6B

**COURSE DESCRIPTION:**

Students will learn the Microsoft Office Word software package to generate documents using merge, table, formatting, printing, and editing. Development of good work habits is emphasized.

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Word 2000, A Comprehensive Approach
Glencoe McGraw-Hill

**ASSESSMENTS:**

Technique Evaluation Forms, used for grading proper keyboarding technique
Lecture Exercise Printouts
Concepts Review
Skills Review
Lesson Applications
Unit Applications
Quizzes
Graded Exercises

**TECHNOLOGY USED:**

Microsoft Word
Internet
LCD Projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Word Processing | GRADE: 9 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Basic Skills** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Creating a document | start Word.<br>identify parts of the Word screen.<br>key text into a document.<br>perform basic text editing.<br>name and save a document.<br>print a document.<br>close a document and exit Word. | M | 3.6.10.B | 3C, 5A, 5B, 6A, 6B |
| Selecting and Editing Text | open an existing document.<br>enter nonprinting characters.<br>move text within a document.<br>use the Undo and Redo options.<br>repeat options.<br>select text.<br>save a revised document.<br>work with document properties. | M | 3.6.10.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing** | **GRADE: 9 – 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Basic Skills (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formatting Characters | apply basic character formatting.<br>change fonts and font sizes.<br>choose character formats from the Font dialog box.<br>repeat and copy character formats.<br>change case.<br>highlight text.<br>create a drop cap effect.<br>automatically format text and numbers. | M | 3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| Writing Tools | use AutoComplete and AutoCorrect.<br>use AutoText.<br>check grammar and spelling.<br>use the Thesaurus. | M | 3.6.10.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Appearance Changes for Documents** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Formatting Paragraphs | align paragraphs.<br>change line spacing.<br>change paragraph spacing.<br>set paragraph indents.<br>apply borders and shading.<br>repeat and copy paragraph formats.<br>create bulleted and numbered lists.<br>insert symbols and special character. | M | 3.7.10.C<br>3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| Margins | change margins in Normal view.<br>change margins in Print Layout view.<br>change margins in Print Preview.<br>set mirror margins and gutter margins.<br>use hyphenation.<br>insert the date and time as a field. | R | 3.7.10.D | |
| Tabs and Tabbed Columns | set tabs.<br>set leader tabs.<br>clear tabs.<br>adjust tab settings.<br>set tabbed columns.<br>sort tabbed paragraphs. | R | 3.7.10.D | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Editing Features** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Moving & Copying Text | understand the use of Clipboards.<br>move text using Cut and Paste.<br>move text by dragging.<br>copy text using Copy and Paste.<br>copy text by dragging.<br>understand how SmartCut and Paste works.<br>work with multiple document windows.<br>move and copy text among windows. | M | 3.6.10.B | 3C, 5A, 5B, 6A, 6B |
| Find and Replace | find text.<br>find and replace text.<br>find and replace special characters.<br>find and replace formatting. | M | 3.6.10.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Page Formatting** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Printing | use Print Preview.<br>choose print options.<br>change paper size and page orientation.<br>print envelopes.<br>print labels.<br>send a document as e-mail. | R | 3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| Page Numbers, Headers, and Footer | add page numbers.<br>vary page numbers in Print Layout view.<br>add headers and footers.<br>work with headers and footers within sections.<br>link and unlink section headers and footers.<br>change starting page numbers.<br>create continuation page headers.<br>create alternate headers and footers. | R | 3.7.10.C<br>3.7.10.D | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing** | **GRADE: 9 - 12** |
| **INSTRUCTIONAL UNIT: Text Organization** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Tables | create a table.<br>key and edit text in tables.<br>select cells, rows, and columns.<br>edit table structures.<br>format tables and cell contents.<br>convert tables and text. | R | 3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| Columns | create multiple-column layouts.<br>key and edit text in columns.<br>format columns and column text.<br>control column breaks. | M | 3.7.10.C<br>3.7.10.D | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing** | **GRADE: 9 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Advanced Topics** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Graphics | insert pictures.<br>select, size, crop, move, and format pictures.<br>draw shapes.<br>select, size, move, and copy shapes.<br>format shapes.<br>draw AutoShapes.<br>change order, group, and align shapes.<br>use WordArt. | M | 3.7.10.D | 3C, 5A, 5B, 6A, 6B |
| Mail Merge | create a main document.<br>create a data source.<br>insert merge fields into a main document.<br>initiate a mail merge.<br>edit an existing data source.<br>create mailing labels. | M | | |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

WORD PROCESSING II
GRADES 10-12

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **Word Processing II**
**Grade Level:** **10 - 12**

## ACADEMIC STANDARDS:

**PA:**
3.6.10.B
3.7.10.A, C, D
3.8.10.C

**NETS:**
1A, 1C, 3C, 5A, 5B, 5C, 5D, 6A, 6B, 6D

## COURSE DESCRIPTION:

Students will work with the Microsoft Office Word software package to learn advanced features such as macros, special print features, sorting, tables, graphics, merging, and templates. This course will include a job simulation as a year-end project. Development of good work habits is emphasized.

## BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:

Word 2000, A Comprehensive Approach
Glencoe McGraw-Hill

## ASSESSMENTS:

Technique Evaluation Forms
Concepts Review
Skills Review
Written Quizzes
Computer Quizzes
Lesson Applications
Unit Applications
Textbook projects
Observation

## TECHNOLOGY USED:

Microsoft Word
LCD Projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Word Processing II | Grade: 10 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare student for: | | | | |
| Equipment usage | identify the safety procedures for using a computer. | R | 3.7.10A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10A | |
| Environmental usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Tables** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Tables | create a table. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B |
| | key and edit text in tables. | R | | |
| | select cells, rows, and columns. | R | | |
| | edit table structures. | R | | |
| | format tables and cell contents. | R | | |
| | convert tables and text. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Word Processing II | Grade: 10 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Lesson 9 – Find and Replace** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Find and Replace | find text. | R | 3.6.10.B, 3.7.10.C | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | find and replace text. | R | | |
| | find and replace special characters. | I | | |
| | find and replace formatting. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Lesson 11 – Page and Section Breaks** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Page Breaks | adjust soft page breaks and insert hard page breaks. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | control soft page breaks with paragraph formatting. | I | | |
| Section Breaks | control section breaks by specifying them by type. | I | | |
| | format sections. | I | | |
| | use the Go To feature. | I | | |

**<u>WEST ALLEGHENY SCHOOL DISTRICT</u>**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing II** | **Grade: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Lesson 12 - Page Numbers, Headers, and Footers** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Page Numbers | add page numbers. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | vary page numbers in Print Layout view. | I | | |
| | change starting page numbers. | I | | |
| Headers and Footers | add headers and footers. | R | | |
| | work with headers and footers within sections. | I | | |
| | link and unlink section headers and footers. | I | | |
| | create continuation page headers. | R | | |
| | create alternate headers and footers. | I | | |

## WEST ALLEGHENY SCHOOL DISTRICT

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Advanced Tables** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Advanced Tables | work with long tables. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | use advanced table-formatting options. | I | | |
| | change the size of tables. | I | | |
| | work with multiple tables. | I | | |
| | sort paragraphs, tables, and lists. | I | | |
| | work with Excel worksheets within Word documents. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Lesson 14 - Columns** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Columns | create multiple-column layouts. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | key and edit text in columns. | R | | |
| | format columns, and column text. | R | | |
| | control column breaks. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Lesson 18 - Mail Merges** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Mail Merges | create a main document. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | create a data source. | R | | |
| | insert merge fields into a main document. | R | | |
| | initiate a mail merge. | R | | |
| | edit an existing data source. | R | | |
| | create mailing labels. | R | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Footnotes and Endnotes** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Footnotes and Endnotes | add footnotes and endnotes. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | view footnotes and endnotes. | R | | |
| | edit and format footnotes and endnotes. | I | | |
| | move, copy, and delete footnotes and endnotes. | I | | |
| | change the placement of footnotes and endnotes. | I | | |
| | change the numbering of footnotes and endnotes. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Fields** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Fields | insert fields. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| ↓ | add options to fields. | I | ↓ | ↓ |
| | view and edit field codes. | I | | |
| | update field codes. | I | | |
| | use bookmarks in fields. | I | | |
| | control print options for field codes. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Lesson 15 - Styles** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Styles | apply styles. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | create new styles. | I | | |
| | redefine, modify, and rename styles. | I | | |
| | use style options. | I | | |
| | use autoformat and the style gallery. | I | | |
| | create automatic styles. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Chapter 16 - Templates and Wizards** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Templates | use Word templates. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | create new templates. | I | | |
| | attach templates to documents. | I | | |
| | modify templates. | I | | |
| | use the Organizer. | I | | |
| Wizards | use wizards. | I | | |

508

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing II** | **Grade: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Charts** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Charts | create charts. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | edit chart data. | I | | |
| | modify chart types. | I | | |
| | add and modify chart options. | I | | |
| | format charts and chart elements. | I | | |
| | import data into charts. | I | | |

509

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing II** | **Grade: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Electronic Forms** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Forms | create a template to use as a form. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| ↓ | insert fields in a form. | I | ↓ | ↓ |
| ↓ | work with form field options. | I | ↓ | ↓ |
| ↓ | protect and save a form. | I | ↓ | ↓ |
| ↓ | use a form. | I | ↓ | ↓ |
| ↓ | edit a form. | I | ↓ | ↓ |
| ↓ | insert a table in a form. | I | ↓ | ↓ |
| ↓ | enter calculated fields in a table. | I | ↓ | ↓ |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing II** | **Grade: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Outlines** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Outlines | create an outline. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | collapse and expand an outline. | I | | |
| | navigate in an outline. | I | | |
| | reorganize an outline. | I | | |
| | number an outline. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Word Processing II | Grade: 10 - 12 |
| --- | --- |
| INSTRUCTIONAL UNIT: Indexes and Tables of Contents | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
| --- | --- | --- | --- | --- |
| | The student will: | | | |
| Indexes | identify index entries. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | format and compile an index. | I | | |
| | edit and update an index. | I | | |
| Table of Contents | create a table of contents. | I | | |
| | format a table of contents. | I | | |
| | edit and update a table of contents. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Master Documents** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Master Documents | create master documents. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | share master documents. | I | | |
| | edit subdocuments. | I | | |
| | move, split, and merge subdocuments. | I | | |
| | create a table of contents and index in a master document. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Comments and Revision Marks** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Comments | create comments. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| Revision Marks | track changes using revision marks. | I | | |
| | accept and reject revisions. | I | | |
| | compare documents. | I | | |
| | create versions of the same document. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Word Processing II** | **Grade: 10 - 12** |
| **INSTRUCTIONAL UNIT: Macros** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Macros | create a macro. | I | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | run a macro. | I | | |
| | edit a macro. | I | | |
| | copy, rename, and delete macros. | I | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Word Processing II** | **Grade: 10 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Portfolio Builder** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Resumes and Portfolios | build a resume. | R | 3.7.10.C, 3.7.10.D | 1A, 3C, 5A, 5B, 6A, 6B, 6D |
| | identify prospective employers. | I | | |
| | build a portfolio. | I | | |
| | target your resume and portfolio. | I | | |
| | write a cover letter. | R | | |
| | fill out an employment application. | R | | |
| | prepare for a job interview. | I | | |
| | follow up an interview. | I | | |

516

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Word Processing II | Grade: 10 - 12 |
|---|---|
| INSTRUCTIONAL UNIT: Business Simulation | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Business Simulation ↓ | generate documents comprised of:<br>Tables<br>Section Breaks<br>Headers and Footers<br>Columns<br>Mail Merges<br>Footnotes<br>Endnotes<br>Templates<br>Charts<br>Outlines<br>Indexes<br>Table of Contents | R | 3.7.10.C, 3.7.10.D ↓ | 1A, 1C, 3C, 5A, 5B, 6A, 6B, 6D ↓ |

WEST ALLEGHENY SCHOOL DISTRICT
INFORMATION AND COMMUNICATIONS
TECHNOLOGY CURRICULUM

YEARBOOK I/II
GRADE 11-12

WEST ALLEGHENY SCHOOL DISTRICT

**Subject:** **JOURNALISM/YEARBOOK I/II**

**Level:** **11-12**

**ACADEMIC STANDARDS:**

PA:
3.6.10.B, 3.7.10.A, 3.8.10.B, C
3.6.12.B, 3.7.12.D, E, 3.8.12.C

NETS:
1A, 1B, 2A, 2B, 2D, 3A, 3B, 3C, 3D, 4A, 4B, 4D, 5A, 5B, 5C, 5D, 6A, 6B, 6D

**PA (Reading, Writing, Speaking and Listening Standards):**
1.1.11.F, , 1.8.11.B, C
1.5.11.A, B, C, D, E, F, G

**COURSE DESCRIPTION:**

**JOURNALISM/YEARBOOK [0140] 11, 12 YEAR 1 CREDIT**
This communications course is designed to introduce students to aspects of journalism including, but not limited to copywriting, photojournalism, computer layout design, and digital proof correction. Students will produce and publish the "Alleghenian," our school annual. Compositional skills will be enhanced through writing narratives and informational copy for various segments of school life. Those enrolled will be expected to meet deadlines, benchmarks and work with minimal supervision in small-group situations. Journalism students are assessed on their ability to meet those deadlines and benchmarks as well as on writing assignments and testing based on journalism lessons. A business and workshop atmosphere will be created, as students are responsible for generating and budgeting revenue to ensure solvent finances.
***Prerequisites:***
*Proficiency on 11th grade Reading and Writing PSSA*
*A "B" average in previous year's English class*
*Permission of Journalism instructor through application essay*

**BASIC TEXT/PUBLISHER AND INSTRUCTIONAL RESOURCES:**

Yearbook Style Manual/Created by Instructor (Lisa A. Monzo)
Yearbook Guide, Journalism Curriculum/Jostens, used only by instructor
The Ultimate Yearbook Book/Jostens, used only by instructor

**ASSESSMENTS:**

Application
Photojournalism Work
Interviewing
Lead Writing
Mini Deadlines
Final Spread Layouts

**TECHNOLOGY USED:**

Microsoft Word
Photoshop
Internet
Online Software – Yearbook Avenue
Digital Cameras
Scanners
LCD Projector

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Safety Unit** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Prepare Students for: | | | | |
| Equipment usage | identify the safety procedures for using a computer. | R | 3.7.10.A | 5A, 5B, 5C, 5D |
| Lab usage | identify proper lab usage. | R | 3.7.10.A | |
| Environment usage | identify environmental problems that might cause computer malfunction. | R | 3.7.10.A | |
| Ethical issues | identify ethical concerns with software usage. | R | 3.8.10.C | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Introduction** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Syllabus | be introduced to the course requirements. | I | 3.6.10.B | N/A |
| Journalism/Yearbook Overview | define the terminology relating to Yearbook. | M | 1.1.11.F | N/A |
| Section Design | Identify the different parts/section of the Yearbook. | M | 1.8.11.C | 2B , 5A, 5B |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Ethical and Legal Guidelines** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| As responsible journalists the yearbook staff has obligations! | learn as a journalist on the yearbook staff that there are important legal and ethical guidelines that need to be followed. | M | 3.7.12.E | 3A, 3B, 3C, 3D |

522

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Yearbook I/II | GRADE: 11 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Photography and Scanning** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Digital Camera Work | learn how to operate and download photos from classroom cameras. | M | 3.6.12.B | 1A, 1B, 2A, 3B, 3C, 5A, 5B, 6A, 6B, 6D |
| | learn the different symbols involved with digital camera work. | M | | |
| Photography Guidelines | learn photography tips, guidelines, and composition. | M | | |
| Scanner Work | learn how to operate the scanners in the classroom. | M | | |
| Scanner Guideline | learn basic desktop scanning software and how to compose an image. | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Photojournalism Writing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Caption Writing | learn how to write captions for photographs using the 8-step approach. | M | 1.5.11.A | N/A |
| | learn how to revise captions after they are written. | M | 1.5.11.E | N/A |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Journalism and Interviewing** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Writing for Yearbook Publication | learn the format for writing copy for the different Yearbook sections. | M | 1.5.11.B | 1A, 2A, 2B, 3B, 4A |
| | define a lead and learn about the different types and examples of leads. | M | 1.5.11.C | |
| | learn different transitional words and transitional expressions. | M | 1.5.11.E | |
| | be introduced to alternative words that are more descriptive. | M | 1.5.11.D | |
| | learn revising strategies for copy. | M | 1.5.11.F | |
| | learn proofreading marks for editing copy. | M | 1.5.11.G | |
| | learn the final editing process, by avoiding blops and reviewing the writing formula. | M | 1.5.11.G | |
| Conducting an Interview | learn how to conduct an interview, and who to interview using the six step approach. | M | 1.8.11.B | |

525

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
|---|---|
| **INSTRUCTIONAL UNIT: Computer Technology for Yearbook Publication** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Photoshop | prepare photos to be uploaded into Yearbook Avenue, by changing size and resolution, intensify color, filtering, and lightening photos. | M | 3.6.12.B<br>3.7.12.D | 1A, 1B, 2A, 2B, 3B, 3C, 5A, 5B, 6A, 6B |
| | adjust photos by removing an unwanted item from a photo and by cropping part of an image. | M | 3.6.12.B<br>3.7.12.D | |
| | create advanced image transformation by feathering photo edges, cutting out, backgrounds, creating a motion blur, placing a photo into type, ghosting a photo, and gray scaling the photo background. | M | 3.6.12.B<br>3.7.12.D | |
| | transform text using type tricks and drop shadows. | M | 3.6.12.B<br>3.7.12.D | |
| Microsoft Word | identify and practice the skills necessary to work with Microsoft Word to transfer information to Yearbook Avenue. | M | 3.7.12.D | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| COURSE: Yearbook I/II | GRADE: 11 - 12 |
|---|---|
| **INSTRUCTIONAL UNIT: Computer Technology for Yearbook Publication (Cont'd)** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Yearbook Avenue (Online Software for page creation) | identify the role of desktop publishing in the publication program. (Layout requirements, photo boxes, text boxes, uploading/inserting photos/graphics and importing information etc…). | M | 3.6.12.B<br>3.7.12.D<br>3.7.12.E | 1A, 1B, 2A, 2B, 3B, 3C, 4B, 5A, 5B, 6A, 6B |
| | identify and practice skills necessary to prepare the yearbook for the printer. (Creating and fine tuning the final layout). | M | | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Ad Campaign** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Selling business ads in the community | identify and practice skills necessary to finance the additional cost of the yearbook. | M | 3.8.12.C | 1A, 2B |
| | learn how to dress for "success" to meet the community. | M | 3.6.12.B | |
| | learn how to introduce themselves to area businesses, by practicing handshaking, speaking, and mannerisms. | M | 3.6.12.B | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Yearbook Spread Completion** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Final layout of assigned Yearbook spread | complete assigned spreads by deadline dates, adhering to the three assigned mini-deadlines:<br>Mini-Deadline #1 – Photos<br>Mini-Deadline #2 – Captions<br>Mini-Deadline #3 – Write-up | M | 3.6.12.B | 1A, 1B, 2A, 2B, 2D, 4B, 4D, 5A, 5B, 6A, 6B |
| | participate in completion of the yearbook, by putting everything together to produce the final spread. The different sections of the yearbook include:<br>Student Life<br>People<br>Academics<br>Sports<br>Clubs<br>Activities<br>Senior<br>Business | M | 3.6.12.B<br>3.7.12.D | |

**WEST ALLEGHENY SCHOOL DISTRICT**

STUDENT OUTCOME STATEMENTS- INDICATOR OF ACHIEVEMENT

| | |
|---|---|
| **COURSE: Yearbook I/II** | **GRADE: 11 - 12** |
| **INSTRUCTIONAL UNIT: Career Development** | |

| Unit Content | Student Outcomes | Level of Proficiency (I-Introduce, R-Review, M-Master) | Pennsylvania Standards | NETS Standard |
|---|---|---|---|---|
| | The student will: | | | |
| Job Fields | explore career options in journalism, mass communications, graphic arts and publication-related fields. | M | 3.7.12.E<br>3.8.12.C | 3A, 3B, 4A, 5C |