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ABSTRACT

This curriculum guide describes a broad range of teaching objectives and student learning experiences in several metal occupations. It also provides assistance to students in gathering data for personal decision making with regard to the metals industry as a career alternative and helps prepare students for entrance into post-high school technical programs. Specific units cover entry-level skills development in the areas of safety, metals technology, bench and wrought metal, sheet metal, art metal, forging, heat treating, foundry, welding, machine shop, metals in everyday living, and finishing. The guide is also designed to assist the local teacher with organization and management of the course. It describes the accountability line and the information flow from the teacher to the principal and to the superintendent. The management system includes measurable objectives which detail the responsibilities of the teacher and the students. The student performance objectives are arranged in nine-week time frames to facilitate the collection of evaluation data at the same time as quarterly grades are issued. The appendix contains a management system report, time frame checklists for teacher and student objectives, and a narrative report example with instructions. Two other curriculum guides accompany this document and include performance objectives for courses in health occupations education (CE 019 076) and industrial arts (CE 019 075).
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CAREER DEVELOPMENT
PROGRAMS

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METALS PROGRAM
MANAGEMENT SYSTEM

San Mateo Union High School District

San Mateo, California

1976

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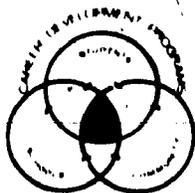
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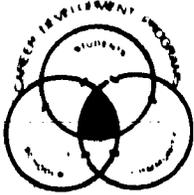
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METALS PROGRAM

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METALS PROGRAM

INTRODUCTION

Man has been using metal for approximately 5,000 years. Found in the form of meteorites, he first regarded it as a precious gift from heaven, and worked it into jewelry, charms, and amulets. These he wore as a matter of personal pride, and to ward off evil spirits.

About 2,500 years ago, man learned to make crude iron over open campfires. He soon put this new discovery to use in the making of weapons to maintain his control over the animal kingdom, and later to fashion the tools which were to raise his standard of living and place him in a higher type of civilization.

Some 100 years ago, the development of large-scale manufacture made iron and steel the cheapest metallic materials on earth, and making things of metal is now the biggest industry in the United States. More people are employed and more products in money value are produced than in any other industrial field. The chances are more than one in ten that a student will someday be employed in some phase of the metalworking industry.

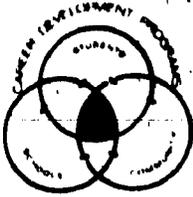
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METALS PROGRAM

PROGRAM DESCRIPTION

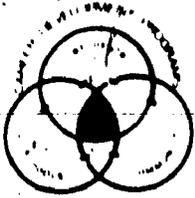
The Metals Program is designed to provide a broad range of student learning experiences in several metals occupations. Specific units cover entry-level skills development in the areas of bench and wrought metal, sheet metal, art metal, forging, heat treating, foundry, welding, and machine shop. The over-all program is geared to lead the student into post high school employment or to advanced training.

The program will be in operation at each high school in the district for a minimum of one hour a day, five days a week, and will cover a time span of three school years. The minimum of one hour a day is to be devoted to classroom/lab learning activities, with the possibility that some advanced students may spend an additional ten hours a week in on-the-job training in a metals industry.

An Industrial Arts Advisory Committee, composed of leaders of local industry, will be utilized to validate and update the instructional program, to assist with the related instruction, and in making work experience placements.

Students will be encouraged to utilize the services of the on-site career center for additional opportunities to explore career alternatives in the metals industry.

Special efforts will be made to recruit, train, support, and place disadvantaged, handicapped, and minority students in entry-level metals occupations.



METALS PROGRAM

PROGRAM GOALS AND EXPECTANCIES

Metals Program Goals

The primary goals of the Metals Program are to:

- Acquaint students with the broad range of career alternatives available in the metals industry
- Acquaint students with the different methods of metal fabrication
- Assist students in gathering data for personal decision making with regard to the metals industry as a career alternative
- Provide students with entry-level skills
- Prepare students for entrance into post-high school technical programs

District Goals and Expectancies

The Metals Program assists students to achieve the following district educational goals and expectancies:

1.0 Know the many forms in which communication occurs and communicate effectively

Expectancies: 1.1, 1.3, 1.4, 1.5, 1.7, 1.8, 1.13

2.0 Maintain good physical and mental health

Expectancies: 2.3, 2.5, 2.6, 2.7

3.0 Understand and accept themselves and others

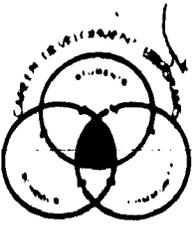
Expectancies: 3.2, 3.10, 3.11, 2.12

4.0 Be aware of and sensitive to value systems

Expectancies: 4.5, 4.6

5.0 Participate in the economic, political and social aspects of modern organized society

Expectancies: 5.2, 5.7



METALS PROGRAM

PROGRAM GOALS AND EXPECTANCIES (Cont'd)

District Goals and Expectancies

6.0 Apply the process of problem solving

Expectancies: 6.7, 6.10

7.0 Have a comprehensive knowledge of the world of work

Expectancies: 7.1, 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, 7.8, 7.9, 7.10, 7.11

8.0 Realize the role of education in human progress

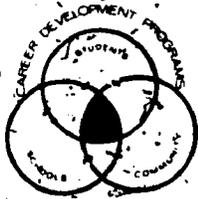
Expectancies: 8.3, 8.4, 8.6

9.0 Conserve the natural and human resources of their environment

Expectancies: 9.2, 9.3, 9.4

10.0 Use leisure time in individually and socially productive ways

Expectancies: 10.3, 10.4

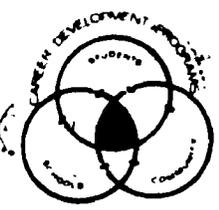


METALS PROGRAM

STUDENT PERFORMANCE OBJECTIVES

Each student in the Metals Program will be awarded credits upon successful completion of the objectives listed within the following instructional units:

- I. Safety
- II. Metals Technology
- III. Bench and Wrought Metal
- IV. Sheet Metal
- V. Art Metal
- VI. Forging
- VII. Heat Treating
- VIII. Foundry
- IX. Welding
- X. Machine Shop
- XI. Metals in Everyday Living
- XII. Finishing



METALS PROGRAM

STUDENT PERFORMANCE OBJECTIVES (Cont'd)

Unit V--Art Metal

- 14. To use a gas furnace to anneal any common art metal

Evaluation--The student will make an on-the-spot demonstration for the instructor.

- 15. To identify and explain the use of four natural compounds commonly employed for the buffing of metals

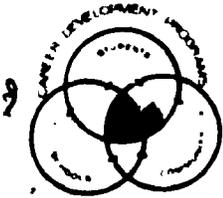
Evaluation--The student will make an on-the-spot demonstration for the instructor.

- 16. To demonstrate his/her complete understanding of safety in the mixing of various kinds of acids in water to make pickling solutions

Evaluation--The student will have responded correctly to all pertinent items on a safety test (see Unit I), and will make an on-the-spot demonstration for the instructor

TIME FRAME

1	2	3	4



METALS PROGRAM

STUDENT PERFORMANCE OBJECTIVES (Cont'd)

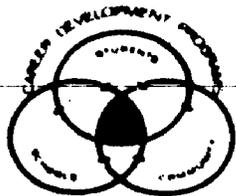
Unit VI--Forging

8. To use three 8" lengths of 1/2" square hot-rolled steel to:
- a. Transform one piece into a circle
 - b. Twist the second two complete turns
 - c. Upset the third on both ends to twice its original area

Evaluation--The student will submit an example of his/her completed work to the instructor for approval.

TIME FRAME

1	2	3	4

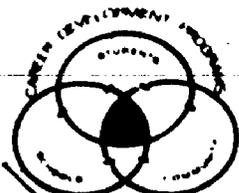


METALS PROGRAM

STUDENT TERMINAL PERFORMANCE OBJECTIVES

The terminal behaviors associated with the Metals Program are those skills and behaviors that students will be able to demonstrate as a result of having completed the program. The student will:

1. Have made an appropriate career choice of a metals occupation
2. Continue in an advanced training program and/or be employed in a metals occupation
3. Be a knowledgeable consumer of metal products
4. Have developed a résumé and personal data file
5. Be able to demonstrate adequate knowledge to conduct a job search, properly complete an employment application form, and meet employer requirements for a satisfactory employment interview
6. Have developed the attitudes and interpersonal skills required for continued employment. Attitudes and interpersonal skills may be identified by observable behaviors such as:
 - a. Consistent compliance with dress and grooming requirements of the work environment
 - b. Ability to receive and carry out instructions
 - c. Working in harmony with supervisors, fellow employees and the public served



METALS PROGRAM

EVALUATION PROCEDURE

The Metals Program will follow an information collection cycle with data being gathered at the 9th and 17th week of each semester. The teacher is responsible for gathering, preparing, and submitting evaluation reports that are based upon objectives indicated in the Metals Program Management System.

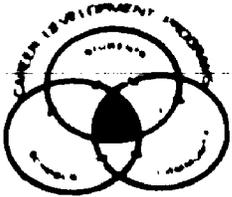
At the 9th and 17th weeks of the semester, the teacher will examine each of the objectives indicated in the management system in order to determine the degree to which each objective was accomplished. The degree of accomplishment should be indicated in the time frame space on the forms. On the narrative report, the teacher will indicate the reasons for partial or nonaccomplishment of objectives. Constraints and problems encountered should be included in the report along with suggestions for revision and/or modification of the program and the Metals Program Management System. The final report, submitted at the end of the 17th week of the semester, should be a compilation of data gathered at the 9th and 17th week.

The time line is intended to provide for program monitoring and to insure the use of evaluation data for improvement of the program. The table below indicates the time line to be followed, the forms to be used in the evaluation and where the report is to be disseminated:

<u>Time Line</u>	<u>Form</u>	<u>Dissemination of Report</u>
9th week	Teacher Objectives Student Objectives Narrative Report	Local school - Department Head and Principal or Designee
17th week	Teacher Objectives Student Objectives Narrative Report	Local school - Department Head District - Superintendent or Designee

The Career Development Programs Office will act as an information and data retrieval center for career development programs. After final evaluation reports on the Metals Program are received, they will be reviewed in order to ascertain the type and level of support needed for the program on the district and local school level.

The Metals Program Management System will be revised and updated on a yearly basis or as needed. Changes in the management system will be based upon student and program needs as indicated in the evaluation reports that are prepared by local teachers and other appropriate individuals.



METALS PROGRAM

APPENDIX



**METALS PROGRAM
MANAGEMENT SYSTEM REPORT**

NARRATIVE REPORT

Teacher _____

Course _____

School _____

Date _____

A Narrative Report should:

- Evaluate success in completing teacher and student objectives.
- Analyze reasons for partial or noncompletion of objectives.
- Describe constraints or problems affecting the teaching or learning process.
- Suggest revisions to improve the course.
- Recommend methods for future program promotion.

NARRATIVE REPORT
(Attach additional sheets if necessary.)