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ABSTRACT

Self contained multi-media kits for grades 1 through 6 involve students directly in the learning process. Emphasis is on non-verbal learning which takes place when youngsters examine real objects and engage in learning activities. Involved in the discovery and inquiry process, students hypothesize, classify, and categorize. In an interdisciplinary approach to the social studies, the MATCH boxes aim for both affective and cognitive learning. Cognitive objectives involve learning facts, information about ancient Greek life, contemporary Japanese life, and the city. Affective objectives help students to deal reflectively with themselves and toward the world around them. Each of the three kits are designed for two to three weeks of study. The program description is divided into five sections and includes information on goals and objectives, content and materials, classroom action, implementation and costs, and program development and evaluation. (SJM)

MATERIALS AND ACTIVITIES FOR TEACHERS AND CHILDREN (MATCH)

Program Report

Margaret Bye

Information/Utilization Division
Far West Laboratory for
Educational Research and Development
Berkeley, California

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INTRODUCTION

A handful of kids in a Boston area school have had it easy. They sit in class, and the MATCH project brings the world to them.

In one classroom, an accident is being staged. Mr. Lindstrom has just run into did it occur? What happened? Who was hurt? As they think of the people who would b graders play the parts--pedestrians, policeman, Mr. Lindstrom's boss, a lawyer, etc. of the many specialized roles played by people in the city and how very dependent peo specialized situations.

Down the hall, a group of students is attired in Japanese kimonos--mother, fathe father, grandmother--and are showing the rest of the class how to eat with chopsticks are pretty intent on picking up their food with the chopsticks.

Another group of fifth graders is working to piece together an ancient Greek roo They have seen a film on the Villa of Good Fortune, have a floor plan, and have many The student leader archeologist of each of six groups presents the objects to his tea statue of a goat, a sculpture of a woman's head, photographs of a door and knocker an of perfumed oil, a strygil, and a photo of a bathtub. Can these "archeologists" solv

The teacher meanwhile lends aid, consults various groups, explains material when as co-worker, making sure all goes smoothly. The children are actively engaged with the world around them and thus learning about themselves and each other.

INTRODUCTION

kids in a Boston area school have had it easy. They sit in class, being kids, and the teacher ect brings the world to them.

oom, an accident is being staged. Mr. Lindstrom has just run into another parked car. How t happened? Who was hurt? As they think of the people who would be involved, the second arts--pedestrians, policeman, Mr. Lindstrom's boss, a lawyer, etc. They are learning a sense lized roles played by people in the city and how very dependent people can be on each other in ions.

, a group of students is attired in Japanese kimonos--mother, father, son, daughter, grand- r--and are showing the rest of the class how to eat with chopsticks. They smile a little but on picking up their food with the chopsticks.

of fifth graders is working to piece together an ancient Greek room in still another classroom. ilm on the Villa of Good Fortune, have a floor plan, and have many objects in front of them. archeologist of each of six groups presents the objects to his team--here we have a small a sculpture of a woman's head, photographs of a door and knocker and door key, a pottery jar strygil, and a photo of a bathtub. Can these "archeologists" solve the mystery?

eanwhile lends aid, consults various groups, explains material when necessary but mostly serves ng sure all goes smoothly. The children are actively engaged with real objects learning about hem and thus learning about themselves and each other.

BASIC INFORMATION

Program Name:
Materials and Activities for Teachers and Children (MATCH)

Format:
Three multimedia kits, each in an area of the social sciences (Japanese Family, Ancient City)

Uniqueness:
Inquiry approach to learning in which students work with real objects (artifacts, models materials (filmstrips, records, etc.), and engage in simulation and role-playing activit

Content:
Interdisciplinary approach to social studies; students examine characteristics of cities between individuals and groups; nature of everyday life of an ancient Greek household th archeology; family life of various cultures

Suggested Use:
Self-contained, supplementary units in social studies

Target Audience:
Students of all abilities in grades 1-6

Aids for Teachers:
Detailed teacher's guide for each unit; teacher training available from American Science Inc.

BASIC INFORMATION

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ps, records, etc.), and engage in simulation and role-playing activities

pproach to social studies, students examine characteristics of cities, interrelationships
and groups; nature of everyday life of an ancient Greek household through the tool of
life of various cultures

plementary units in social studies

lities in grades 1-6

guide for each unit; teacher training available from American Science and Engineering,

Availability:
Three units available; in the Boston area 13 additional units may be rented from the de

Director/Developer:
The Children's Museum of Boston, The Jamaicaway, Boston, Mass. 02130, Frederick H. Kre

Publisher:
American Science and Engineering, Inc., 20 Overland Street, Boston, Mass. 02215

Information in this Report current as of June 1971

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TABLE OF CONTENTS

1. GOALS AND OBJECTIVES

The developer's goals are discussed here in three sections: "Long-range goals" which lives after they have completed the program; "terminal objectives," which students should a they complete the program; and "detailed objectives," which should be achieved from studyin program's activities.

1.1 Long-range goals.

The major goal of the MATCH program is for students to begin to think and feel as a re experience with authentic materials and thus to understand the world about them. Since the that much of learning is nonverbal, students are exposed to real objects such as Japanese c facts, or model city buildings in order to understand and feel what it would be like to be ferent culture or what it would like to live in the city. The developers believe that it i students to learn facts and have become disenchanted with "knowledge as the sole end produc process."[1] They believe that,

> One whose objective is amassing facts may never learn how to learn. He becomes conditioned to submit to the finality of authority rather than to question, to consider, to test, to evaluate.[2]

By becoming involved with real objects rather than the printed page, the student's curiosity freedom to experience his own feelings, and he becomes committed to "reflective doing" rathe absorbing."

1.2 Terminal objectives

The specific objectives of the MATCH program can be divided into three groups: (a) cog deal with pupil knowledge levels and development of intellectual abilities and skills; (b) a

1. GOALS AND OBJECTIVES

are discussed here in three sections: "Long-range goals" which relate to students'
leted the program; "terminal objectives," which students should achieve by the time
and "detailed objectives," which should be achieved from studying each of the

MATCH program is for students to begin to think and feel as a result of direct
naterials and thus to understand the world about them. Since the developers believe
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real objects rather than the printed page, the student's curiosity is aroused, he has
own feelings, and he becomes committed to "reflective doing" rather than "passive

es of the MATCH program can be divided into three groups: (a) cognitive goals, which
levels and development of intellectual abilities and skills; (b) affective objectives,

which deal with the child's interest level, attitudes, values and appreciations; and (
covery and inquiry.

Cognitive goals. Students should learn about something which is "out there" in t
unit on the city, children form an idea of what the city is, what happens in it, and h
acquire geographic map and spatial relations skills. The Japanese Family unit introdu
Japanese culture via the family; in the unit entitled "A House of Ancient Greece," stu
the everyday life of an ancient Greek household. Using archeology as a tool, they lea
educated guesses, and the experience of archeologists, can all contribute to historica

Students are expected to acquire a commitment to social studies based on current
disciplines and an awareness that facts are not an end in themselves, but are useful a
patterns.

Affective objectives. Students learn about themselves and their capacities, beco
individuals, and build confidence in themselves. Through role-playing, they empathize
cultures and come to understand and appreciate them.

Discovery and inquiry. Students make hypotheses, test and revise them as when th
gical puzzle of reconstructing life in the Villa of Good Fortune in the Gree unit. St
classify, categorize, and sequence information, thus focusing on levels of thinking hi

1.3 Detailed objectives.

The objectives for each activity are listed at the beginning of each lesson in th
Lesson 10 from the unit, "The City," the objectives are:

To have the children recognize and respect differences in life styles.
To remind the children that cities are populated by real people.
To get them thinking about the unique qualities of their own lives in the cit

. the child's interest level, attitudes, values and appreciations; and (c) the process of dis-
uiry.

goals. Students should learn about something which is "out there" in the world. In the MATCH
y, children form an id·a of what the city is, what happens in it, and how it changes. They also
hic map and spatial relations skills. The Japanese Family unit introduces children to the
·e via the family; in the unit entitled "A House of Ancient Greece," students are introduced to
fe of an ancient Greek household. Using archeology as a tool, they learn that incomplete data,
·s, and the experience of archeologists, can all contribute to historical knowledge.

ıre expected to acquire a commitment to social studies based on current data from social science
ı an awareness that facts are not an end in themselves, but are useful and meaningful in creating

objectives. Students learn about themselves and their capacities, become aware of themselves as
ıd build confidence in themselves. Through role-playing, they empathize with members of different
ɔme to understand and appreciate them.

and inquiry. Students make hypotheses, test and revise them as when they work out the archeolo-
reconstructing life in the Villa of Good Fortune in the Gree unit. Students also learn to
gorize, and sequence information, thus focusing on levels of thinking higher than recall.

bjectives.

tives for each activity are listed at the beginning of each lesson in the teacher's guides. In
the unit, "The City," the objectives are:

ve the children recognize and respect differences in life styles.
mind the children that cities are populated by real people.
t them thinking about the unique qualities of their own lives in the city.

The Eastern Regional Institute for Education (ERIE) in collaboration with The developed a modified teacher's guide for "A House of Ancient Greece" to include spe objectives [See 1.2]. For example, after completing exercise 2, "E Pluribus Unum," series of archeological experiences, each student should be able to:

Cognitive objectives

1. State at least three observations of a simple object which are significan based upon them.

2. Construct at least three plausible inferences about a people, based upon object made by them.

3. Demonstrate active participation as a member of a team investigating a pr

Affective objective

1. Demonstrate that he enjoys the work being done with the unit and its mate

tern Regional Institute for Education (ERIE) in collaboration with The Children's Museum of Boston
nodified teacher's guide for "A House of Ancient Greece" to include specific cognitive and affective
See 1.2]. For example, after completing exercise 2, "E Pluribus Unum," to prepare students for a
cheological experiences, each student should be able to:

ve objectives

ate at least three observations of a simple object which are significant to constructing inferences
sed upon them.

nstruct at least three plausible inferences about a people, based upon his observations of a simple
ject made by them.

monstrate active participation as a member of a team investigating a problem posed by the teacher.

ve objective

monstrate that he enjoys the work being done with the unit and its materials.

2. CONTENT AND MATERIALS

2.1 Content focus.

The main focus of the MATCH program is on the social and behavioral sciences. TH Japanese family and of ancient Greece, students are exposed to the history, geography, sciences of Japan and modern and ancient Greece. In the unit "The City," the social s sociology, intergroup relations, community relations, and geography are emphasized.

Other disciplines are also woven into the curriculum--art (in relation to Greek a culture); science (in relation to using archeology as a tool in the Greek unit and in ronment in "The City"); languages (in learning some Japanese and Greek symbols); and p about the self in relation to other peoples).

2.2 Content and organization of the subdivisions.

The commercially available MATCH program consists of three self-contained supplem is designed to be used over a period of two to three weeks for one to one and one-half The unit "The City" contains 16 activities from which the teacher can choose eight to grades 1-3 (K-3, according to the distributor). The unit on the Japanese family conta able for grades 5 and 6; the Greek unit contains 11 activities also designed for grade stress, however, that the units have been used at numerous grade levels including juni In all of the units, real objects form the basis of learning.

"The City" unit is about citiness. It teaches that any city is the product of ma being changed by these forces--including the inhabitants themselves. It is planned to about cities and the interrelationships between the individuls and groups which make u based on the belief that children's notions of citiness evolve out of contact with the unit. Children view films of the city, create and plan cities with model buildings, t

2. CONTENT AND MATERIALS

s.

is of the MATCH program is on the social and behavioral sciences. Through studies of the nd of ancient Greece, students are exposed to the history, geography, social and economic and modern and ancient Greece. In the unit "The City," the social science disciplines of roup relations, community relations, and geography are emphasized.

ines are also woven into the curriculum--art (in relation to Greek artifacts and Japanese (in relation to using archeology as a tool in the Greek unit and in learning about the envi-ty"); languages (in learning some Japanese and Greek symbols); and psychology (in learning relation to other peoples).

rganization of the subdivisions.

lly available MATCH program consists of three self-contained supplementary units. Each unit used over a period of two to three weeks for one to one and one-half hours a day per lesson. " contains 16 activities from which the teacher can choose eight to ten; it can be used in according to the distributor). The unit on the Japanese family contains nine activities suit-and 6; the Greek unit contains 11 activities also designed for grades 5 and 6. The developers hat the units have been used at numerous grade levels including junior and senior high school. s, real objects form the basis of learning.

nit is about citiness. It teaches that any city is the product of many forces and is capable of hese forces--including the inhabitants themselves. It is planned to emphasize characteristics he interrelationships between the individuls and groups which make up the city. The unit is f that children's notions of citiness evolve out of contact with the materials provided in the ew films of the city, create and plan cities with model buildings, take a walk through their

neighborhood and make a map of it, role play an accident situation, match city sights with these and other activities [see 3.1], the students are expected to obtain a personal view

The unit on the Japanese family is an attempt to view another culture from the inside children first to Japanese families and some of the things that would commonly be found in class is divided into five "families"--representatives of various middle class occupations Each child has a specific role in his family, and remains in this role throughout the cour family pursues certain activities common to Japanese culture and family life, such as flow religious rituals. Through various role-playing activities, the children sense what it is of a family in a different culture.

"A House of Ancient Greece" introduces students to the everyday life of an ancient Gr archeology as a tool. It emphasizes the process of sifting through evidence of the past a from this evidence. The children look at pictures and reproductions of objects that were the Villa of Good Fortune. Students divided into teams of archeologists piece together a function and structure of each part of the villa through the use of real objects.

The activities in the individual units are relatively independent and do not have to sequence in which they appear in the teacher's guides. "The City" unit guide contains a c sequences, each with a somewhat different emphasis, from which the teacher can choose [see is a development in the sequence of activities within the units and a general increase in activities are closely linked, as indicated in the teacher's guides, and should be taken u rance.

The units can be woven into the overall curriculum in several ways: (a) as independe (b) as a base on which to build a more detailed study of Greek or Japanese art, geography, processes; (c) as a basis for comparing Greek or Japanese city life to that of other cultu

2.3 Materials provided.

Student materials. All of the materials for each unit are contained in a multimedia

ıap of it, role play an accident situation, match city sights with sounds. Through es [see 3.1], the students are expected to obtain a personal view of what a city is.

anese family is an attempt to view another culture from the inside out. It introduces se families and some of the things that would commonly be found in their homes. The ve "families"--representatives of various middle class occupations and backgrounds. s role in his family, and remains in this role throughout the course of the unit. Each ctivities common to Japanese culture and family life, such as flower arranging or ugh various role-playing activities, the children sense what it is like to be a member nt culture.

Greece" introduces students to the everyday life of an ancient Greek household using emphasizes the process of sifting through evidence of the past and drawing conclusions children look at pictures and reproductions of objects that were actually unearthed at e. Students divided into teams of archeologists piece together a picture of the f each part of the villa through the use of real objects.

ne individual units are relatively independent and do not have to be presented in the ppear in the teacher's guides. "The City" unit guide contains a chart with some possible mewhat different emphasis, from which the teacher can choose [see 2.3]. However, there equence of activities within the units and a general increase in difficulty. A few inked, as indicated in the teacher's guides, and should be taken up in order of appea-

ven into the overall curriculum in several ways: (a) as independent 2-3 week encounters; o build a more detailed study of Greek or Japanese art, geography, political, and social for comparing Greek or Japanese city life to that of other cultures and other times.

All of the materials for each unit are contained in a multimedia unit-kit entitled a

MATCH Box. The materials consist primarily of real, concrete objects combined with films, graphs, models, maps, and books. The children can handle and use many of the objects.

"The City" MATCH Box contains the 16mm color-sound film entitled "My City," four book *Corner, The Red Balloon, The Looking Down Game, How to Read a City Map*), a picture pool of of four aerial maps and a map of an imaginary town called Five Corners, a set of four magi over the map for a detailed look at a particular section, a record entitled "City Sounds," buildings and a magnetic board.

"The Japanese Family" MATCH Box contains a record entitled "Sounds of Japan," a photo book, a magazine, and a poetry book, a calligraphy box with brushes, ink stone, water dish the seal. There are five envelopes included--one for each family--each containing a Famil histories, nine Family Role cards, five Family job charts, a chart showing how to use the and a calligraphy card. In addition, there are five boxes of materials for each family. a brass bell, striker for bell, cushion, incense burner and sticks, a Buddha statue and an Tanaka Box contains boy's and girl's kimonos with sashes; the Yamakawa Box contains a flow clay, a scroll and dried flowers; the Honda Box contains different types of Japanese shoes includes a soup bowl, plates, bowls, dry soup and several pairs of chopsticks.

The Greek MATCH Box contains authentic ancient artifacts (a coin and pottery shard); tions of ancient Greek statuary; reproductions of metal artifacts (coins, jewelry, spoon, fish hook and strygil); miscellaneous reproductions and other objects (wax tablet and stylu clothing, knucklebones, loom weight, olive oil wick, mortar and pestle, etc.); maps, photog (maps of Greece, photographs of the Villa of Good Fortune and of excavated objects, two fil and the Villa); and three reference books on archeology and ancient Greece.

Teacher materials. Each MATCH Box contains a detailed teacher's guide to show how all be used in the classroom. Each guide has a fold-out front cover illustrating the materials they are packaged. There is also a section in the guide called "Initial Set up and Turnaro which tells how to set up the materials and check the unit at the end of its use for possib

ls consist primarily of real, concrete objects combined with films, recordings, photo-
nd books. The children can handle and use many of the objects.

Box contains the 16mm color-sound film entitled "My City," four books about the city (*Evan's*
, The Looking Down Game, How to Read a City Map), a picture pool of 36 photographs, a set
a map of an imaginary town called Five Corners, a set of four magic windows to be placed
iled look at a particular section, a record entitled "City Sounds," and 75 wooden
c board.

ly" MATCH Box contains a record entitled "Sounds of Japan," a photo album, a Japanese comic
poetry book, a calligraphy box with brushes, ink stone, water dish, seal, and ink for
ve envelopes included--one for each family--each containing a Family Guide, three family
Role cards, five Family job charts, a chart showing how to use the Family's materials,
In addition, there are five boxes of materials for each family. The Kawai Box contains
or bell, cushion, incense burner and sticks, a Buddha statue and an ancestor tablet; the
's and girl's kimonos with sashes; the Yamakawa Box contains a flower bowl, a box of
d flowers; the Honda Box contains different types of Japanese shoes; the Yashida Box
lates, bowls, dry soup and several pairs of chopsticks.

x contains authentic ancient artifacts (a coin and pottery shard); actual-size reproduc-
statuary; reproductions of metal artifacts (coins, jewelry, spoon, snail, safety pin,
miscellaneous reproductions and other objects (wax tablet and stylus, cloth to drape as
loom weight, olive oil wick, mortar and pestle, etc.); maps, photographs and filmstrips
raphs of the Villa of Good Fortune and of excavated objects, two filmstrips of Olynthus
ee reference books on archeology and ancient Greece.

Each MATCH Box contains a detailed teacher's guide to show how all the materials can
m. Each guide has a fold-out front cover illustrating the materials in the Box and how
re is also a section in the guide called "Initial Set up and Turnaround information"
up the materials and check the unit at the end of its use for possible damage and

required replacements. Each guide has a preface with a short rationale of the project, a specific unit, and a brief description of each lesson activity.

The largest section of the teacher's guide for each unit consists of numbered Lesson gives a description of the lesson, outlines the objectives, materials, and arrangements n up, details the procedure, gives notes on using the materials and on planning ahead for f guide for "The City" includes a chart giving a sequence of activities from which the teac topics are a general view of the city, people and the dynamics of the city, the neighborh to the city, the physical form of the city and maps. At the end of each guide there is a additional books for teachers and children and additional films and filmloops which may b

The ERIE modified guide on "A House of Ancient Greece" contains the above information behavioral objectives for each lesson [see 1.3], background and supplemental material for dures for reviewing and means of assessing student performance including a questionnaire t the objectives of the program. Plans for publishing this guide, however, are still indefi

In addition to the teacher's guides, there are ditto masters of maps and exercises to students.

2.4 Materials not provided.

All required materials for students and teachers are provided.

ts. Each guide has a preface with a short rationale of the project, an introduction to the
a brief description of each lesson activity.

ction of the teacher's guide for each unit consists of numbered Lesson Activities. Each
of the lesson, outlines the objectives, materials, and arrangements necessary for setting it
cedure, gives notes on using the materials and on planning ahead for future lessons. The
" includes a chart giving a sequence of activities from which the teacher can choose. The
l view of the city, people and the dynamics of the city, the neighborhood and its relation
ysical form of the city and maps. At the end of each guide there is a bibliography of
teachers and children and additional films and filmloops which may be used.

ied guide on "A House of Ancient Greece" contains the above information plus specific
es for each lesson [see 1.3], background and supplemental material for each lesson, proce-
and means of assessing student performance including a questionnaire to parents to assess
he program. Plans for publishing this guide, however, are still indefinite.

the teacher's guides, there are ditto masters of maps and exercises to be distributed to

provided.

aterials for students and teachers are provided.

3. CLASSROOM ACTION

3.1 Teaching-learning strategy

The MATCH program is built around an inquiry and discovery strategy which enc active role in finding things out for themselves. By manipulating real objects, t nation and explore and discover what life actually would be like in Japan, ancient are encouraged to handle and use such objects in the units as calligraphy brushes how the Japanese or Greeks would have used them. Learning in this way proceeds fo from the teacher; the child is thus the agent of his own learning--whether by expl religious ceremony or discovering and piecing together the artifacts of an ancient activities call for class division into small groups with a student as leader rath role is that of co-worker or co-learner. Much open classroom presentation and fre

Although most of the activities rely on discovery and inquiry techniques--stu rial, evaluate it, set up, test, and revise hypotheses--the developers realize tha achieved through other teaching-learning methods. Inquiry and exposition skills a or films are studied with the intention of affecting attitudes about other people followed by practice is used to teach map reading skills.

3.2 Typical lesson.

Most of the lesson activities are introduced in one of three ways: (a) by ha objects from a MATCH Box to the children and allowing them to handle them and ask having the teacher show a film or photograph and allowing children to exclaim and having the teacher explain the objectives of a lesson, leaving a bit of a mystery teams from which they proceed on their own.

In Lesson 1 from the unit "A House of Ancient Greece," the children take thin

3. CLASSROOM ACTION

g-learning strategy

CH program is built around an inquiry and discovery strategy which encourages students to take an in finding things out for themselves. By manipulating real objects, the students use their imagi- xplore and discover what life actually would be like in Japan, ancient Greece, or the city. They ed to handle and use such objects in the units as calligraphy brushes or Greek jewelry to experience ese or Greeks would have used them. Learning in this way proceeds form the materials rather than cher; the child is thus the agent of his own learning--whether by exploring the ritual of a Japanese remony or discovering and piecing together the artifacts of an ancient Greek room. Most of the all for class division into small groups with a student as leader rather than the teacher whose of co-worker or co-learner. Much open classroom presentation and free discussion ensues.

h most of the activities rely on discovery and inquiry techniques--students gather data from mate- te it, set up, test, and revise hypotheses--the developers realize that some skills can be be ough other teaching-learning methods. Inquiry and exposition skills are often mixed as when stories studied with the intention of affecting attitudes about other people and cultures. Exposition practice is used to teach map reading skills.

lesson.

the lesson activities are introduced in one of three ways: (a) by having the teacher present a MATCH Box to the children and allowing them to handle them and ask questions about them; (b) by eacher show a film or photograph and allowing children to exclaim and ask questions; or (c) by eacher explain the objectives of a lesson, leaving a bit of a mystery, and dividing the class into nich they proceed on their own.

on 1 from the unit "A House of Ancient Greece," the children take things out of a full wastebasket

one at a time and try to discover which room the basket stood in, what went on in the r
were who used it. The objectives are stated in the teacher's guide:

To introduce the children to the methods of archeology.
To show that much can be learned about people from their leavings.
To demonstrate that what is learned from people's leavings depends on careful
record keeping, and thoughtful interpretation.

To begin the lesson, the teacher places the wastebasket where all can see it and a
as excavator. His job is to take the objects one by one out of the basket and to descr
discuss them. Important clues should be passed around. The teacher then appoints anot
it is his job to draw a cross-section view of the basket on the blackboard and note the
tant items as they are dug up by the excavator.

Next, the basket is excavated piece by piece. The teacher asks the children to gi
conclusions about the contents and explains that they need to be good detectives to do
the clues in the basket, the teacher should help the class to find answers to such ques
item? Who might have thrown it in? How long ago was it thrown in? Has the basket bee
are there old things in it? Which items give the best clues? Where does the basket co

The teacher's guide mentions several important points about excavating illustrated

1. Once the basket has been excavated, it is easy to forget where items were unl
made.
2. We can feel quite sure about some things but can only guess about others.
3. It is possible to come to the wrong conclusions or ot be fooled by what we se

By the end of the lesson, the class should come to a conclusion about where the ba
it, and thus be introduced to the process of archeology taken up in subsequent lessons.

iscover which room the basket stood in, what went on in the room and who the people
ectives are stated in the teacher's guide:

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ing, and thoughtful interpretation.

the teacher places the wastebasket where all can see it and appoints a lively student
to take the objects one by one out of the basket and to describe them so the class can
lues should be passed around. The teacher then appoints another child as cataloger;
oss-section view of the basket on the blackboard and note the position of the impor-
up by the excavator.

xcavated piece by piece. The teacher asks the children to give evidence for their
ents and explains that they need to be good detectives to do this job well. From
he teacher should help the class to find answers to such questions as: What is each
wn it in? How long ago was it thrown in? Has the basket been filled up quickly or
? Which items give the best clues? Where does the basket come from?

entions several important points about excavating illustrated by this activity:

has been excavated, it is easy to forget where items were unless careful notes are

e sure about some things but can only guess about others.
o come to the wrong conclusions or ot be fooled by what we see.

son, the class should come to a conclusion about where the basket came from, who used
to the process of archeology taken up in subsequent lessons.

Teacher's role.

> With materials at hand, learning can proceed from the materials and doesn't have to proceed from the teacher. She does not have to be the respository and dispenser of information. With materials instead of the teacher serving as the learning medium, the teacher is freed to become a co-worker or co-learner and associate of the students . . . In a situation like this it seems that the teacher is freer to be herself. Her personality and learning task itself are separated. The children are not placed in the position of having to read her--they can concentrate on the subject that matters rather than on the subject who matters.[3]

The teacher is responsible for (a) choosing and structuring activities commensurate the class; (b) introducing lessons and materials; (c) showing films, filmstrips, and phot appropriate students for various role-playing situations; and (e) guiding class discussio activities of the class.

Student's role. The students are actively engaged in the learning process. They wa strips, look at photoraphs and comment about them, work directly with materials, discover pictures, share experiences with each other, use their imaginations, and are involved in problem solving situations. Throughout any unit, students are discovering and inquiring- materials, testing, revising them and reaching conclusions. They are involved in a conti encounter, response, and reencounter with the materials.

3.3 Student testing and evaluation.

No tests have been prepared for any part of the MATCH program. Teachers are to obse learning from what they are doing and saying. This is no doubt a direct outgrowth of the borative role with the children and the fact that materials enable student performance to developers state:

ole.

with materials at hand, learning can proceed from the materials
oesn't have to proceed from the teacher. She does not have to
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lents for various role-playing situations; and (e) guiding class discussion and overseeing all
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ve been prepared for any part of the MATCH program. Teachers are to observe what children are
at they are doing and saying. This is no doubt a direct outgrowth of the teacher's more colla-
th the children and the fact that materials enable student performance to become visible. The
:

> Written tests are often relied upon because the teacher has no other signs of student performance . . . The trouble is that tests provide only a limited type--usually verbal in form. This denies the richness of human expression and is unfair to the many children who happen not to be symbol manipulators.[4]

In the ERIE modification of the teacher's guide, assessment procedures are provided in becoming a better observer of pupil performance. These clearly define what to look fo through opinion voting box results (children rate activities as to how they liked them) a tarily bringing materials to class which are related to the activity studied. In additio for parents to complete asking if the child talks about what he is learning at home.

3.4 Out-of-class preparation.

Teacher. The teacher should be thoroughly familiar with the MATCH program, its rati before beginning to teach any unit. He should also familiarize himself with the objects MATCH Box. He then should choose activities commensurate with the ability level of the c to the success of the MATCH units is that the teacher understand his students and be able appropriate roles for the role-playing activities. In addition, the teacher must look ah activity before presenting it to the class, familiarize himself with the background mater materials needed are present, observe student behavior, and reproduce ditto masters where also work the units into his regular curriculum either as separate two- to three-week enc material into a broader spectrum of activities. Although learning proceeds from the mate the teacher to make sure that all proceeds smoothly.

Student. There are very few explicit homework assignments for students, although te material for this purpose. In the unit "The City," students are expected to solve at hom to run an anticipated highway through the town of Five Corners. They also may be asked t home into class.

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of student performance . . . The trouble is that tests provide
limited type--usually verbal in form. This denies the richness
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ials to class which are related to the activity studied. In addition, there is a letter
te asking if the child talks about what he is learning at home.

paration.

acher should be thoroughly familiar with the MATCH program, its rationale and objectives
each any unit. He should also familiarize himself with the objects and packaging of the
hould choose activities commensurate with the ability level of the class. Also important
MATCH units is that the teacher understand his students and be able to place them in
the role-playing activities. In addition, the teacher must look ahead and review each
nting it to the class, familiarize himself with the background material, make sure all
present, observe student behavior, and reproduce ditto masters where necessary. He must
nto his regular curriculum either as separate two- to three-week encounters or weave the
er spectrum of activities. Although learning proceeds from the materials, it is up to
ure that all proceeds smoothly.

re very few explicit homework assignments for students, although teachers could adapt
pose. In the unit "The City," students are expected to solve at home the problem of where
highway through the town of Five Corners. They also may be asked to bring objects from

3.5 Role of other classroom personnel.

Parents. Parents may be called upon to assist with field trips, help with homewo
assess student performance [see 3.3].

classroom personnel.

ents may be called upon to assist with field trips, help with homework assignments or to help formance [see 3.3].

4. IMPLEMENTATION: REQUIREMENTS AND COSTS

4.1 School facilities and arrangements.

The classroom should be large enough to permit the teacher to divide the class into smal Moveable furniture would be an asset as some activities call for the whole class to watch a f small group activities. There should be ample room for displaying the objects, presenting sk seminars. No special type of classroom, school, or staff organization is necessary.

4.2 Student prerequisites.

There are no special student prerequisites for the MATCH program. Because learning proc real objects rather than the printed page, a nonverbal student who doesn't read well or who w pate in large class discussions should experience success with this program.

4.3 Teacher prerequisites and training.

MATCH units were designed to be extremely well organized and easily manageable, requirin teacher preparation. Earlier it was assumed that a careful reading of the guides before intr to the class was all that was necessary in the way of teacher preparation. However, time has teachers are more comfortable and the units better presented following some training or a str

During the summer of 1970, ERIE conducted a three-day workshop in the Syracuse, New York teachers with experience with all available MATCH units and the MATCH approach to learning. workshop served to prepare teacher/leaders to train other teachers in the use of MATCH units. arranged for districts that purchase a minimum of six kits of each unit (18-20 kits) by conta Science and Engineering, Inc. The workshops are conducted by people who have worked on the d program or have taught units in it. In some cases, demonstrations of the units can be arrang work at colleges. Interested persons should contact American Science for details and costs o

4. IMPLEMENTATION: REQUIREMENTS AND COSTS

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of 1970, ERIE conducted a three-day workshop in the Syracuse, New York area to provide e with all available MATCH units and the MATCH approach to learning. In addition, the pare teacher/leaders to train other teachers in the use of MATCH units. Workshops can be that purchase a minimum of six kits of each unit (18-20 kits) by contacting American , Inc. The workshops are conducted by people who have worked on the development of the units in it. In some cases, demonstrations of the units can be arranged for preservice erested persons should contact American Science for details and costs of the workshops.

4.4 Cost of materials, equipment, services.

The following chart itemizes information about the use and cost of materials:

MATERIALS, EQUIPMENT, SERVICES, etc.; COSTS

Required Items	Quantity Needed	Source	Cost/Item	R
KITS:				
The City	1 per several classes	All items from American Science and Engineering	$557	A
Replacement listing				
Film	As needed		$200	
Wooden buildings and board	As needed		250.98	
Maps	As needed		25.45	
Ditto masters	As needed		3.00	
Picture pool	As needed		50.00	
Magic windows	As needed		15.00	
Record	As needed		4.98	
4 books	As needed		2.95-3.95	
Carrying case	As needed		19.95	
Teacher's guide	As needed		4.00	

erials, equipment, services.

ng chart itemizes information about the use and cost of materials:

MATERIALS, EQUIPMENT, SERVICES, etc.; COSTS

	Quantity Needed	Source	Cost/Item	Replacement Rate
	1 per several classes	All items from American Science and Engineering	$557	All items are reusable
sting				
	As needed		$200	
ings				
	As needed		250.98	
	As needed		25.45	
s	As needed		3.00	
	As needed		50.00	
s	As needed		15.00	
	As needed		4.98	
	As needed		2.95-3.95	
e	As needed		19.95	
ide	As needed		4.00	

Required Items	Quantity Needed	Source	Cost/Item	Re
A House of Ancient Greece	1 per several classes		$525	
Replacement listing				
6 kits	As needed		$58.55-129.50	
Maps and sketches	As needed		2.85- 4.30	
Filmstrip	As needed		6.00	
Authentic coin	As needed		13.75	
3 books	As needed		3.95- 4.95	
Carrying case	As needed		19.95	
Teacher's guide*	As needed		4.00	
Japanese Family	1 per several classes		$770.00	
Replacement listing				
Film (optional)	As needed		$275.00	
Family kits (5)	As needed		48.25-130.85	
Table	As needed		19.95	
Books and magazines	As needed		1.50- 7.15	
Record	As needed		4.98	
Photo album	As needed		8.95	
Calligraphy set	As needed		8.65	
Extra drawers	As needed		42.90	
Carrying case	As needed		19.95	
Teacher's guide	As needed		4.00	

* A modified teacher's guide for "A House of Ancient Greece" developed by ERIE will be availa Science and Engineering in the future.

	Quantity Needed	Source	Cost/Item	Replacement Rate
t	1 per several classes		$525	
ng				
	As needed		$58.55-129.50	
es	As needed		2.85- 4.30	
	As needed		6.00	
	As needed		13.75	
	As needed		3.95- 4.95	
	As needed		19.95	
	As needed		4.00	
	1 per several classes		$770.00	
g				
	As needed		$275.00	
	As needed		48.25-130.85	
	As needed		19.95	
nes	As needed		1.50- 7.15	
	As needed		4.98	
	As needed		8.95	
	As needed		8.65	
	As needed		42.90	
	As needed		19.95	
	As needed		4.00	

's guide for "A House of Ancient Greece" developed by ERIE will be available from American
ering in the future.

Recommended Supplementary Items	Quantity Needed	Source	Cost/Item
Additional teacher's guides for each unit	1 per teacher	American Science and Engineering, Inc.	$4.00

In addition, the three commercial MATCH units can be rented or leased directly fr Rental fees for four full school weeks are: The City ($55); Japanese Family ($65); A H ($65). Shipping charges are extra. Also, thirteen other MATCH Boxes can be rented fr of Boston for $30 to $40 for two to three weeks. Because of heavy local demand and a l facilities, the Museum does not ship MATCH Boxes for rental outside the New England sta

The developers also stress that not all the materials in a MATCH Box may be needed items can be purchased separately. A small class, for instance, might need only four c kits instead of the five which are offered. Units may also be purchased without films, reduce the cost. One unit can be used for as many as 15 classes.

Other costs. Schools will need to have a 16mm projector and screen, an 8mm filmst record player.

4.5 Community relations.

It can be inferred that this program is probably no more critical to introduce tha

tems	Quantity Needed	Source	Cost/Item	Replacement Rate
her's h unit	1 per teacher	American Science and Engineering, Inc.	$4.00	Reusable

n, the three commercial MATCH units can be rented or leased directly from American Science. four full school weeks are: The City ($55); Japanese Family ($65); A House of Ancient Greece g charges are extra. Also, thirteen other MATCH Boxes can be rented from the Children's Museum 30 to $40 for two to three weeks. Because of heavy local demand and a lack of proper shipping Museum does not ship MATCH Boxes for rental outside the New England states.

ppers also stress that not all the materials in a MATCH Box may be needed for a classroom. All rchased separately. A small class, for instance, might need only four of the Japanese family the five which are offered. Units may also be purchased without films, which would greatly . One unit can be used for as many as 15 classes.

s. Schools will need to have a 16mm projector and screen, an 8mm filmstrip projector, and a

relations.

inferred that this program is probably no more critical to introduce than any new program.

5. PROGRAM DEVELOPMENT AND EVALUATION

5.1 Rationale.

In 1964, the Children's Museum of Boston proposed a project to the U.S. Office of
said in part:

> Much of learning is non-verbal. Instead of being mediated by words
> it is mediated by things. Because they like time and money, most teache
> even the ones in over-privileged schools--do not possess the vocabulary
> things they need to communicate effectively with their pupils . . . Thi
> lack of appropriate media with which to convey knowledge and to develop
> skills and atittudes is particularly acute at the elementary level where
> the portion of non-verbal learning is high.[5]

It was felt that a nonverbal fact could best be communicated by a single object or
convey a nonverbal principle or concept, patterns of media or objects were needed. The
the focus of their project, then, was to investigate ways of combining media that would
communication between teachers and pupils on subjects having a high nonverbal content.

Several theories have been combined in the development of the program. Bruner in
Instruction, emphasizes the role of inferring or discovery learning and believes that a
a learning task is necessary for mastery in any field. To support the importance of th
and interpersonal relationships to the development of the child, Erickson in *Childhood*
if the child despairs of his tools and skills of his status among his tool partners, his
and he abandons hope for the ability to identify with others.

The significance of interpersonal and social interaction in the learning process is
Rogers in *Freedom to Learn*. Rogers states that when the learner is prized as a separate

5. PROGRAM DEVELOPMENT AND EVALUATION

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the role of inferring or discovery learning and believes that an inquiry attitude toward
ssary for mastery in any field. To support the importance of the acquisition of skills
ionships to the development of the child, Erickson in *Childhood and Society* states that
f his tools and skills of his status among his tool partners, his ego boundaries suffer
r the ability to identify with others.

f interpersonal and social interaction in the learning process is supported by Carl
arn. Rogers states that when the learner is prized as a separate person, valued in his

own right, and given the freedom to experience his own feelings and those of others wi threatened, the climate for learning increases.

5.2 Program development.

The Children's Museum of Boston spent a total of 47 months (1964-1968) developing overall strategy of the program consisted of developing and evaluating three distinct " Boxes. By this strategy, the developers sought to conceive the MATCH Box form, establi MATCH Boxes, and find out how they worked in the classroom before developing all of th "generations" involved six stages and the life cycle for each generation was approximat six stages are:

1. Topic selection and Box conception (3 months). Ideas for boxes were generate background research was conducted, curricula studied, subject matter speciali

2. Early research and development (3 months). Coleaders interviewed subject mat teachers, and certain ones were invited to work on the Box thus forming the c sive research was undertaken into available films, pictures, filmstrips, book real materials that might be used in the Box. Sample materials were previewe readied, and various elementary curricula studied and compared.

3. Tryouts and revision (6 months). Tryouts were spread over six months of deve January through June in public and private schools. Lessons and lesson seque

4. Final development and production (3 months). During this stage, design of th teacher's guides written, materials specified and ordered, packaging designs graphics designed, the Boxes assembled. Many of the Boxes and materials were In all, 114 units were built on 16 different topics. Plans were made to eval school systems, develop evaluation procedures, and train people to use them.

:n the freedom to experience his own feelings and those of others without being
imate for learning increases.

)pment.

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t the program consisted of developing and evaluating three distinct "generations" of MATCH
rategy, the developers sought to conceive the MATCH Box form, establish methods for making
ind out how they worked in the classroom before developing all of them at once. All three
lved six stages and the life cycle for each generation was approximately 21 months. The

lection and Box conception (3 months). Ideas for boxes were generated, discussed and examined;
nd research was conducted, curricula studied, subject matter specialists consulted, etc.

search and development (3 months). Coleaders interviewed subject matter specialists,
, and certain ones were invited to work on the Box thus forming the development team. Exten-
earch was undertaken into available films, pictures, filmstrips, books, and sources for the
erials that might be used in the Box. Sample materials were previewed, sample lesson ideas
and various elementary curricula studied and compared.

nd revision (6 months). Tryouts were spread over six months of development cycle, from
hrough June in public and private schools. Lessons and lesson sequences were tried out.

velopment and production (3 months). During this stage, design of the Boxes was completed,
guides written, materials specified and ordered, packaging designs evolved for each Box,
designed, the Boxes assembled. Many of the Boxes and materials were designed at the Museum.
14 units were built on 16 different topics. Plans were made to evaluate the new Boxes in
stems, develop evaluation procedures, and train people to use them.

5. Evaluation (3 months). Each generation of Boxes was formally evaluated in the sch fall and winter after its completion. Evaluations were conducted in a diversified systems mostly near Boston except for Salinas, California and Somerset, Pennsylvan the prime source of data on how the Boxes worked. Classroom observers were a seco Teachers filled out questionnnaires on the program and observers wrote summaries o Evaluation periods ran two to three weeks with the Box being used an hour per day.

6. Data analysis and Box appraisal (3 months). After the Boxes had been evaluated, t and a report on each Box prepared. The Boxes were turned over to the Museum's Sch Department for direct circulation to schools.

Related programs. Aside from the three commercially available Boxes which this Report the Children's Museum has developed other Boxes available on a rental basis [see 4.4]. Thes Birds (grades K-2) to teach young children the purposes of classification; The Algonquins (g teach about the Algonquin Indians; Seeds (grades 3, 4) to learn about seeds and seed dispers 1-3) to compare an Eskimo igloo with a Nigerian mud-and-thatch hut to learn that different p call for different ways of life; Animal Camouflage (grades 2, 3); Netsilik Eskimos (grades 3 the seal hunt; Musical Shapes and Sounds (grades 3, 4) to study the relationship of the size instruments; Rocks (grades 5, 6); Medieval People (grades 5, 6) focusing on life in a fictio village; Waterplay (grades nursery-2) to allow children to become aware of what is around th Unlimited (grades 4-6) drawing on children's thoughts and feelings of images; Paddle-to-the- about a story of an Indian's canoeing adventures; and the MATCH Box Press (grades 5, 6) allo print a book.

5.3 Developer's evaluation of program.

As each unit reached the protytype stage, it was formally evaluated. Teachers in the S area, Salinas, California, and Somerset, Pennsylvania filed daily written reports on individ each unit and submitted careful appraisals on the total unit. This data was evaluated by th addition, specialists observed MATCH units in use in the classroom to provide a further pers

on (3 months). Each generation of Boxes was formally evaluated in the schools during the winter after its completion. Evaluations were conducted in a diversified sample of school mostly near Boston except for Salinas, California and Somerset, Pennsylvania. Teachers were e source of data on how the Boxes worked. Classroom observers were a secondary source. filled out questionnnaires on the program and observers wrote summaries of their impressions. on periods ran two to three weeks with the Box being used an hour per day.

lysis and Box appraisal (3 months). After the Boxes had been evaluated, the data was analyzed port on each Box prepared. The Boxes were turned over to the Museum's School Services nt for direct circulation to schools.

ams. Aside from the three commercially available Boxes which this Report has focused upon, eum has developed other Boxes available on a rental basis [see 4.4]. These are: Grouping to teach young children the purposes of classification; The Algonquins (grades 3, 4)to gonquin Indians; Seeds (grades 3, 4) to learn about seeds and seed dispersal; Houses (grades Eskimo igloo with a Nigerian mud-and-thatch hut to learn that different physical surroundings ways of life; Animal Camouflage (grades 2, 3); Netsilik Eskimos (grades 3, 4) focusing on ical Shapes and Sounds (grades 3, 4) to study the relationship of the size and sound of (grades 5, 6); Medieval People (grades 5, 6) focusing on life in a fictional medieval French (grades nursery-2) to allow children to become aware of what is around them; Imagination 4-6) drawing on children's thoughts and feelings of images; Paddle-to-the-Sea (grades 4-6) n Indian's canoeing adventures; and the MATCH Box Press (grades 5, 6) allowing children to

valuation of program.

reached the protytype stage, it was formally evaluated. Teachers in the Syracuse, New York ifornia, and Somerset, Pennsylvania filed daily written reports on individual lessons within nitted careful appraisals on the total unit. This data was evaluated by the Museum staff. In sts observed MATCH units in use in the classroom to provide a further perspective.

During the development and testing of the 16 units, approximately 350 teachers used c additional teachers tested selected lessons. Approximately 12,000 students were involved

5.4 Results of developer's evaluation.

The following are the results of the field tests on the units "The City," "The Japanes House of Ancient Greece."

The data from the unit "The City" show that teachers were pleased with the Box experi involved rated the lessons "very successful" 56% of the time, "moderately successful" 36% "unsuccessful" 7% of the time. Observers answered positively to the question "Did the acti some thought them not appropriate to the age group involved. Teachers responded that chil affected by the experience and showed greater interest in the lessons than in other approac the Box was well received by teachers and children, with the reservations that some of the difficult for grades 1-3, some not creative enough, and that the Box should perhaps be limi drawn from a single city.

The Greek Box in general elicited high enthusiasm from teachers and children. In an o of 1-5, teachers placed the Greek Box at 4.5 The response of the teachers involved to the lessons was 87 "very successful"; 28 "moderatley effective" and 1 "unsuccessful." Observer teachers. Teachers felt that children's attention, interest in the subject and class discu usual. One observer commented, "Yes, I'd say the children learned a lot about Greece, and process of discovery, analysis, sifting information, etc. The children worked intelligentl commented, "Oh boy! We didn't have to read any books, we just worked with real things."7

In addition, 67% of the observers felt that the lessons did not require the teacher to media and children. They thought there was a wholeness about the Greek Box. The expeditio by teachers to be uncontrived; it is a thing that happened in real life. This quality of " to greatly interest the children involved.

ent and testing of the 16 units, approximately 350 teachers used complete units and 95
ed selected lessons. Approximately 12,000 students were involved in the field test.

r's evaluation.

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"

nit "The City" show that teachers were pleased with the Box experiment. The 14 teachers
ns "very successful" 56% of the time, "moderately successful" 36% of the time and
time. Observers answered positively to the question "Did the activities work?" although
propriate to the age group involved. Teachers responded that children were positively
ce and showed greater interest in the lessons than in other approaches. On the whole,
d by teachers and children, with the reservations that some of the activities were too
, some not creative enough, and that the Box should perhaps be limited to a set of media
.

neral elicited high enthusiasm from teachers and children. In an overall success ratio
the Greek Box at 4.5 The response of the teachers involved to the success of individual
cessful"; 28 "moderatley effective" and 1 "unsuccessful." Observers concurred with the
that children's attention, interest in the subject and class discussion were "more than"
mented,. "Yes, I'd say the children learned a lot about Greece, and more about the
alysis, sifting information, etc. The children worked intelligently."[6] One child
didn't have to read any books, we just worked with real things."[7]

the observers felt that the lessons did not require the teacher to be middleman between
v thought there was a wholeness about the Greek Box. The expedition to Olynthus was felt
rived; it is a thing that happened in real life. This quality of "ringing true" seems
children involved.

The Japanese Box was rated "very high" by teachers regarding its overall success. N
teachers rated class interest in the subject as "more than usual." One hundred percent
that children knew they had learned something and knew what they had learned. From the
view, the Box was a success because it encouraged them to do "fun things" in a school si
to control and plan something on their own (Japanese family skits). Much of the success
the role-playing/family strategy. By seeing the rules for a Japanese family's behavior
them out themselves, and by finding out why they came to be the way they are, the childr
sense out of their own world. As one teacher said:

> I think the rest [class with exception of 3] learned something for li
> an insight, a glimpse into another world; an art, a grace, a beauty; an at
> a skill, a curiosity to know more--an understanding of the kinship of man-
> more of these, every participating member now possesses about Japan.[8]

5.5 Project funding.

The MATCH program was sponsored by the U.S. Office of Education under Title III of th
Education Act (NDEA). Commercial production was financed by American Science and Enginee

5.6 Project staff.

The MATCH program was developed by the staff of The Children's Museum of Boston, Fred
Director; Phyllis O'Connell, Assistant Director. The project's senior staff was composed
Sharon Williamson, and Susan Schanck.

)x was rated "very high" by teachers regarding its overall success. Ninety-six percent of
s interest in the subject as "more than usual." One hundred percent of the teachers felt
they had learned something and knew what they had learned. From the children's point of
success because it encouraged them to do "fun things" in a school situation. They also got
something on their own (Japanese family skits). Much of the success of the Box rests on
mily strategy. By seeing the rules for a Japanese family's behavior written out, by acting
, and by finding out why they came to be the way they are, the children are able to make
own world. As one teacher said:

I think the rest [class with exception of 3] learned something for life--
sight, a glimpse into another world; an art, a grace, a beauty; an attitude,
ll, a curiosity to know more--an understanding of the kinship of man--one or
of these, every participating member now possesses about Japan.[8]

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and Susan Schack.

FOOTNOTES

1. Riesz, E. The MATCH project, p.2
2. *Ibid.*
3. Kresse F. H. *Materials and Activities for Teachers and Children*, Vol. I, pp. 68-9
4. *Ibid.*, p. 69
5. *Ibid.*, p. 9
6. Kresse, F. H. *Materials and Activities for Teachers and Children*, Vol. II, Appendices
7. *Ibid.*, p. 133
8. *Ibid.*, p. 257

FOOTNOTES

ATCH project, p.2

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