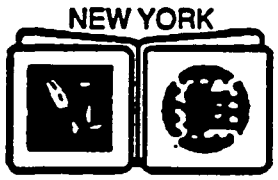
GRADES
K - 6

Elementary School Technology Education



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The State Education Department
Division of Occupational Education Programs
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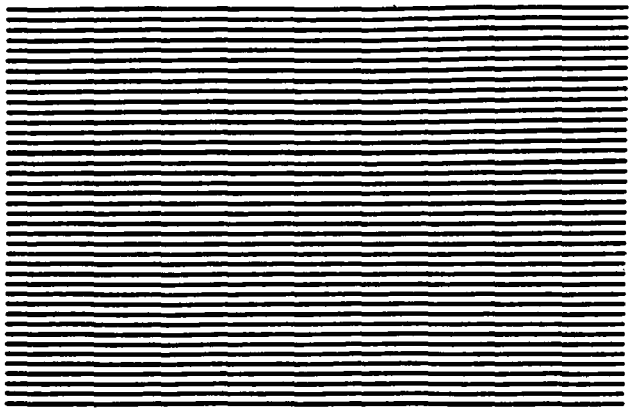

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Contributors to this syllabus include

Robert DeLapp .....Rochester City School District
Curriculum Project Co-ordinator

Janet Adams .....State University of New York • College at Oswego

Harold Folls .....State University of New York • College at Oswego

Vito Pace .....State University of New York • College at Buffalo

Robert Simmons ....Hannibal Central School

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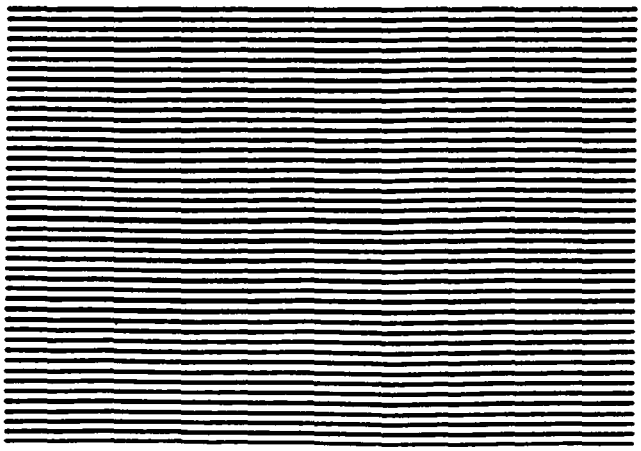

PREFACE

This curriculum has been developed as a result of a 1983 decision by the Division of Occupational Education Programs to include technology in New York State schools at all levels from Kindergarten through Grade 12. It provides children in Kindergarten through Grade 6 with information about technology at an awareness level, facilitates the development of important attitudes toward technology, builds a foundation for technological literacy and provides students with basic skills which prepare them for the middle school or junior high school requirements.

This syllabus is designed for technology educators working at the elementary level. Performance objectives have been arranged in a grade level sequential order and instructional strategies have been provided. Additional activities are often suggested in the curriculum guides of other academic disciplines as well as educational materials produced by major corporations, power companies and various organizations and associations. Choice of activities will vary with local situations. The format of this guide allows for the addition of new Implementation Activities developed by individual instructors. Sample Implementation Activities are included in each section of Part I. A blank Implementation Activity form, to be duplicated and used by the teacher when creating new activities, is provided at the end of this guide.

Comments, evaluations, additions and questions are invited to keep this guide current and relevant for our students and teachers.

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Grades 3 and 4: Technology: Past, Present and Future ..... Yellow

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Elementary School Technology Education

Scope

The Elementary School Technology Education curriculum presents basic technological concepts to children in Grades K-6. It provides elementary students with general information about technology and forms a valuable foundation to, but not a substitute for, Introduction to Technology: Parts I and II.

Statement of Purpose

Since recorded history, technology has been a significant component of society. Today, more than ever before, understanding and coping with the various aspects of technology has become extremely complex and increasingly important.

Elementary School Technology Education is designed to enable students beginning at the kindergarten level to become aware of technology and their relationship to it. Children in our elementary schools are already interacting with technology and will be expected to make important decisions about more advanced technologies as adults. As with reading and math, it is important that children's technological literacy begin as early as possible in the elementary grades.

Description

Through Elementary School Technology Education, students become aware of physical technology, information/communication technologies and biologically related technologies as related to their lives and childhood experiences. They learn about technology involved in information processing, communication, production, transportation, power, construction, biotechnology and careers at their level of comprehension. The curriculum stresses hands-on activity utilizing simple equipment, hand tools and basic processes which are not only appropriate but especially beneficial in many ways for young children in their developmental years. Children learn to utilize simple manageable technology to satisfy their desires and needs, and to facilitate learning in the traditional academic areas. Decision making, problem solving, resources and impacts of technology, group interaction and safety are infused at all levels. The activities provide children with basic skills,

understandings and creative experiences which provide a firm foundation for more advanced learning and for life in a technological society.

A unique feature of the Elementary School Technology Education program is its ability to provide much needed support for the total elementary school program. Its activities can serve as valuable tools for learning, reducing abstract concepts, providing great motivation and allowing students to apply basic classroom learning and skills in a realistic manner.

The Learning Environment

The most effective learning environment for this program is a technology laboratory in the elementary school which includes such things as basic tools and equipment for processing a variety of materials, computers, audio-visual production equipment and simple biologically-related devices. Laboratory design should take into consideration such things as ample space for instruction, student activity and material storage.

There are several other facility options for implementing this program which include transporting students to labs in other buildings or taking technology activities around to classrooms on mobile carts. The total school facilities are often utilized due to the interdisciplinary nature of the program.

A guide to planning technology facilities is available from the Division of Occupational Education Programs.

Instructional Overview

This syllabus is arranged in two major parts as follows:

Part I: Grade Level Performance Objectives and Implementation Activities
- Grades K, 1 and 2, LEVEL 1: "Awareness of Technology" (Pink Section)
- Grades 3 and 4, LEVEL 2: "Technology: Past, Present and Future" (Yellow Section)
- Grades 5 and 6, LEVEL 3: "Applying Technology" (Green Section)

Part II: Performance Objectives Infused at All Levels (Ivory Section)
- Problem Solving and Decision Making
- Resources of Technology
- Impacts of Technology
- Safety

Use of This Syllabus

There are two approaches to using this syllabus. The first entails identifying a desired Performance Objective at an appropriate grade level, then selecting or designing an Implementation Activity to motivate and facilitate learning of its concepts. The second approach, which is most useful with interdisciplinary Implementation Activities involves selecting the activity first, then identifying an appropriate Performance Objective at that grade level.

Following each grade level Performance Objective in Part I is a listing of Suggested Instruc-

tional Strategies and space for inserting specific Implementation Activities as they are developed by individual teachers at the local district level. Part II lists Performance Objectives that can either be used as Primary Objectives for Implementation Activities or, more likely, as Secondary Objectives for those activities that have Primary Objectives taken from Part I. It is suggested that each Implementation Activity contain one Primary Objective from Part I and several Secondary Objectives from Part II.

Many activities can be used to accomplish more than one Primary Performance Objective.

General Instructional Strategies

A variety of instructional strategies may be employed by teachers to support instruction:

- Experimentation, problem solving and decision making
- Individual and group projects
- Models
- Student reports and demonstrations
- Discussion
- Field trips and resource persons
- Library research
- Audio-visual
- Role playing
- Writing
- Reading
- Simulation

The Implementation Activities included in this guide are by no means all inclusive but are intended to serve as examples and stimulate development of new activities by teachers to meet local school needs. Teachers are encouraged to develop activities based on student interest and need, relationship to traditional classroom studies, resources available and other factors. A master for the development of new Implementation Activities is provided at the end of this guide.

It is expected that a minimum of 75 percent of instruction will be accomplished through "hands-on" laboratory-based activities which directly address the Performance Objectives and concepts identified.

Constants in Elementary Technology

The interdisciplinary features of this curriculum can give significant reinforcement and meaning to classroom units of study and, at the same time, teach technical skills and concepts. Almost all these manipulative activities will help children develop fine motor coordination considered essential to learning readiness. They also provide valuable experiences through which children learn to recognize their own potential and the abilities of others.

Populations Served

This program meets the needs of all kindergarten through sixth grade elementary school students including those considered disadvantaged, handicapped and exceptional.

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Part I: Grade Level Performance Objectives

PINK SECTION: LEVEL 1

GRADES K, 1 and 2: Awareness of Technology

1A: Awareness of Communication Technology

1B: Awareness of Production Technology

1C: Awareness of Transportation Technology

1D: Awareness of Power Technology

1E: Awareness of Construction Technology

1F: Awareness of Biologically Related Technology

1G: Awareness of Information Technology

1H: Awareness of Careers in Technology

YELLOW SECTION: LEVEL 2

GRADES 3 and 4: Technology: Past, Present and Future

2A: Communication Technology: Past, Present and Future

2B: Production Technology: Past, Present and Future

2C: Transportation Technology: Past, Present and Future

2D: Power Technology: Past, Present and Future

2E: Construction Technology: Past, Present and Future

2F: Biologically Related Technology: Past, Present and Future

2G: Information Technology: Past, Present and Future

2H: Careers in Technology: Past, Present and Future

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3B: Applying Production Technology

3C: Applying Transportation Technology

3D: Applying Power Technology

3E: Applying Construction Technology

3F: Applying Biologically Related Technology

3G: Applying Information Technology

3H: Applying Careers in Technology

IVORY SECTION:

Part II: Performance Objectives Infused at All Levels

Problem Solving and Decision Making

PS1: Problem Solving
DM1: Decision Making

Resources of Technology

RT1: Identifying Tools and Equipment

RT2: Identifying Functions of Tools and Equipment

RT3: Maintenance of Tools and Equipment

RT4: Applying Information to Complete a Task

RT5: Selecting and Using Tools and Equipment

RT6: Using Processing Systems

RT7: Information Technology in the Home

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Impacts of Technology

IT1: Human Responsibility for Technology

IT2: Impacts of Technology on Life Style

IT3: Relationship Between People and Technology

IT4: Impacts of Technology

IT5: Advantages of Technology

Safety

S1: Understanding Safety

S2: Effects of Stress and Personal Emotions on Safety

S3: Complying with Safety Rules

S4: Dressing and Grooming for Safety

S5: Selecting and Utilizing Safety Equipment

S6: Identifying Physical and Environmental Hazards

S7: Creating a Safe Workplace

S8: Hazardous Substances and Devices

S9: Avoiding Injury While Lifting and Moving Objects

GRADES K, 1 AND 2
AWARENESS OF TECHNOLOGY

1A: Awareness of Communication Technology

1B: Awareness of Production Technology

1C: Awareness of Transportation Technology

1D: Awareness of Power Technology

1E: Awareness of Construction Technology

1F: Awareness of Biologically Related Technology

1G: Awareness of Information Technology

1H: Awareness of Careers in Technology

PERFORMANCE OBJECTIVE 1A

Awareness of Communication Technology

Given a definition of communication technology, examples of communications technology and instruction in its function and importance in our society, the student will demonstrate an awareness of communication technology and its importance in society.

In order to do this, the student must be able to:

a. Define "communication" and "communication technology" in general terms.

b. Identify examples of graphic and electronic communication technology.

c. Describe, in generalities, the basic operation of major communication systems.

d. Operate equipment to produce or receive graphic and electronic messages.

e. Describe life in a hypothetical society devoid of communication technology.

CONCEPTS TO BE DEVELOPED

1A.1 Communication is the exchange of messages or ideas between people, animals or machines.

1A.2 Communication technology is the use of equipment or devices to exchange messages or ideas.

1A.3 Examples of communication technology are books, newspapers, pictures, posters, television, tape recorders, telephones, computers and talking toys.

1A.4 The basic components of all communication systems include a message or idea (input), a method of sending it (process) and a means of receiving it (output).

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Communication Technology (1A)

Activities:

1. Print with rubber stamps.
2. Screen print simple designs.
3. Print with potatoes and/or miscellaneous objects.
4. Construct models of such things as telephones, television cameras, microphones and radios from cardboard boxes, egg cartons, wood or other scrap materials.
5. Provide a variety of electronic communication devices for children to use (e.g., telephone, tape recorder, video camera, CB radio).
6. Print and bind books of children's writings.
7. Produce letterhead stationery, greeting cards and signs with a computer.
8. Produce a tape recording of a student reading a story.
9. Develop a bulletin board or display showing a variety of communication devices.

Audio/Visual:

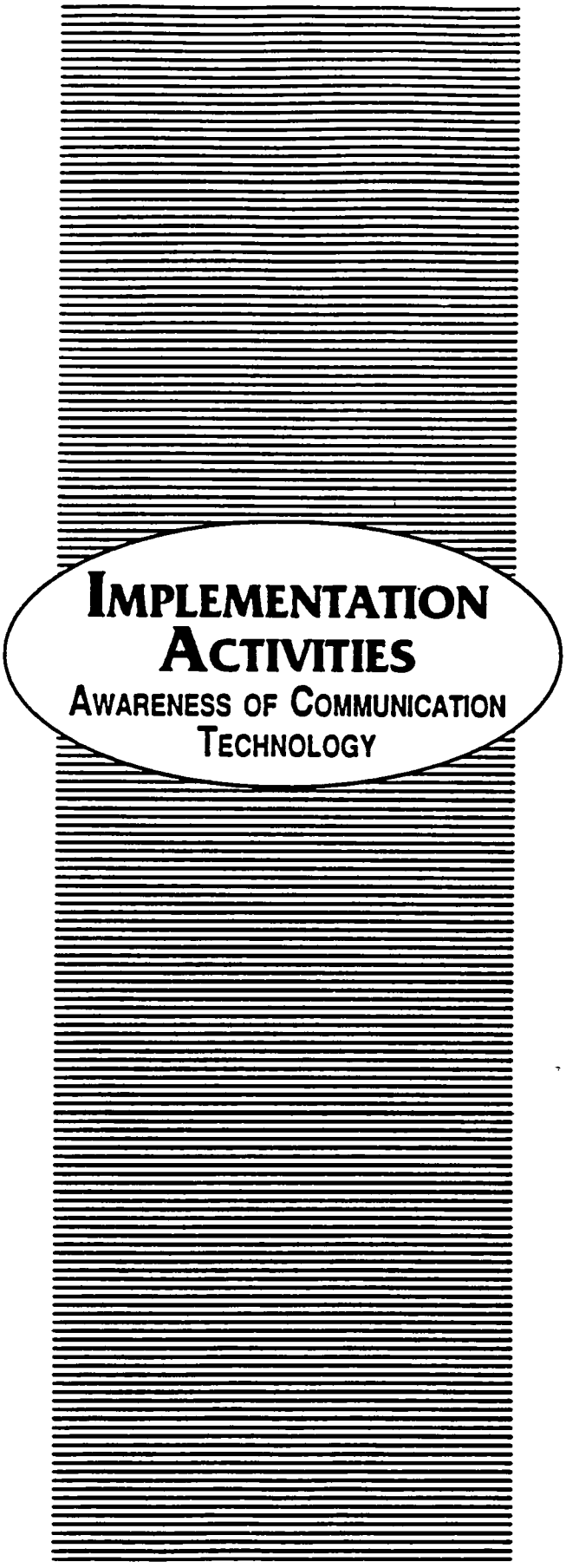
1. View pictures, films, filmstrips and video cassettes showing simple aspects of communication technology.

Resource Persons:

1. Contact parents or local people involved in communications either as a hobby or an occupation.

Visitations:

1. Tour neighborhood radio or television station or telephone company.
2. Visit the area which contains the school's communications system.


IMPLEMENTATION
ACTIVITIES
AWARENESS OF COMMUNICATION
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Publishing a book of student writings* **GRADE** *2*

Overview of Activity

Students will learn about several forms of printed communication, including publishing, as they write, print and bind a book of their own writings based on what they are studying in their classroom (social studies, language, health, etc.). Each child will write a story, report, poem or other piece, assist in keying it into a word processor, print it out, add an illustration and contribute a copy of it to the publication.

Primary Performance Objective

- *Awareness of Communication Technology (1A)*

Secondary Performance Objectives

- *Decision Making: DM1* • *Resources of Technology: RT1, RT2, RT4, RT6*
- *Impacts of Technology: IT5* • *Safety: S2*

Resources

Necessary resources:

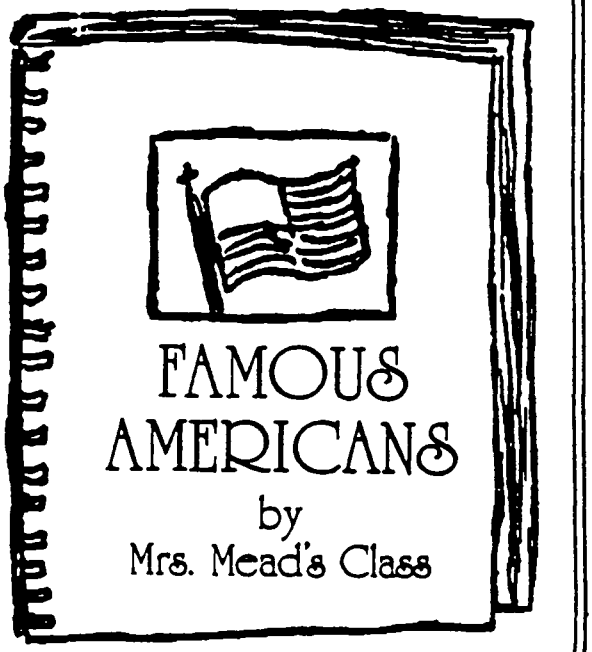
- *Computer system with printer* • *Large print word processing program such as Multi Scribe* • *Copy machine* • *Paper for pages* • *Index paper (oak tag) for covers*

Helpful resources:

- *Binding system (Ibico type)* • *Light table for refining illustrations* • *Print Shop computer program for cover designs*
- *Adult volunteer typist*

References

- *MultiScribe 2.0, Copyright 1986, 1987 StyleWare, Inc.*



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce words "communication" and "technology."	Read and define in simple terms "communication" and "communication technology."
	Describe how books are made (published).	Examine samples of published books.
	(With classroom teacher) introduce the activity and make writing assignment.	
2-7	Set up word processing program and work with individuals or teams of students to help them key their writing into the computer.	Key material into computer allowing teacher or an adult to help if desired.
8	Give lesson on making illustrations for the writings and pasting them up on a print out of the writing.	Draw illustrations and either trace them onto text page using a light table or paste them onto the text page.
	Make copies of completed student-made pages.	
9	Demonstrate collating pages and binding books.	Collate a book, putting your own page as the first page, then bind it.
	Show pictures and samples of familiar kinds of graphic communications technology.	Name technologies presented and tell how each is important to you.

IMPLEMENTATION ACTIVITY

ACTIVITY *Tin Can Telephones* **GRADE** *K and 1*

Overview of Activity

By constructing a tin can telephone students will become aware of a basic communication system. This simple project contains all the basic ingredients of a communication system.

Primary Performance Objective

- *Awareness of Communication Technology (1A)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM2*
- *Impacts of Technology: IT2* • *Safety: S5*

Resources

Materials/Supplies

- *Cans, Cups*
- *Yarn*
- *Wax*

Equipment/Tools

- *Awl*
- *Scissors*

References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce 'communication' and 'communication technology.'	Read and define 'communication' and 'communication technology.'
		Name and give examples of communication equipment.
	Introduce project and describe basic steps.	Tell why communication technology is useful.
	Discuss advantages of communication.	
2	Demonstrate construction of tin can telephones.	Make and use this project to communicate simple messages.
	Quiz students on 'communication' and 'communication technology.'	Answer questions.

COMMENT: This activity is very simple yet there is a great deal to learn from it.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Wooden key chains in the shape of a hand; displaying picture, name and date completed* **GRADE** *1*

Overview of Activity

The students will learn about photography and computers as forms of communication as they work on this project. Each student will make an actual size replica of his/her hand and affix a photograph to the front side. The student will then generate and print his/her name, using a computer, and attach this to the back of the product.

Primary Performance Objective

- *Awareness of Communication Technology (1A)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT4*
- *Impacts of Technology: IT2* • *Safety: S9*

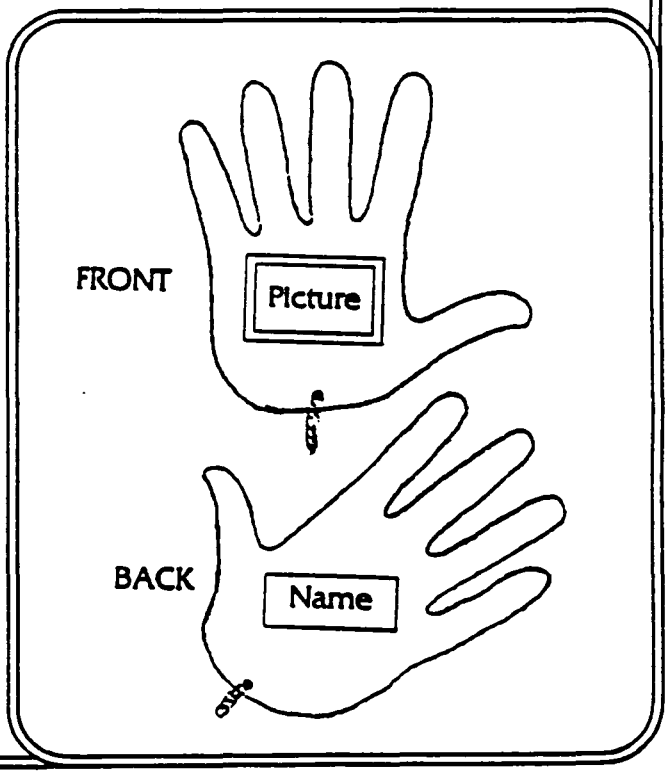
Resources

Materials/Supplies

- *Wood - 1/2" X 6" X 6" pieces*
- *Glue/Decoupage*
- *Finishing brushes*
- *Posterboard for hand templates*
- *Pictures of students*
- *Paper for frames*

Equipment/Tools

- *Computers (hardware/software)*
- *Bandsaw, jigsaw*
- *Drill press, 1/8" bit*
- *Abrasive paper*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce "communication" and "technology." Ask students to identify, and explain how they are exposed to communication every day. Introduce the project and show a brief procedure. Split the class into two groups—the first group to trace their hands, and the second group to generate their names on a computer.	Understand and define "communication" and "technology." Tell how you communicate daily, and by what means. Understand the procedure and know what is expected of you. Trace your hands on poster board and type in your names on a computer.
2	Bring in cut out hands. Demonstrate sanding, drilling and gluing photo and name. Demonstrate applying finish.	With the help of an instructor, drill a hole in each project and sand all the surfaces of the cutout hand. Glue the pictures on the hands, and brush on a coat of finish. Put a final coat of finish on each hand and allow to dry.
3	Hand out the chains. Review forms of communication technology.	Put a chain on each. Identify photography and computers as two forms of communication.

PERFORMANCE OBJECTIVE 1B

Awareness of Production Technology

Given a definition of production, examples of production technology and instruction in its role in our society, the student will demonstrate an awareness of the basic processes, tools and products associated with production.

In order to do this, the student must be able to:

a. Define "production" and "production technology."

b. Classify objects into "manufactured" or "natural" categories.

c. Identify three basic methods of producing goods:
   - individually handcrafted.
   - combined effort of a group or team.
   - line production method.

d. Manufacture items using the three basic methods of production.

e. Describe life in a hypothetical society devoid of production technology.

CONCEPTS TO BE DEVELOPED

1B.1 Production is the processing of materials to make things.

1B.2 Production technology is the use of tools and knowledge to make the things we need or want.

1B.3 Some things are produced by nature (trees, stones, clay, plants) and other things are manufactured by people using technology (furniture, buildings, bricks, cloth).

1B.4 Things can be made in several ways. Some are made by one person working alone (baking a cake), others are made by groups or teams (helping mother make a cake), and others are made in factories on assembly lines (making cakes in a large commercial bakery).

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Production Technology (1B)

Activities:

1. Use simple hand tools and processes to make . . .
   - projects correlated with classroom studies.
   - gift items or crafts.
   - useful objects for home or school.
   - creative and/or decorative projects.
2. Produce projects using clay, metal, paper, wood, and other common materials.
3. Collect, label, and display objects made from a variety of materials.
4. Construct a bulletin board display of things which are . . .
   - individually handcrafted.
   - made by a group or team.
   - produced on an assembly line.

Audio/Visual:

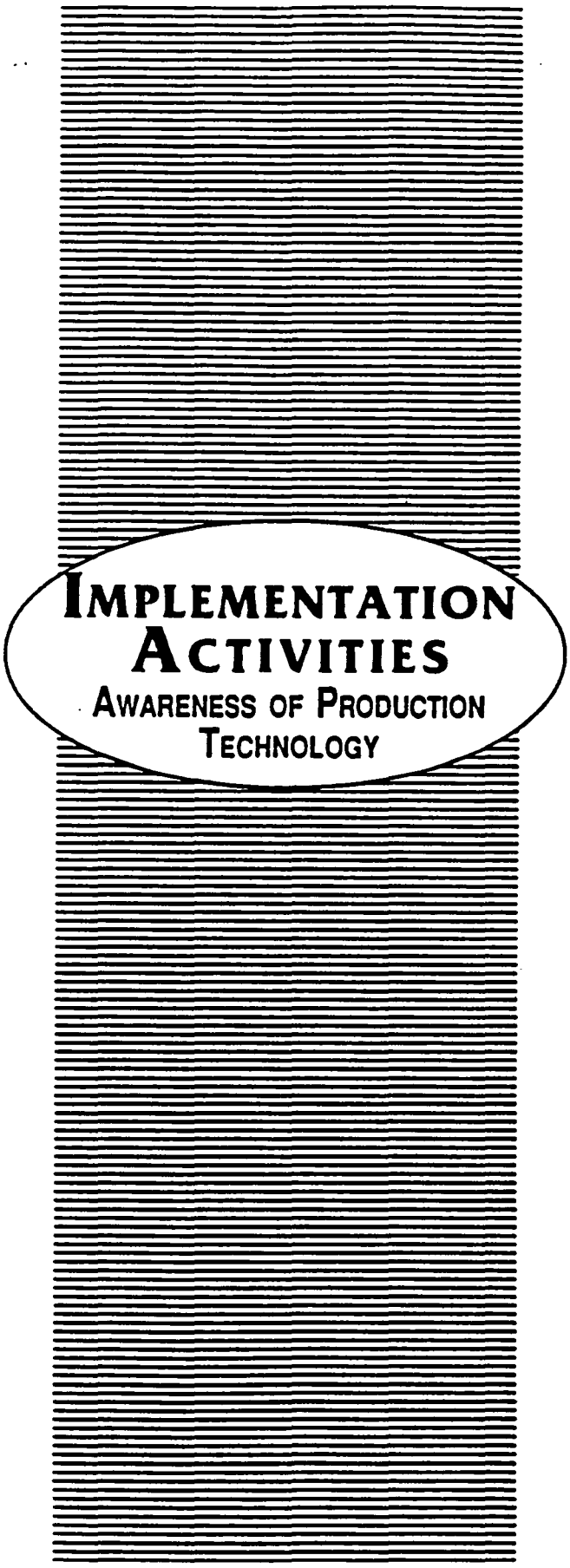
1. View pictures, films, filmstrips and video cassettes of products being manufactured.

Resource Persons:

1. Ask neighborhood people to demonstrate how they make such things as needle work, ceramics, and woodworking projects.
2. Invite parents or others to talk about their jobs in factories or manufacturing businesses.

Visitations:

1. Tour neighborhood cottage industries where objects are being produced on a small scale (a bakery, a florist shop).


IMPLEMENTATION ACTIVITIES
AWARENESS OF PRODUCTION TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Math Puzzles* **GRADE** *1 and 2*

Overview of Activity

Students will learn how things are produced with technology by actually producing wood puzzles..

These can be designed to reinforce classroom math facts.

Primary Performance Objective

- *Awareness of Production Technology (1 B)*

Secondary Performance Objectives

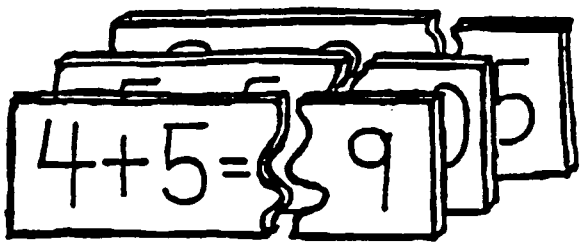
- *Problem Solving: PS1* • *Decision Making: DM1*
- *Resources of Technology: RT1, RT2, RT4, RT5, RT6*
- *Impacts of Technology: IT3, IT5,* • *Safety: S8*

Resources

- *5.2 mm Lauan underlayment or 1/4" plywood cut into 1 1/2" X 5" pieces.*
- *Fine point permanent markers or adhesive back commercial numerals*
- *Linseed oil and brushes*
- *Sandpaper*
- *Latex paint*

References

- *Classroom math books*



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Lead discussion to point out that some things are 'natural' and some are 'produced' by people using technology.	Name and list things under headings 'natural' and 'produced.'
		Name machines and tools used in production.
	Show project sample and ask students to speculate on how it was produced.	Suggest steps needed to produce puzzles.
	List steps for students to follow on chart paper or chalk board.	Read steps using proper technological terminology.
	Demonstrate smoothing and oiling wood.	Sand edges of 1 1/2" X 5" pieces and oil all surfaces and edges.
2	Review concepts and skills previously taught.	Respond to questions posed by the teacher.
	Demonstrate applying numerals.	
	Spray projects with protective clear finish.	Apply numerals to uncut pieces of finished wood.
3	Demonstrate making 'puzzle cuts' with Dremel saws and smoothing.	Practice, then saw irregular 'puzzle cuts' separating the math problems from the answers.
	Review concepts from previous lessons regarding production.	Respond to questions posed by the teacher.

PAGE 1

PAGE 2

STUDENT NAME

GRADE

Things Made Of Wood

DRAW SOMETHING MADE OF WOOD ON EACH PAGE

PAGE 3

PAGE 2

PAGE 1

PAGE 3

STUDENT NAME

GRADE

My Book of Clay Things

DRAW SOMETHING MADE OF CLAY
ON EACH PAGE

PERFORMANCE OBJECTIVE 1C

AWARENESS OF TRANSPORTATION TECHNOLOGY

Given a definition of transportation, examples of transportation technology and instruction in its role in our society, the student will demonstrate an awareness of the basic types of transportation technology and their importance in our society.

In order to do this, the student must be able to:

a. Define "transportation" and "transportation technology."

b. Name examples of land, water, air and space transportation.

c. Describe in general terms the basic operation of significant transportation systems.

d. Describe life in a hypothetical society devoid of transportation technology.

CONCEPTS TO BE DEVELOPED

1C.1 Transportation is the means by which people, products and resources are moved from one place to another.

1C.2 Transportation technology is the application of tools and knowledge to develop systems that move people, products and resources from one place to another.

1C.3 People travel on land, on and under water, through air and in space.

1C.4. Land transportation technology includes trains, cars, trucks, buses, skate boards, skis and bicycles.

1C.5 Water transportation technology includes boats, submarines, jet skis, hydroplanes and rubber rafts.

1C.6 Air transportation technology includes hang gliders, hot air balloons, blimps, helicopters and planes.

1C.7 Space transportation technology includes space shuttles, rockets and satellites.

1C.8 All transportation systems include vehicles, power sources, controls and pathways.

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Transportation Technology (1C)

Activities:

1. Produce simple toy-like models of cars, trucks, boats, planes, and other familiar transportation vehicles.
2. Make a simple paddle wheel or sailboat.
3. Bring in toy vehicles to repair, if necessary, and repaint.
4. Construct a tabletop model of the neighborhood or community with small models of such things as cars, buses, fire trucks, boats, and airplanes found there.
5. Bring in models or toys for a transportation display.
6. Construct a bulletin board of land, sea, air and space transportation.

Audio/Visual:

1. View pictures, films, filmstrips and videos of transportation systems.

Resource Persons:

1. Contact parents or neighborhood bus drivers, truck drivers, boat owners, pilots, mechanics, etc.

Visitations:

1. Take a walk or bus ride to observe evidence of transportation and related technology in the neighborhood or community.
2. Visit a car or truck dealership or garage and note the variety of products and options available.

IMPLEMENTATION ACTIVITIES

AWARENESS OF TRANSPORTATION TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Wooden models of simple cars, trucks, boats, helicopters, etc...* **GRADE** 2

Overview of Activity

After the teacher introduces this unit, students will select a vehicle from choices provided by the teacher and will build it.

Each day students come to the Technology lab to work, they will do such things as (a) name and talk about transportation vehicles, (b) bring magazine pictures for a transportation bulletin board and (c) draw or color pictures in a worksheet book provided by the teacher.

Primary Performance Objective

- *Awareness of Transportation Technology (1C)*
- *Awareness of Power Technology (1D)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1*
- *Resources of Technology: RT2, RT5*
- *Impacts of Technology:IT2* • *Safety: S3, S4*

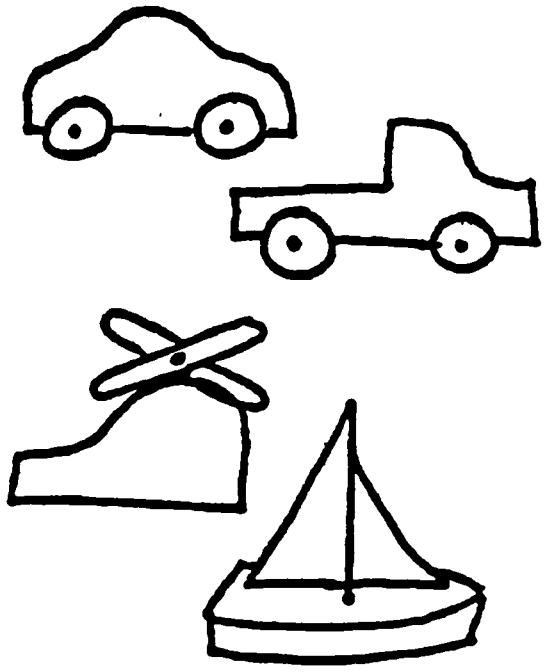
Resources

Materials/Supplies

- *Wood* • *2 X 4" scraps* • *1/4" doweling*
- *1/2" wood for wheels* • *tongue depressors or craft sticks for propellers* • *Paper or cloth for sails* • *Glue* • *Linseed oil or latex paint*

Tools/Equipment

- *Coping saws* • *Dremel saws* • *Hand drill (or drill press) and 1/4" bit* • *Abrasive paper and files* • *Paint brushes*
- *Band saw and drill press with hole cutter for teacher use*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce 'transportation' and 'transportation technology.' Ask students to bring in pictures for bulletin board display.	Read and define 'transportation' and 'transportation technology.'
	Introduce project and describe basic steps. Demonstrate layout steps. Saw vehicles on band saw.	Choose a vehicle to make. Trace templates on wood. Sand vehicles.
2-3	Ask children to name vehicles. List on blackboard in categories (land, water, air and space).	Name vehicles and identify categories.
	Place pictures on bulletin board.	Bring pictures from magazines.
	Demonstrate filing and sanding.	Continue filing and sanding.
4	Provide materials for wheels, axles, masts, propellers, etc. Describe importance of these features in transportation.	
	Demonstrate measuring, sawing and drilling. Assign 'coloring book' worksheet for homework.	Measure, saw and drill as needed.
5	Collect worksheet 'coloring books' and comment on them.	Return worksheet 'coloring books.'
	Demonstrate assembly steps.	Assemble projects.
6	Demonstrate oiling projects.	Oil projects.
	Question students on 'transportation' and 'technology.'	Answer questions.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Wooden Trains* **GRADE** 2

Overview of Activity

The students will be introduced to transportation. All students will make individual train cars. Each student's train car will be connected together to create a transportation system.

Primary Performance Objective

- *Awareness of Transportation Technology (1C)*

Secondary Performance Objectives

- *Resources of Technology: RT4*
- *Impacts of Technology:IT2*
- *Safety: S4*

Resources

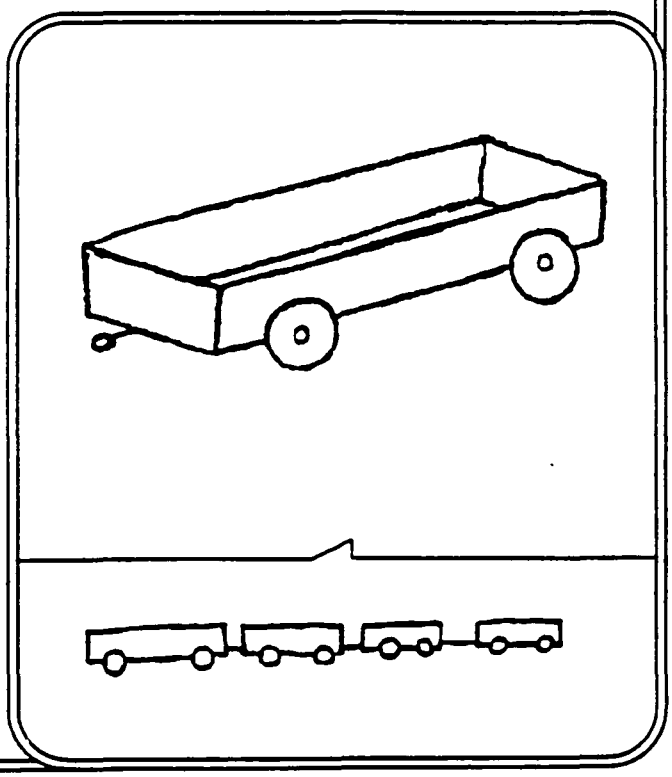
Materials/Supplies

Each student will need:

- *1 pc. pine 1 X 4 X 6 (base of train)*
- *4 pcs. masonite 2pc/3 X6, 2pc/3X4 (sides)*
- *Acrylic paint • paint brush • smock*
- *1/8" dowel, 6" long (axles)*
- *2 toothpicks (keep wheels from falling off axles) • 4 wheels (cut out of 1 X 4 pine)• 1 eye hook • 1 hook (these two items connect trains together)*
- *Brads (attach masonite to pine base)*
- *Glue (reinforce weak areas)*

Tools/Equipment

- *Tack hammers (as many as needed)*
- *Drill press • table saw*
- *Miter boxes (as many as needed)*
- *1/16" drill bit and a 1/8" drill bit*
- *1 1/4" hole cutter*
- *Safety glasses (as many as needed)*



References

Students can look through any set of encyclopedias to find information on and pictures of trains.

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss what transportation is, how trains are part of transportation, the importance of transportation and trains in our society.	Participate in discussion by adding your own ideas.
	Cut out all materials, then hand out materials. Demonstrate hammering and safety involved.	Hammer sides of train (masonite) to base of train (pine) using brads.
2	Review what has been done, hand out materials and demonstrate how to paint the trains. A clean-up procedure might also be covered here.	Complete task.
3	Review previous steps, hand out materials and demonstrate how to affix the wheels and axles to the train.	Follow along with the teacher's demonstration without using glue. When demonstration is over, disassemble the wheels and axles and complete the final assembly with glue.
4	Have students connect their trains into a 'system.' Follow with discussion on the importance of the trains being connected together. (As more cars are added to the 'system' it increases in value because more materials, such as food and clothes, can be carried.)	Add ideas to the discussion.

COMMENT: This activity does not have to be done in the time frame above. It can be stretched out or condensed based on student need and the discretion of the instructor. Ideally, a balance can be reached where the students will feel neither pressure to finish nor boredom with the project.

PAGE 2

PAGE 1

PAGE 3

STUDENT NAME

GRADE

Machines That Help Us GO

CUT OUT A PICTURE
TO PASTE ON EACH PAGE

PERFORMANCE OBJECTIVE 1D

AWARENESS OF POWER TECHNOLOGY

Given a definition of power, examples of the technologies that produce power, and instruction in its role in our society, the child will demonstrate an awareness of power technology and its importance in our society.

In order to do this, the student must be able to:

a. Define 'power' and 'power technology.'

b. Differentiate between power and energy.

c. Name machines or systems for converting energy from the sun, wind, water, sound, heat and atoms.

d. Describe, in general terms, the basic operation of representative energy conversion systems.

e. Give examples of uses of the various forms of power.

f. Convert energy from wind or water into useful power (e.g., pinwheel, kite, water wheel).

g. Describe life in a hypothetical society devoid of power technology.

CONCEPTS TO BE DEVELOPED

1D.1 Energy may be defined as a source of power. All energy comes directly or indirectly from the sun.

1D.2 Examples of energy include muscles, wind, water, heat and light.

1D.3 Power may be defined as putting energy to work.

1D.4 People create engines, motors, wheels and other devices which can change energy into power. Power can also be produced without the use of technology by people and animals using their muscles.

1D.5 People need power for such things as transportation, communication and production.

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Power Technology (1D)

Activities:

1. Construct pinwheels, small kites and sailboats which are powered by the wind.
2. Produce wind chimes.
3. Make simple windvanes and anemometers for science.
4. Construct projects employing simple machines (e.g., wheels, inclined planes, windlasses).
5. Construct a small paddle boat.
6. Construct simple electric circuits powered by flashlight batteries.
7. Construct a shoe box solar heater to warm air or water.
8. Construct a tabletop layout showing how electric power is transmitted to our homes.
9. Construct a bulletin board showing things powered by electricity, gasoline, wind, water and the sun.

Audio/Visual:

1. View pictures, films, filmstrips, and videos showing various aspects of power technology.

Resource Persons:

1. Contact people in the neighborhood who work for the gas and electric company, repair engines, or service appliances.

Visitations:

1. Tour local sites where solar power, waterfalls or windmills are used to produce power.

IMPLEMENTATION ACTIVITIES

AWARENESS OF POWER TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Little Kite* **GRADE** *2*

Overview of Activity

While focusing on the wind as a source of power which can fly their kites, the students will also learn about other power sources.

Each student will make and decorate a little kite which will fly with a minimum of wind.

This activity can easily correlate with the classroom science program.

Primary Performance Objective

- *Awareness of Power Technology (1D)*

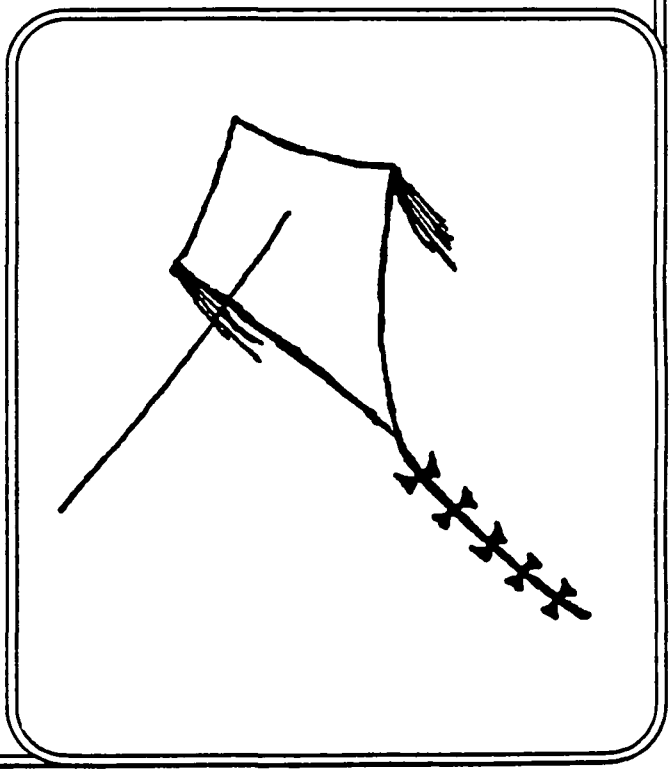
Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1*
- *Resources of Technology: RT1, RT2, RT4* • *Impacts of Technology: IT1, IT2, IT4, IT5*
- *Safety: S1, S2, S3*

Resources

- *Colored plastic bags*
- *Sticks 1/4" X 1/4" X 36"*
- *Plastic tape*
- *String*
- *Cloth for tails*

- *Indelible marker*
- *Scissors*
- *Coping Saws*
- *Rulers*
- *Glue*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Show pictures or devices which are powered by the wind.	Tell how the wind makes things move.
	Introduce kite project and tell how to make it.	Hear and read steps to be followed.
	Demonstrate measuring, marking and cutting the stick into 20" and 16" pieces.	Perform steps as demonstrated.
	Demonstrate gluing the sticks together in a cross.	
2	Show pictures of devices which use water power.	Identify water as a source of power.
	Demonstrate cutting slits in the ends of the sticks and putting string around the frame.	Perform steps as demonstrated.
	Demonstrate laying frame on plastic, taping it down, drawing around it and cutting the plastic. (Leave a 1" flap to fold over the string).	Perform steps as demonstrated.
	Demonstrate folding plastic flap over string frame and taping it down.	Perform steps as demonstrated.
3	Show students pictures of things which utilize other kinds of power.	Name several kinds of power.
	Demonstrate inserting a piece of styrofoam between the sticks and the plastic to create a bowed effect.	Insert a 1" X 1" X 2" piece of styrofoam (or cups cut from egg cartons) to hold plastic away from crossed sticks.
	Encourage students to decorate kites with colored plastic tape and pieces of colored plastic.	Decorate kites with designs, tassles, etc.
4	Demonstrate making and attaching a tail and a string.	Make tails and attach string for flying.
	Discuss safe kite flying.	Take kites out and fly them.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Clock with moveable hands* **GRADE** *K, 1 and 2*

Overview of Activity

Students will each make a small clock with movable hands and learn to tell time. They will learn about some sources of power as they investigate the operation of real clocks (spring, battery, solar and electric).

Primary Performance Objective

- *Awareness of Power Technology (1D)*

Secondary Performance Objectives

- *Impacts of Technology: IT3* • *Resources of Technology: RT1, RT4, RT5*
- *Safety: S2, S4, S5*

Resources

Materials/Supplies

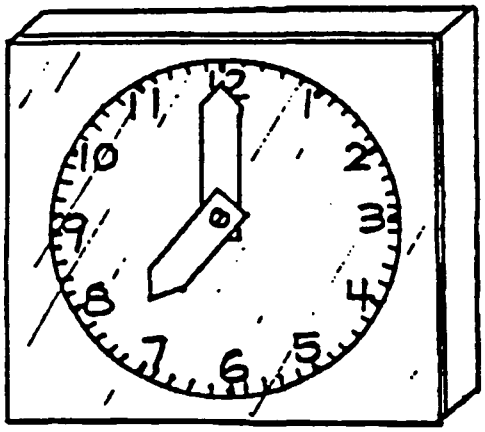
- *1 piece pine, 6" X 6" X 3/4"* • *1 piece transparent plastic, 6" X 6" X 1/8"*
- *1 paper clockface, 5" in diameter*
- *1 piece thin plastic (from a liquid soap bottle, 5" X 1/2"* • *1 screw, round head, #8, 3/4"*

Tools/Equipment

- *Rulers, pencils, erasers*
- *Sandpaper, medium, 2" X 2" pieces*
- *Hand drill(s), manual, hand crank*
- *Drill bits, 1/8"*
- *Scrap wood jig for holding plastic and wood squares during drilling*
- *Template for marking hands*
- *Scissors and paper punch*
- *Screwdrivers*

References

Consult with classroom teacher to determine markings on clock face so it will coincide with the math curriculum at that grade level.



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce 'technology' as machines people make and use. Introduce 'power' as that which makes things work. Introduce clock making activity and demonstrate: • sanding the wood and plastic smooth. • drawing from corner to corner to find the center of the plastic square. • drilling a hole in the plastic. • using the plastic as a template to mark the center of the wood. • drilling a hole in the wood. Give clean-up instructions. Describe activity for the next work session.	Read and say the word 'technology.' Name things that are powered. Read steps from the chalkboard or a chart and perform them as demonstrated. (Some children should start on marking and drilling operations immediately to avoid long waits for the drill.) Put away projects and clean up.
2	Review steps already completed. Demonstrate: • cutting out clock face. • marking, cutting and punching hole in plastic for clock hands. • assembling clock using the screw and a screwdriver. • adjusting screw for the correct tension on hands.	Read steps from chalkboard or chart and perform them as demonstrated.
3	Show class clocks that are powered by springs, batteries, solar, and electricity.	Examine the clocks and identify power sources.

PERFORMANCE OBJECTIVE 1E

AWARENESS OF CONSTRUCTION TECHNOLOGY

Given a definition of construction technology, examples of types of constructions, materials and techniques employed, and instruction in the role of construction technology in our society, the student will demonstrate a knowledge and awareness of construction technology.

In order to do this, the student must be able to:

a. Define construction technology.

b. Name types of constructions in each of the following categories:
   - buildings
   - roads and bridges

c. Identify common materials used in construction.

d. Tell why some materials are best suited for certain applications.

e. Describe life in a hypothetical society devoid of construction technology.

CONCEPTS TO BE DEVELOPED

1E.1 Construction technology is the application of tools and knowledge for the on-site production of such things as buildings, bridges, tunnels, airports, dams and towers.

1E.2 Some common materials used in construction are wood, brick, stone, metal, plastic, glass and concrete.

1E.3 Materials are selected for specific applications because of their availability and characteristics (strength, durability, beauty).

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Construction Technology (1E)

Activities:

1. Produce milk carton models of students' homes and locate them on a table top map of the neighborhood.
2. Construct a map of the community with monopoly game-like buildings arranged to show urban, suburban, and rural developments.
3. Construct cardboard box models of important buildings in the neighborhood or community.
4. Help construct flats and props for classroom plays.
5. Use 2 X 4's, plaster, cement, molding, pipes, tubing and other building materials to make gifts or other useful projects. Discuss how each material is used in construction.
6. Arrange a display of common construction materials.

Audio/Visual:

1. View pictures, films, filmstrips and videos showing construction processes.

Resource Persons:

1. Contact parents or other neighborhood people experienced in various phases of construction.

Visitations:

1. Tour the school outside and inside noting its construction and materials.
2. Examine a bridge in the community.
3. Visit a construction site.
4. Walk around the neighborhood noting various types of buildings.
5. Visit a lumber company or home building supply store.

IMPLEMENTATION ACTIVITIES

AWARENESS OF CONSTRUCTION TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Table top model of the neighborhood* **GRADE:** *2*

Overview of Activity

Students will learn about construction materials and technology by focusing on their own homes and important neighborhood buildings. Each student will make a half-pint milk carton size model of his or her own home to place on a large map along with models of public and commercial buildings. This activity will correlate directly with the classroom social studies curriculum.

Primary Performance Objective

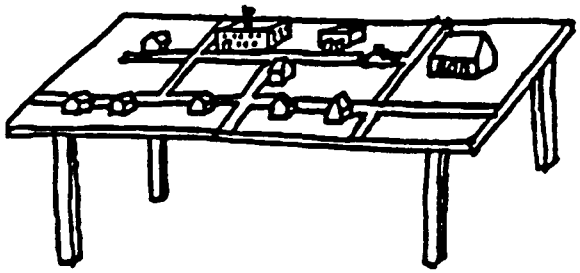
- *Awareness of Construction Technology (1E)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT4, RT5, RT6* • *Impacts of Technology: IT5* • *Safety: S3, S4*

Resources

- *1 each 4' X 8' panel of plywood, tri-wall cardboard, homosote, etc.*
- *Half-pint milk cartons (empty and clean)*
- *Paper for making doors and windows on houses and buildings*
- *Cardboard for roofs of buildings*
- *Masking tape for streets and roads*
- *Latex paint, brushes, glue*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity and lead discussion identifying familiar buildings in the neighborhood or community.	Name buildings in the neighborhood or community.
	List buildings on chart or chalkboard.	Read names of buildings from the chart or blackboard.
	Assign each child to examine his or her own house for building materials, color, doors, windows, etc., and to draw a picture of it.	Take "MY HOME" worksheets to complete for homework.
	Demonstrate painting the 4' X 8' base.	Paint the base to represent land.
2	Initiate discussion of construction technology based on things students observed about their homes.	Return "MY HOME" worksheets and share information during the discussion.
3 - 4	Demonstrate attaching roofs to milk carton houses and painting them to resemble their own homes.	Glue cardboard roofs to milk cartons (with rubber cement) and paint them.
5 - 6	Lead discussion about door and window construction.	Name materials used for doors and windows.
	Demonstrate making paper doors and windows and attaching them to houses.	Cut paper doors and windows, draw on frames and glue them to their houses.
7 - 8	Discuss other important buildings in the neighborhood.	
	Demonstrate how to make these buildings out of various sized boxes.	Use boxes or combinations of boxes taped together and painted to represent important neighborhood buildings.
9 - 10	Help students place strips of masking tape for streets and roads.	Use rubber cement to glue buildings onto the base in the proper locations.
	Review materials and construction processes learned.	Respond to questions from the teacher.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Models of simple shelters for man* **GRADE** *2*

Overview of Activity

Sudents will gain an awareness of Construction Technology in the area of human shelters. After the teacher introduces this unit, the students will select a shelter from choices provided by the teacher and build it. Each day, students will come to the technology lab to work on such things as:

- *magazine pictures for class bulletin board.*
- *naming and talking about shelters.*
- *drawing and coloring pictures for class scrap book.*
- *research teacher supplied materials for construction of their chosen structure.*

Primary Performance Objective

- *Awareness of Construction Technology (1E)*

Secondary Performance Objectives

- *Resources of Technology: RT2, RT6* • *Impacts of Technology: IT2*

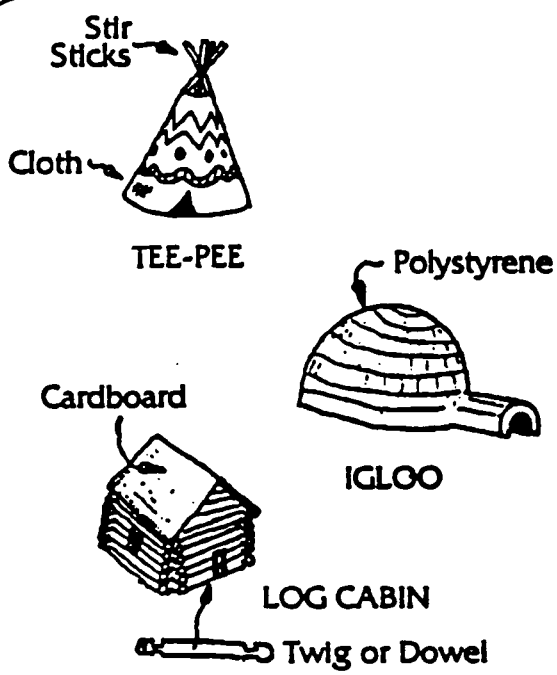
Resources

Materials/Supplies

- *Cloth scraps*
- *Wood stir sticks*
- *1/2" diameter twigs or dowel rod*
- *1/2" polystyrene insulation*
- *Glue: all purpose type*
- *Cardboard*

Tools/Equipment

- *Coping saw*
- *Scissors*
- *Pencils*
- *Colored markers*
- *Sandpaper*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce types of shelters. Ask students to bring in pictures for bulletin board display.	Bring in pictures from home.
2	Show and discuss the pictures brought in by the students.	Name types of shelters and the materials used for construction.
3 - 4	Introduce project and describe basic steps.	Draw and color picture of selected shelter.
	Explain plans for building scale models of simple shelters. Describe the building materials.	Begin work on models.
	Demonstrate the steps of construction (gluing, sawing, etc.).	
	Collect drawings and place in scrapbook.	Hand in drawings.
	Assist students as necessary.	Continue to work on models.
5	Question students regarding shelters and materials. Discuss reasons for, and methods of, construction.	Display and discuss models.

PERFORMANCE OBJECTIVE 1F

AWARENESS OF BIOLOGICALLY RELATED TECHNOLOGY

Given a definition of biotechnology, examples of biologically related technologies, and instruction in the role of biotechnology in our society, the student will demonstrate an awareness of the basic processes of biotechnology, products associated with it, and its importance in and impact on our society.

In order to do this, the student must be able to:

a. Define biologically related technologies.

b. Identify examples and uses of biologically related technologies.

c. Describe, in general terms, the basic concepts of biologically related technology.

d. Identify basic equipment used in biologically related technology.

e. Describe life in a hypothetical society devoid of biologically related technologies.

CONCEPTS TO BE DEVELOPED

1F.1 Biologically related technology utilizes knowledge and equipment to improve the quality of plant, animal or human life.

1F.2 Biologically related technologies are used in medicine (doctors, dentists, paramedics, veterinarians), agriculture (fertilizers, hydroponics, food processing) and genetic engineering (hybrid plants and animals, gene splicing).

1F.3 Biologically related technology involves the manipulation of cells and organisms to make changes in living things.

1F.4 Equipment used in biologically related technology ranges from the doctor's stethoscope to the CAT scan machine, from the hoe to the combine harvester, from the test tube to the electron microscope.

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Biologically Related Technology (1F)

Activities:

1. Construct planters for starting seeds.
2. Produce ceramic flower pots.
3. Produce plastic bottle terrariums or 'greenhouses.'
4. Help make cages or habitats for animals brought into the classroom.
5. Help make an incubator for hatching chicks.
6. Operate a stethoscope, thermometer, blood pressure gauge and other simple devices provided by the school nurse.

Audio/Visual:

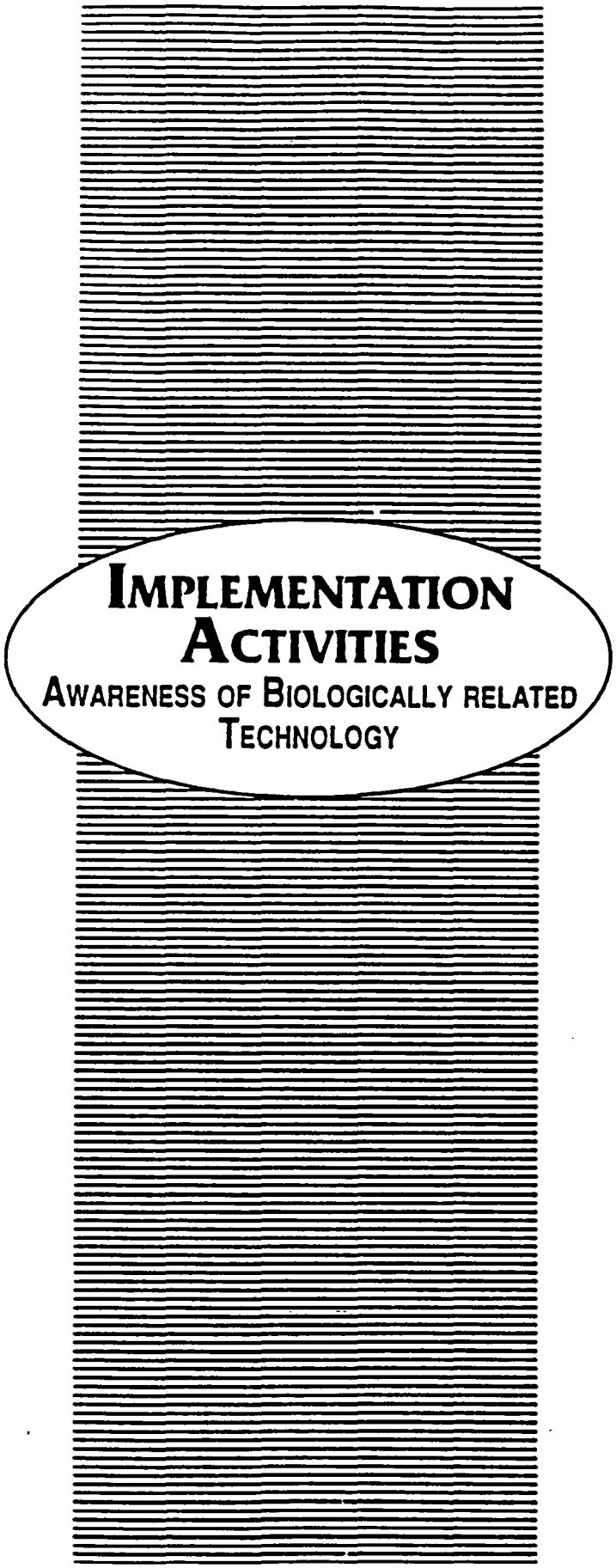
1. View pictures, films, filmstrips or videos showing various aspects of biologically related technology.

Resource Persons:

1. Contact a neighborhood florist, gardener, veterinarian, nurse, greenhouse owner, medical technician, etc.

Visitations:

1. Visit a local hospital, farm, florist shop, garden center, veterinarian clinic, zoo, or nurse's office.


IMPLEMENTATION
ACTIVITIES
AWARENESS OF BIOLOGICALLY RELATED
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Controlled Environment Greenhouse* **GRADE** *K, 1, and 2*

Overview of Activity

This activity will show children how people have learned to create and maintain an environment which is conducive to seed germination and plant growth.

Each child will make a little greenhouse from a plastic soda bottle, plant a seed in it and watch the seed grow into a useful plant.

This activity will correlate with springtime science units on plants.

Primary Performance Objective

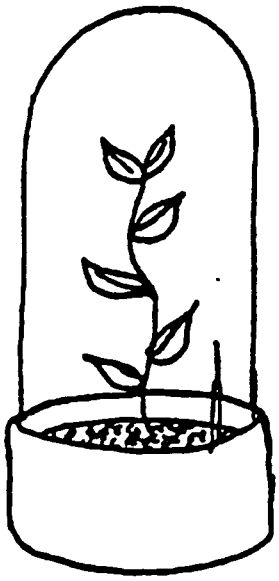
- *Awareness of Biologically related Technology (1F)*

Secondary Performance Objectives

- *Resources of Technology: RT4* • *Impacts of Technology: IT5* • *Safety: S1*

Resources

- *1 plastic quart size soda bottle*
- *Potting soil*
- *Seeds*
- *Scissors*
- *Awl, 8d nail or drill with 1/8" bit*



References

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Establish with students that many plants come from seeds and that they need water, light and nutrients to grow.	Name conditions needed for plants to grow.
	Introduce this project as a way we can create a near ideal environment for growing a plant.	Demonstrate understanding of reasons for constructing a greenhouse.
	Outline steps in the making of this project.	Hear and read steps involved in sequence.
	Demonstrate removing labels and bottoms from bottles (pour 1/4 cup of hot water into the bottle to soften the glue).	Soak bottles in warm soapy water and peel off labels. Wait for glue to soften and pull the bottom unit off.
2	Demonstrate cutting tops from bottles and making a 2" slit down one side so it can be inverted and fitted into the bottom part.	Perform steps as demonstrated.
	Discuss need for controlling the humidity in the "greenhouse."	Tell what will happen if there is either too much or too little moisture.
	Demonstrate making vent holes.	Punch or drill several holes in the top of the greenhouse. Plug most of the holes with plasticene modeling clay.
3	Demonstrate plugging holes in bottom unit with modeling clay, filling it with soil, planting a few seeds, watering and installing the top part.	Plant seeds and set up the greenhouse.
	Describe other ways people use technology to improve growing conditions and life.	
	Each day until plants are well grown and ready for transplanting:	
	Help students evaluate the moisture level and open or close vents as needed.	Observe condensation on inside of plastic dome and adjust vents appropriately.

IMPLEMENTATION ACTIVITY

ACTIVITY *Bird Feeder* **GRADE** *2*

Overview of Activity

This activity will help students focus on the ways people employ technology to help animals meet their needs and improve their existence. Students will make a real feeder to hang outside.

This project will correlate with a classroom science unit.

Primary Performance Objective

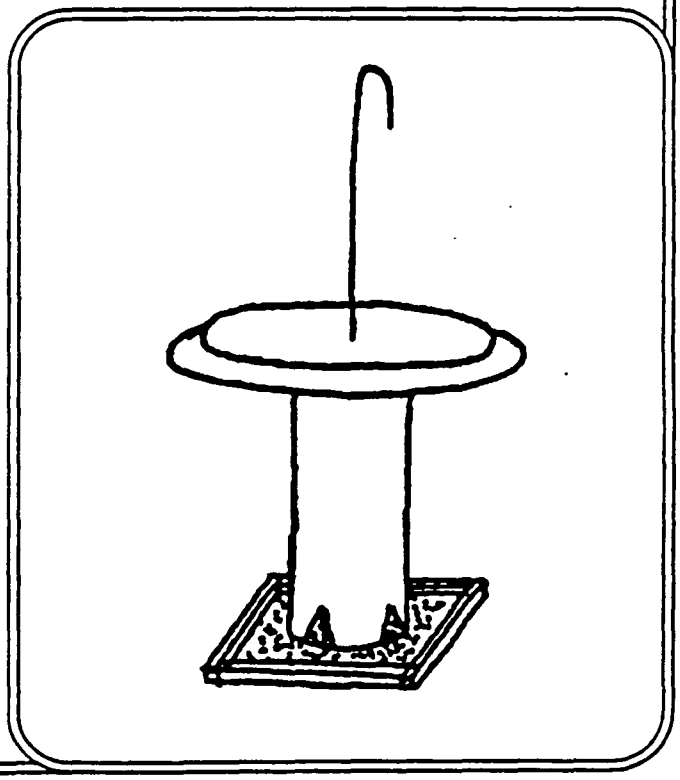
- *Awareness of Biologically related Technology (1F)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT4*
- *Impacts of Technology: IT5* • *Safety: S2*

Resources

- *1 coffee can or other weatherproof container with a removable plastic lid* • *1—9" pie tin or strong plastic dinner plate* • *1 steel coat hanger* • *1 piece wood, 1/2" X 6 1/2" X 6 1/2"* • *1 piece wood, 1/2" X 1/2" X 25"*
- *Wire nails or brads, 1", #18* • *Latex paint and 5/8" easel brushes* • *Electric hand drill, cordless with 1/8" bit*
- *Rulers, pencils, tri-squares, coping saws, sandpaper, claw hammers, awl, side cutting pliers and can opener (for making triangular holes)*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Initiate discussion about how animal needs for food are met: (1) naturally and (2) provided by people.	Name things animals eat and tell which are provided for them by people.
	Introduce bird feeder project and discuss how it works.	Name parts of the feeder and explain how the feeder works.
	Demonstrate making the wood platform/base.	Measure, mark and cut sticks for the base.
2 - 3	Demonstrate nailing the sticks to the base to make a frame. Demonstrate smoothing the completed unit.	Continue previous steps and assemble the base. File and sand the base.
4 - 5	Demonstrate painting.	Paint the base, can and pie tin.
6 - 7	Demonstrate punching holes for seed and for assembling.	Make holes for seed with a can opener.
	Straighten and bend coat hangers for students.	Drill 1/8" holes and assemble all feeder parts on the coat hanger.
	Explain how to hang and use the feeder. Lead discussion dealing with other ways people use technology to care for animals and how we benefit from it.	Take feeders home and use them.

PERFORMANCE OBJECTIVE 1G

AWARENESS OF INFORMATION TECHNOLOGY

Given a definition of information technology and instruction in some applications of it, the student will demonstrate an awareness of information technology.

In order to do this, the student must be able to:

a. Define 'information' and 'information technology' in general terms.

b. Name several ways computers are used.

c. Explain ways machines can process data to produce new or unknown information.

d. Perform simple operations on computers, calculators and other forms of information technology.

e. Describe some advantages of having information technology.

f. Brainstorm possible new forms and uses of information technology for the future.

CONCEPTS TO BE DEVELOPED

1G.1 Information is knowledge we obtain from study or instruction.

1G.2 Information technology utilizes knowledge and equipment to process information (data).

1G.3 Computers are used to produce messages, print pictures, make music, control machines, store data, calculate and entertain.

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Information Technology (1G)

Activities:

1. Make letterhead stationery, greeting cards, signs, etc. with a computer.
2. Have students supply personal information, such as names, ages, birth dates, height and weight, and watch as an adult keys it into a data base computer program and provides printouts showing things like the number of children with birthdays in each month.
3. Use computer programs to teach or strengthen math or reading skills.
4. Use a calculator to solve grade level appropriate math problems.

Audio/Visual:

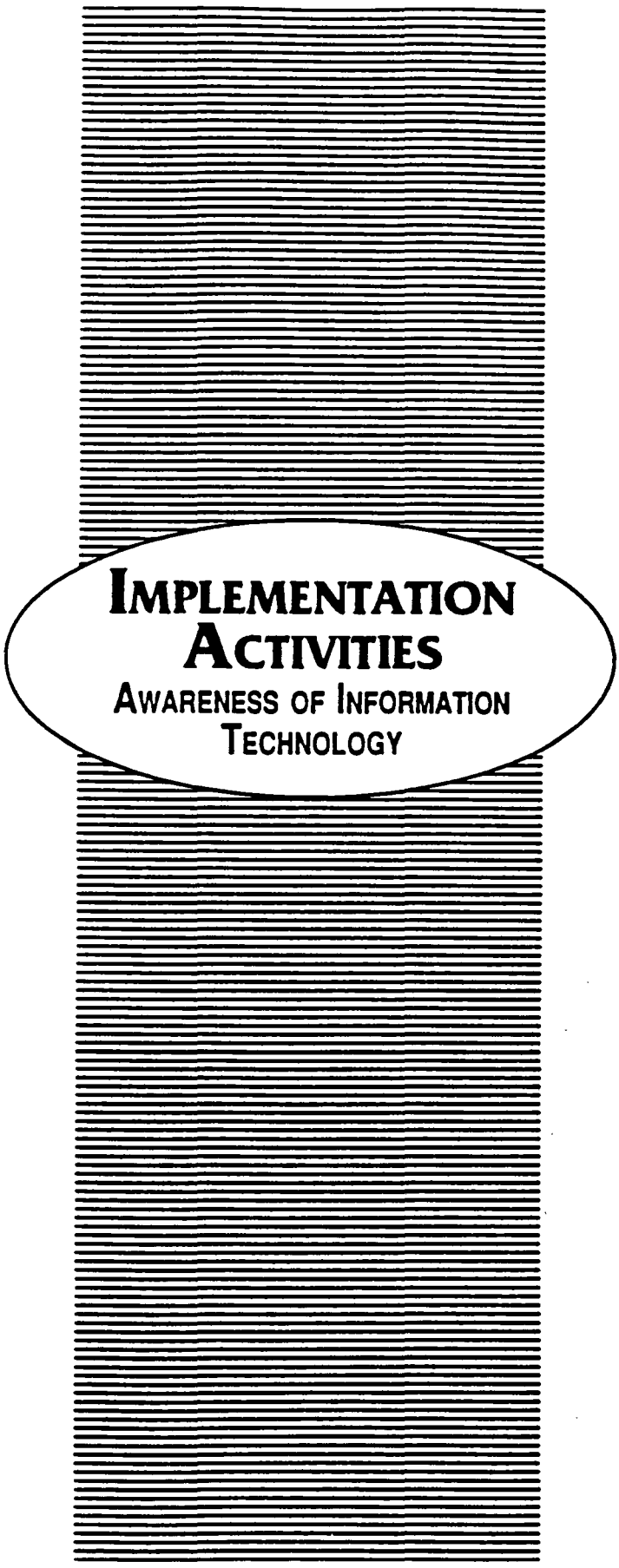
1. View videos, films, pictures and books explaining simple aspects of information technology.

Resource Persons:

1. Contact parents, neighbors or school personnel who work with computers, calculators, etc.

Visitations:

1. Tour neighborhood businesses which use computers to keep track of customer records or billing.
2. Visit the administrative office or other place in the school using an information system.


IMPLEMENTATION
ACTIVITIES
AWARENESS OF INFORMATION
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Having fun with a computer data base* **GRADE** *1 and 2*

Overview of Activity

Students will see how data about themselves can be put into a computer then arranged to produce new information about themselves.

The teacher will use Appleworks or a similar computer program to set up a data base format. Each student will watch (and participate whenever feasible) while information about him or her is keyed in.This data will then be sorted, arranged and printed out in various ways to show different things about the class.

Primary Performance Objective

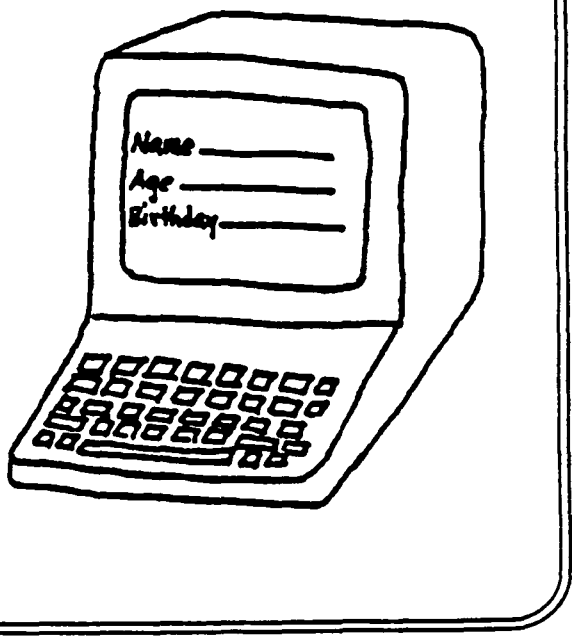
- *Awareness of Information Technology (1G)*

Secondary Performance Objectives

- *Resources of Technology: RT1, RT2, RT4, RT6* • *Impacts of Technology: IT1, IT3, IT5*

Resources

- *A computer system with printer*
- *A computer software program with a data base*
- *A student information worksheet similar to "ME"*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity by asking students to guess at things such as "How many students have birthdays in the same month as the school nurse s?"	Respond to teacher's questions to the best of your ability. Understand that you need more data to examine.
	Describe the computer as an information technology system that can answer questions.	Define "information" and "technology." Identify parts of the computer system.
	Distribute worksheet "ME" and assist students in filling in data about themselves.	Fill in data about yourselves on worksheet.
2	Set up a data base program with categories such as: student name; age; sex; birthday.	Watch as the teacher sets up the system and explains, in very simple terms, what is being done.
	Call students to the computer, individually or in groups of 2 or 3, and key their information into the data base.	Bring data worksheets and either key your own data in or watch as an adult does it for you. (You will want to do at least some of it.)
3	Write questions such as "Who is the oldest student in the class?" on the board. Use the computer to arrange student data to answer the questions.	Examine print outs with the teacher to determine answers.
	Ask the computer a question it is unable to answer with the available data.	Realize that computers are not omniscient and must have data from humans, or other sources, to work with. Identify human error as the probable cause when a technological system generates incorrect information.
	Lead discussion identifying other information technology systems such as weather forecasting systems, medical diagnostic systems, military warning systems and law enforcement systems.	

ME

My name is

_____

My birthday is on

_____

MONTH DAY YEAR

I am _____ *years old.*

PERFORMANCE OBJECTIVE 1H

AWARENESS OF CAREERS IN TECHNOLOGY

Given grade level appropriate information and experiences related to careers, the student will demonstrate a beginning awareness of self, family and community.

In order to do this, the student must be able to:

a. Define "jobs" and "careers."

b. Identify jobs done by children and adults.

c. Name things he or she is good at and enjoys doing.

d. Discuss the many kinds of technology used by people in their jobs and careers.

CONCEPTS TO BE DEVELOPED

1H.1 A job is a task or work to be done.

1H.2 A career is a long term job.

1H.3 There are many jobs children can do at home and in school. Adults do jobs at home or in special work locations.

1H.4 People use many kinds of technology in their jobs or careers.

Suggested Instructional Strategies
Grades K, 1 and 2: Awareness of Careers in Technology (1H)

Activities:

1. Develop 'career boxes' containing various items related to specific careers.
2. Take turns doing routine classroom jobs.
3. Share with the class jobs, chores and responsibilities at home.
4. Collect, mount and display pictures of people at work on the bulletin board.

Audio/Visual:

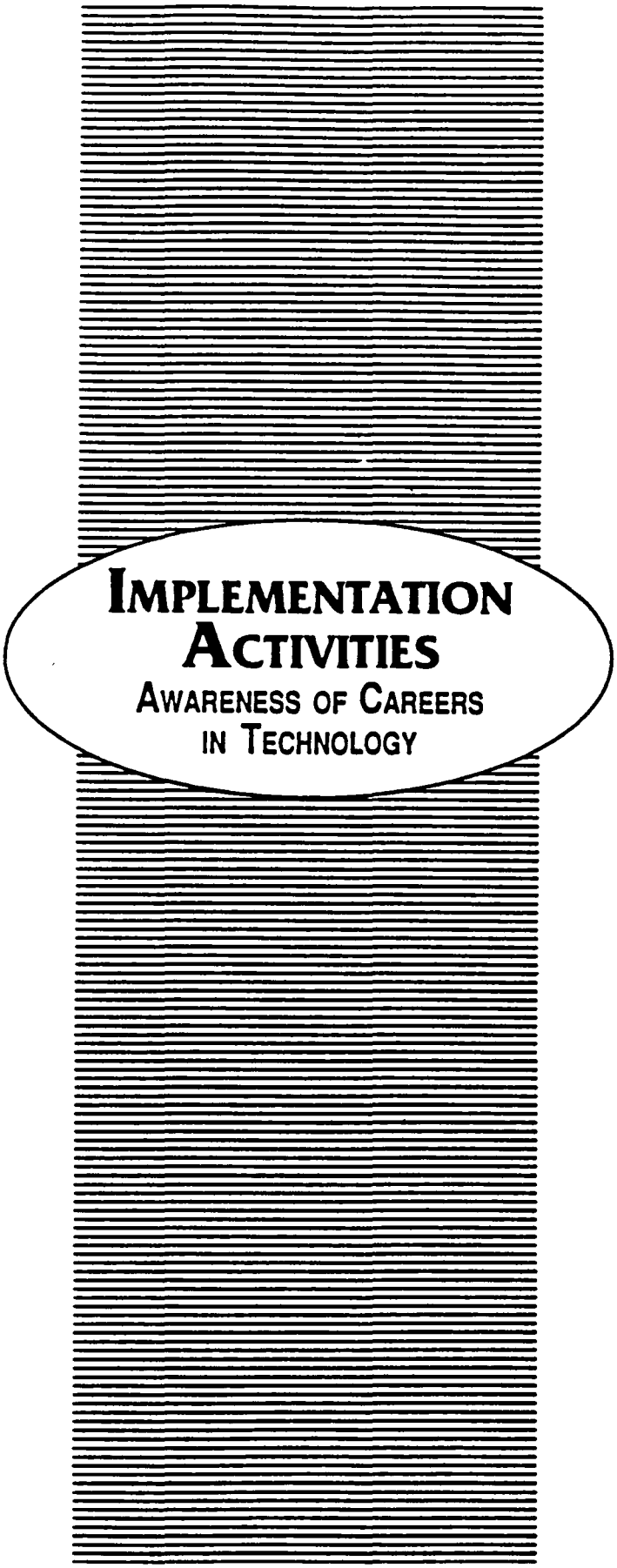
1. View pictures, films, filmstrips and videos showing people at work.

Resource Persons:

1. Contact a repairperson, school custodian, cook, hairdresser, firefighter, policeofficer and letter carrier.

Visitations:

1. Tour parts of the school with the custodian noting service needs he or she supplies.
2. Tour the school kitchen and/or garage.
3. Visit a fire station, police department or post office.


IMPLEMENTATION
ACTIVITIES
AWARENESS OF CAREERS
IN TECHNOLOGY

IMPLEMENTATION ACTIVITY

ACTIVITY *Career Boxes* **GRADE** *K, 1 and 2*

Overview of Activity

Students will decorate shoe boxes, locate pictures or objects related to specific careers and place these objects in the appropriate career box. Through doing this, the students will increase their awareness of careers.

Primary Performance Objective

- *Awareness of Careers in Technology (1H)*

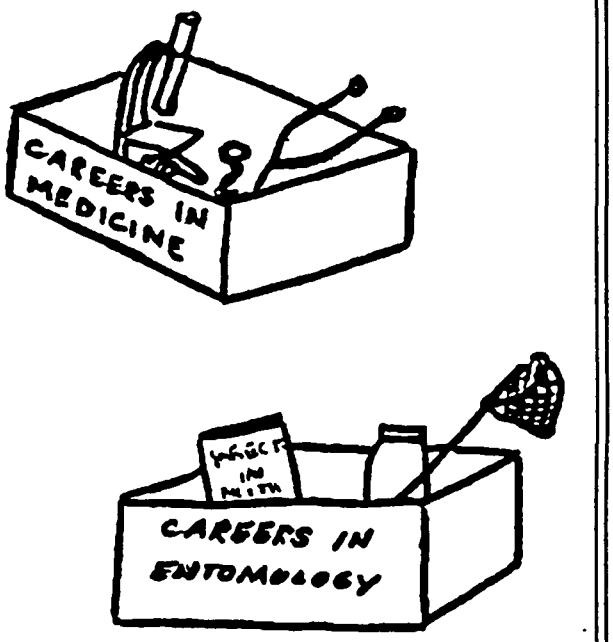
Secondary Performance Objectives

- *Decision Making: DM1* • *Resources of Technology: RT 1, RT2*
- *Impacts of Technology: IT2, IT3, IT5* • *Safety: S1*

Resources

- *Shoe boxes*
- *Crayons or markers*
- *Plain or colored paper*
- *Magazines*
- *Scissors*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity.	Name familiar jobs and careers.
2	Demonstrate decorating and preparing boxes. Ask students to bring in things for the boxes.	Cover boxes and decorate them.
3-5	Guide discussion of objects and help students locate them in appropriate boxes.	Bring in objects or pictures and place them in the boxes.
6	Ask students to draw pictures to show what they have learned.	Draw and color pictures of people at work and share them with the class.

GRADES 3 AND 4

TECHNOLOGY: PAST, PRESENT AND FUTURE

2A: Communication Technology: Past, Present and Future

2B: Production Technology: Past, Present and Future

2C: Transportation Technology: Past, Present and Future

2D: Power Technology: Past, Present and Future

2E: Construction Technology: Past, Present and Future

2F: Biologically Related Technology: Past, Present and Future

2G: Information Technology: Past, Present and Future

2H: Careers in Technology: Past, Present and Future

PERFORMANCE OBJECTIVE 2A

COMMUNICATION TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of communication technology, present-day technology and future possibilities, the student will be able to discuss the major steps in the development of communication technology and hypothesize on its future.

In order to do this, the student must be able to:

a. Define 'communication' and 'communication technology' in general terms.

b. Name the major steps in the development of communication technology.

c. State needs that prompted the development of selected key communications technologies.

d. List present-day or future conditions or needs that could benefit from more advanced communication technology.

e. Brainstorm possible new forms of communication technology to meet future needs.

CONCEPTS TO BE DEVELOPED

2A.1 Communication is the exchange of messages or ideas between people, animals or machines.

2A.2 Communication technology is using equipment or devices to communicate.

2A.3 Throughout history, communication systems have developed from simple to complex. Some significant major developments include the use of cameras, telegraphs, telephones, radios, televisions, recorders, computers and fibre optics.

2A.4 All communications systems evolve to satisfy human needs or wants.

2A.5 New or advanced communication technology will process messages faster, store information in less space, be more mobile and help people with impairments to communicate better.

Suggested Instructional Strategies
Grades 3 and 4: Communication Technology: Past, Present and Future (2A)

Activities:

1. Print and bind books of student writings.
2. Print a class newspaper.
3. Prepare and tape a radio or television broadcast.
4. Produce a filmstrip or slide show.
5. Research booklets on various aspects of communications.
6. Make pin hole cameras or box cameras to use for photography.
7. Construct replicas of communication systems, e.g., telegraphs, telephones, radio, television, movie cameras, microphones and speakers.
8. Print on a computer.
9. Print on a proof press or letterpress machine.
10. Print with rubber stamps.
11. Do linoleum printing.
12. Make a silk screen print.

Audio/Visual:

1. Create bulletin board displays of communications, past and present.
2. View films on communications.

Resource Persons:

1. Invite speakers from a radio or television station to class.
2. Contact a local author to address the class.

Visitations:

1. Interview a newspaper publisher in person.
2. Tour a television station.

IMPLEMENTATION ACTIVITIES

COMMUNICATION TECHNOLOGY PAST, PRESENT AND FUTURE

IMPLEMENTATION ACTIVITY

ACTIVITY *Electric Code Sender/Receiver* **GRADE** 4

Overview of Activity

Students will learn about the development of electronic communication from its beginning to its present state.

As an application activity they will make simple but workable code senders and receivers.

This activity will correlate well with electromagnetism and series circuits taught in the classroom science program.

Primary Performance Objective

- *Communication Technology: Past, Present and Future (2A)*

Secondary Performance Objectives

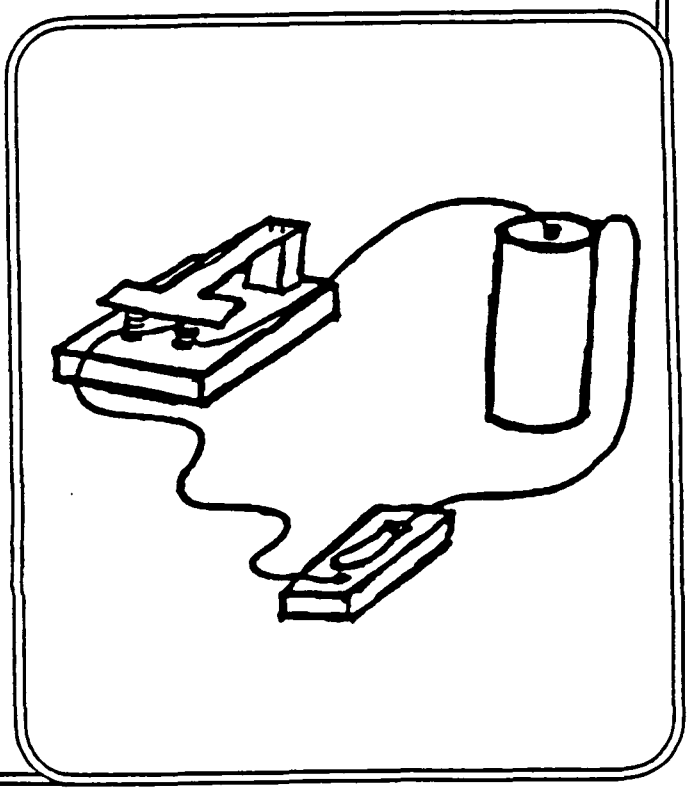
- *Problem Solving and Decision Making: PS1* • *Resources of Technology: RT1, RT2, RT4, RT5, RT6* • *Impacts of Technology: IT4, IT5* • *Safety: S1, S2, S3, S5*

Resources

- *Wood, 3/4" for bases*
- *Tin for switch and sounder*
- *2-8d iron nails*
- *1.5 volt dry cell*
- *Bell wire*
- *Round head or pan head wood screws*
- *Woodworking tools (square, ruler, saw, file, sandpaper, claw hammer)*
- *Metalworking tools (awl, square, tin snips, bending tool, file, emery cloth)*
- *Wire cutters and strippers*

References

Classroom science text book



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Display and demonstrate examples of present day electronic communication equipment.	Share their personal experiences with telephones, radios, etc.
	Introduce project and demonstrate its operation.	
	Discuss and list basic procedure for constructing it. Demonstrate woodworking skills for preparing wood bases.	Suggest steps to follow in appropriate sequence. Cut, smooth and finish wood for bases.
2 - 3	Discuss historical aspects of electronic communications and assign students to research to find dates of selected inventions.	Tell about personal encounters with these or things on television or in museums.
	Demonstrate preparing metal parts for the sounder and the switch, and attaching them to the base pieces.	Cut, smooth and bend metal pieces. Make holes in metal and attach parts to wood bases.
4	Record invention dates on a chart and discuss the evolution of electronic communication briefly.	Relate information found on invention dates.
	Demonstrate winding the electromagnets and attaching them to bases.	Wind electromagnets around 8d nails and fasten them under the sounder.
5 - 6	Teach series circuitry and show how to wire up the project.	Prepare wires and wire up the projects.
7	Demonstrate adjusting sounder. Demonstrate trouble shooting and repairing the circuit.	Adjust sounders and solve problems that may prevent proper operation of the project.
	Discuss cutting-edge technology in electronic communications and brainstorm possible future developments.	Name current problems related to communications and suggest possible solutions using electronics.

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct and operate a visual communication system* **GRADE** *3 and 4*

Overview of Activity

In this activity the students will be introduced to the history of communications systems with emphasis on the telegraph. Students will construct a communication system to send messages visually. They will compare their system to that of Samuel Morse.

Primary Performance Objective

- *Communication Technology: Past, Present and Future (2A)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT2, RT4, RT6* • *Impacts of Technology: IT2, IT4, IT5* • *Safety: S5, S8*

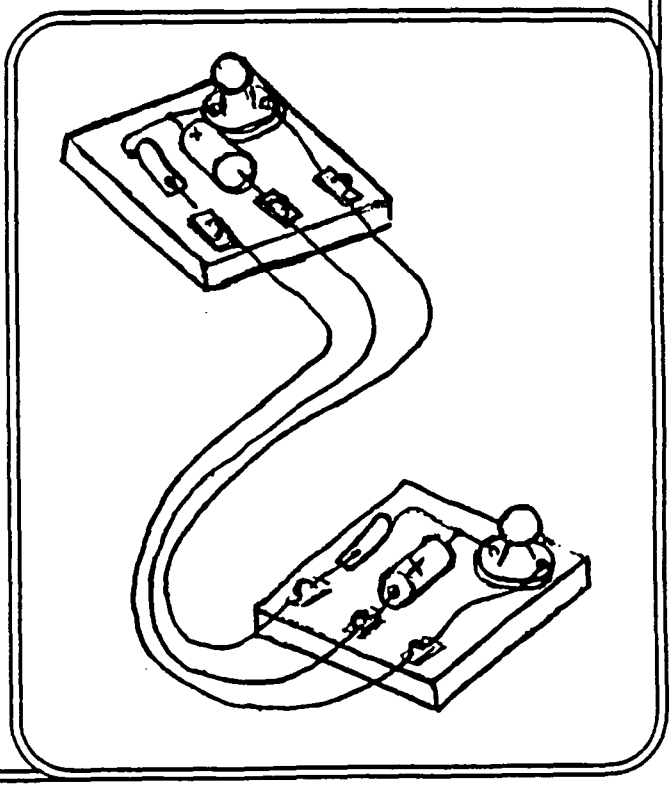
Resources

Materials:

- *3, 10-foot sections of thin electrical wire*
- *2 touch-sensitive switches (down for on)*
- *2 flashlight light bulbs in a wiring socket*
- *2, 1.5-volt batteries*
- *1 battery holder (for 2, 1.5-volt batteries in series)*

Tools:

- *Soldering gun*
- *Screwdriver*
- *Wire stripers*
- *Pliers*



References

Basic Electricity, Paul B. Zbar, McGraw Hill, 1983

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss the need for early communications systems. Give a history of these systems before the telegraph was invented.	Relate knowledge of early communication systems. Personal experiences, such as tin-can phones, could be discussed.
2 - 3	Give the history of the telegraph invented by Samuel Morse. Explain its operation and the Morse code. Introduce the visual telegraph (project) and show how it is similar to the original telegraph.	Identify Samuel Morse's telegraph and the Morse code. Understand the upcoming project and demonstrate a working understanding of Morse code procedures.
	Construct the visual telegraph. A lesson on tool operation and lab safety will be presented.	Manipulate the materials and tools to produce a working visual telegraph. Learn the importance of safe lab practices.
4	Demonstrate the correct use of the visual telegraph to send and receive messages through the use of the communication system, and the language of the Morse code.	Experiment with the operation of the visual telegraph. Become familiar with the Morse code and the benefits of long distance communication. Be able to identify the pieces involved in the telegraph (visual) and how they relate to the original telegraph.

PERFORMANCE OBJECTIVE 2B

PRODUCTION TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of production technology, present-day methods of production and future possibilities, the student will be able to discuss the major steps of production technology and hypothesize on its future.

In order to do this, the student must be able to:

a. Define 'production' and 'production technology.'

b. Name significant milestones in the evolution of production.

c. Hypothesize on future sources and types of materials.

d. Hypothesize on future production technologies.

CONCEPTS TO BE DEVELOPED

2B.1 Production is the processing of materials to make things.

2B.2 Production technology is the use of tools and knowledge to make the things we need or want.

2B.3 Production methods have evolved over time.

50,000 BC	crude tools and weapons
2800 BC	hand made pottery
2000 to 1500 BC	simple machines
1750 AD	Industrial Age
1800 AD	Machine Age
1900 AD	Age of Automation
Present Day	computers and robotics

2B.4 Future production technology will deal with increasing demands for more and better products while facing decreasing resources.

Suggested Instructional Strategies
Grades 3 and 4: Production Technology: Past, Present and Future (2B)

Activities:

1. Dip candles, weave, construct leather and metal crafts.
2. Engage in assembly line activities and individually crafted products.
3. Role play the craft of the blacksmith, tinsmith, weaver, potter and gunsmith.
4. Create a bulletin board display of life in a 19th century town.
5. Research a craft and report on the training and tools necessary, methods of production and uses of the product.
6. Design and build a model of your town in the 21st century.
7. Make models of early tools.
8. Examine farming tools as models of the past.

Audio/Visual:

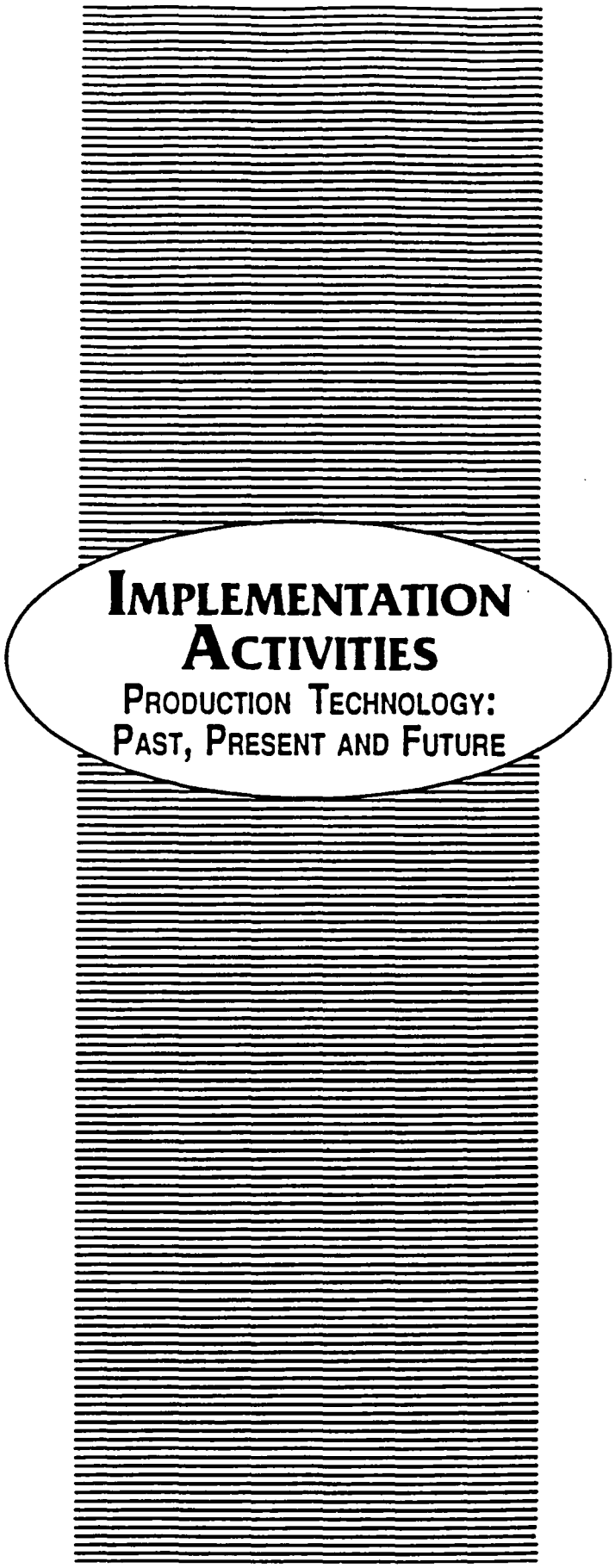
1. Research and compare life in an 18th, 19th, and 20th century town in regards to effects of industrialization.
2. View film on mass production.
3. Trace historical development of industrialization.
4. View movie, "Inheritance" (story about craftsmen of Central New York in 1960's).

Resource Persons:

1. Have a craftsman come in and explain craft.
2. Have parents explain and demonstrate interesting hobbies, such as spinning/weaving, painting on glass, early photography, or collecting antiques.

Visitations:

1. Tour a local factory.
2. Take a field trip to Cooperstown (Restored Early American Village).


IMPLEMENTATION ACTIVITIES
PRODUCTION TECHNOLOGY: PAST, PRESENT AND FUTURE

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Creating Robots* **GRADE** *4*

Overview of Activity

Students will learn about early and present day tools used in production. Using these tools they will design and construct simple robots which perform (or almost perform) simple tasks.

Students will be making and using machines studied in the classroom science program.

Primary Performance Objective

- *Production Technology: Past, Present and Future (2B)*

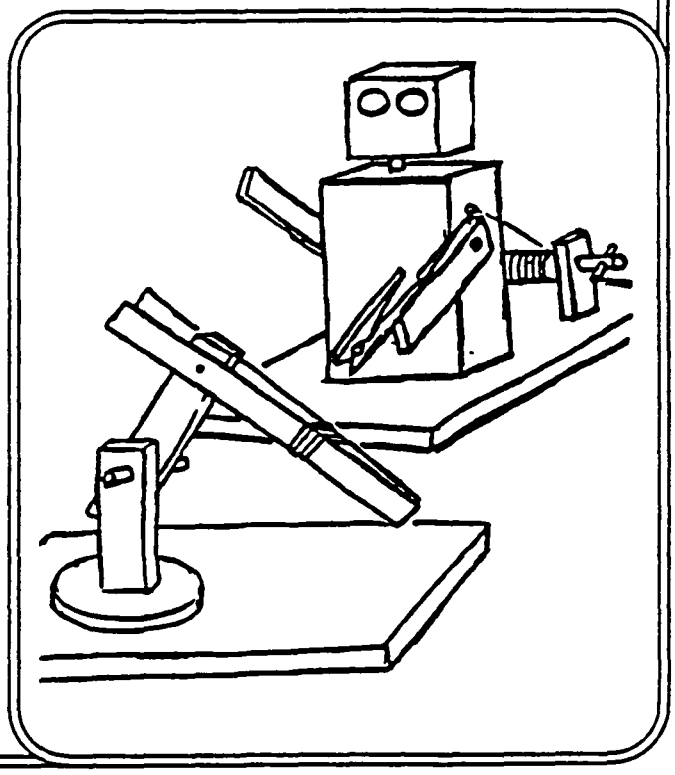
Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT2, RT5, RT6*
- *Impacts of Technology: IT1, IT2, IT3, IT4* • *Safety: S1, S2, S3, S5*

Resources

- *Pictures and samples of past and present tools*
- *Computer system with a mouse and drawing program such as MousePaint*
- *Assorted pieces of wood (circles, squares, rectangles)*
- *Dowels, spools, snap clothespins, plastic magnets, string, and wire*
- *Glue, tape, and nails*
- *Assorted hand tools*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Define 'production' and 'production technology.'	
	Show tools or pictures of historic and present day tools -- including robots.	Name tools and describe their primary functions.
		Identify the simple machines incorporated into them.
	Challenge students to design a simple robot that is capable of performing a task.	Begin designing robot.
2	Demonstrate several methods of building a workable wheel, lever, and pulley mechanism.	Begin construction of your robot.
	Provide an assortment of wood pieces, spools, dowels and other odds and ends for students to experiment with.	Experiment with materials and select those needed for your robot.
3	Demonstrate basic techniques for shaping and fastening pieces together.	Continue construction of your project.
4 - 7	Provide individual instruction and assistance as necessary. Creativity is more important than quality.	Cut parts, drill holes, glue, nail, attach string, and clothes pins to produce robot.
8	Demonstrate how to make a simple computer drawing of the robots.	Use a computer program to make a simple drawing of your robot.
9	Provide opportunity for the students to demonstrate and explain their robots.	Demonstrate how your robot works, or how it is supposed to work.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Family Tree Frames* **GRADE** 4

Overview of Activity

In studying old fashioned days, the students also learn about their ancestry.

Each student will make a frame for a diagram of his or her family tree using early production methods (hand tools).

Primary Performance Objective

- *Production Technology: Past, Present and Future (2B)*

Secondary Performance Objectives

- *Resources of Technology: RT2*

Resources

Materials/Supplies

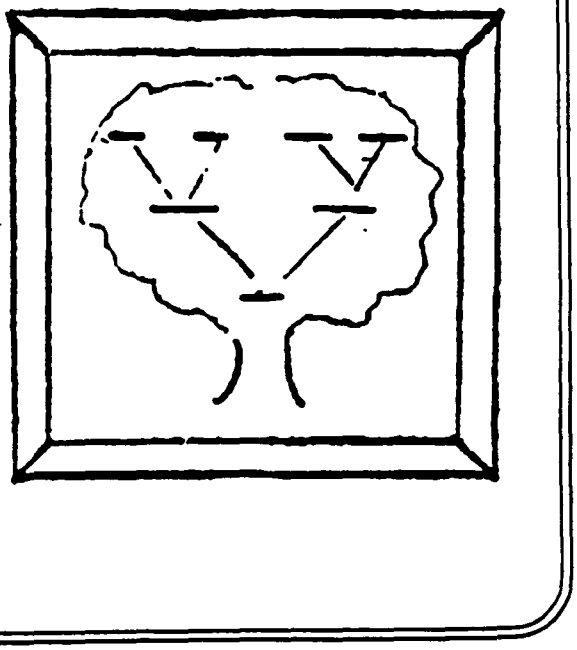
- *Strips of pre-cut wood, nails, glue, abrasive paper, oak tag paper and string*

Tools/Equipment

- *Miter box saw, hammers, miter clamps, stapler*

References

Parents and grandparents (family history research)



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity and describe how it relates to production technology.	Respond to questions.
	Describe various family tree designs.	Design personal family trees.
2	Outline construction steps for this project.	
	Demonstrate making a working drawing.	Make a working drawing of the project.
3-6	Demonstrate construction steps as needed.	Make the frame.
7	Demonstrate adding the family tree to the frame.	Color and decorate the family tree and attach it to the frame.
		Tell how procedures used in this project compare with old fashioned methods.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construction of Colonial Toys* **GRADE** *4*

Overview of Activity

This activity can be done while students are studying the colonial era. Toys are interesting to students, so making some of the toys of this era will serve to arouse their interest in living during those times. They will learn that toys were produced by hand during colonial times, and they will become familiar with many different kinds in the course of their research. Each student will choose one toy to construct and present to other students.

Primary Performance Objective

Production Technology: Past, Present and Future (2B)

Secondary Performance Objectives

- *Problem Solving: PS1*
- *Decision Making: DM1*
- *Resources of Technology: RT5*
- *Impacts of Technology: IT2, IT4*
- *Safety: S5, S7*

Resources

Materials/Supplies

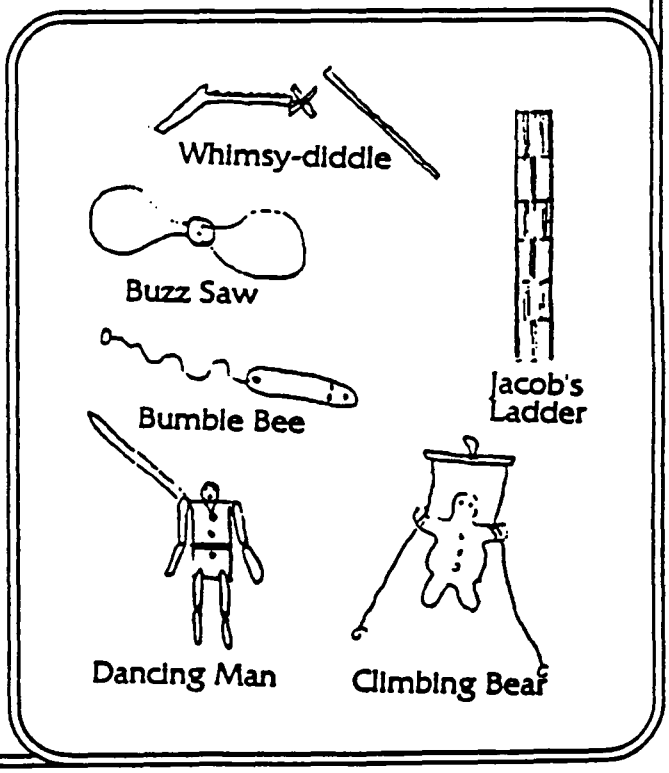
- *Homosote, cardboard, dowel rod, wood, glue, string, markers and paint.*

Equipment/Tools

- *Coping saws, scissors, files, rulers, tape, utility knives, hammers.*

References

- *Library books*
- *Encyclopedia ("Toys")*



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Present the topic and describe how it relates to production technology.	Listen attentively.
2	Help students with library skills.	Go to the library and research colonial toys. Choose project and list materials needed to do it.
3-5	Help students choose best approach to their project. Discuss construction methods.	Start work on projects.
6-7	Give individual help as needed. Assign students to write a short paragraph pertaining to their respective toys and tell how they work.	Work on projects.
8	Compare toy production in the past and present.	Read stories and demonstrate work to the class. Name materials used in toys and tell how they were made in colonial times in comparison to the present.

COMMENTS: The students can share their creations with their classmates. After demonstrating their toys, have them set up a showcase display in the school lobby.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Memo Board* **GRADE** *3 and 4*

Overview of Activity

Students will learn about Production Technology while they construct this memo board using hand tools as craftsman did in the past. The shape on the top of the memo board will be cut using a coping saw, and all surfaces will be hand sanded. The design on the metal rectangle will be made using the colonial method of a hammer and nail to make the design.

Primary Performance Objective

- *Production Technology: Past, Present, and Future (2B)*

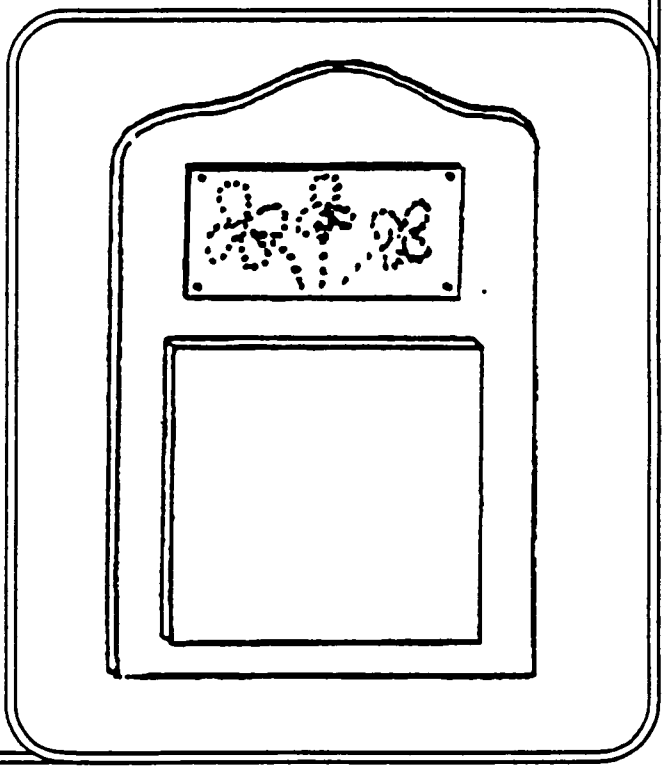
Secondary Performance Objectives

- *Decision Making and Problem Solving: DM1* • *Resources of Technology: RT4, RT5, RT6* • *Impacts of Technology: IT2, IT5* • *Safety: S2, S5, S7*

Resources

- *Pine or plywood, 1/2" or 3/4" thick, 11" X 16"*
- *1 piece thin aluminum, 5" X 7"*
- *1 piece cork board, 1/4" X 7" X 8"*
- *5" X 7" picture pattern to transfer to metal*
- *Coping saw, crosscut saw, C-clamp, file and nail hammer*
- *Sandpaper, white glue, stain and brush*
- *Brads to attach metal rectangle*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Identify 'production technology' and its importance in our lives. Discuss how products are made from a production system.	Name examples of things made from 'production technology.'
	Introduce project, show an example, explain what students will be making.	
	Demonstrate cutting wood to length.	Cut wood to proper length.
		Smooth all surfaces.
2	Demonstrate how to draw shape of top of board and cut shape using coping saw.	Draw shape on top board.
		Cut out shape.
3	Demonstrate how to stain board.	Stain board.
	Demonstrate how to tap picture on metal rectangle using pattern, nail, and hammer.	Select pattern and begin tapping design.
4	Review tapping design.	Continue tapping design.
5	Demonstrate how to attach metal rectangle to board.	Attach metal rectangle.
	Demonstrate how to attach cork board.	Attach cork board with white glue.
6	Demonstrate how to attach picture hook to back of board.	Attach picture hook.
	Talk about how this project could have been made from a production system. discuss how electric tools make this type of work easier.	Suggest ideas about product systems.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Making Paper* **GRADE** *3 and 4*

Overview of Activity

Sudents will learn about various crafts and occupations while they study early America. As they make their own paper they will learn about the process used and its importance in early American life. Students will screen print a design on their paper and use it to make greeting cards.

Primary Performance Objective

- *Production Technology: Past, Present and Future (2B)*

Secondary Performance Objectives

- *Resources of Technology: RT4, RT6* • *Impacts of Technology: IT1, IT4* • *Safety: S1*

Resources

Materials/Supplies

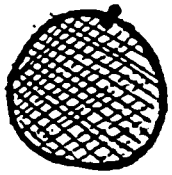
- *Wood frame, old paper products, overhead plastic sheets, screen, screen printing stencils, paint, paper, blotter paper, plywood squares*

Equipment/Tools

- *Drill with mixer blades on the end, mixing buckets, iron and weight*

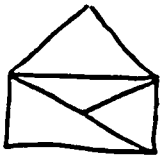
References

Goerl, Stephen. Papermaking in America. 1945
Fisher, Leonard Everett. The Papermakers. 1965



Frame and Screen

HOMEMADE PAPER
Made Into Greeting Cards



Envelope For Card

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1 - 2	Introduction: Talk about early paper makers, how they made paper and how it is made today. Review the steps of papermaking and then talk about recycling paper, and why we recycle paper. Introduce worksheet 'papermaking.' Explain how paper can be made in the classroom.	Research papermaking and report findings to the class. Complete worksheet 'papermaking.' Cut old paper products up into small pieces and place into a large container with water to soak.
3	Demonstrate making paper.	Make paper: Mix paper and water into pulp, screen out mixture with frame and then press.
4 - 5	Demonstrate screen printing and envelope making.	Screen print writing onto the paper and make envelopes for the greeting cards.
6	Introduce Tic Tac Toe Game for papermaking.	Play Tic Tac Toe game for papermaking.

Papermaking

Circle the words that relate to papermaking and be prepared to explain why each is important.

Water	Scrap	Mixer
Pulp	Sun	Press
Wood Frame	Screen	Drying Rack
Blotter	Earth	House
Trees	Moon	Car

Name _____

Screen Printing Word Search

The words hidden in this puzzle may be found horizontally, vertically or diagonally. Some of the words may even be found spelled in reverse. Ex: The word INK may be found spelled KNI.

Can you find these words?

1. Screen Printing
2. Heat Oven
3. Multi Color
4. Stencil
5. Frame
6. Bridge
7. Thinner
8. Silk
9. Registration
10. Right Reading
11. Emulsion
12. Transfer Paper
13. Squeegee
14. Japanese
15. Iron on
16. Fabric
17. Image
18. Z Tab
19. Nylon
20. Ink
21. Mesh
22. Clog
23. Tie
24. Mask

S H Y W R F E M U L S I O N T R
T C M E S H H U N S Z W Q O T E
E N R D Q M K L Y M E S F Y R G
N J Q E U M P Z L L Q F R A A I
C M Z C E B N M O A S D A F N S
I C H K E N M O N L P Y M U S T
L O E M G V P N B M I T E F F R
M A A Y E K I R R W E R T Y E A
A J T V E J R N I M B M E Q R T
T A O N Z Z O I D N A M O P P I
A P V I N H N G G O T I N L A O
P A E K I N O U E Z Z I N Y P N
N N N O N I N S Q U E E N G E K
T E C L O I T R A N S F E G R U
H S P A P F R O L O C I T L U M
I E E M U L T L O I M A G E L O
N T I U K L I S G R E G I S P K
N S L I K L E S C R E E L K P S
E K C L O G K O F A B R I C H A
R B G N I D A E R T H G I R J M

PERFORMANCE OBJECTIVE 2C

TRANSPORTATION TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of transportation technology, present-day transportation technology and future possibilities, the student will be able to discuss the major steps in the development of transportation and hypothesize on its future.

In order to do this, the student must be able to:

a. Define 'transportation' and 'transportation technology' in general terms.

b. Name significant technological advances in land, sea, air and space travel.

c. Identify current and forseeable (or hypothetical) transportation problems.

d. Brainstorm possible new forms of transportation for the future.

CONCEPTS TO BE DEVELOPED

2C.1 Transportation is the means by which people, products and resources are moved from one place to another.

2C.2 Transportation technology is the application of tools and knowledge to develop systems that move people, products and resources from one place to another.

2C.3 Transportation technology has evolved over time:

10,000 BC	dugout canoes	1883	automobiles
3200 BC	sailboats	1903	Wright Bros. airplane
3000 BC	wheeled vehicles	1940	rockets
1783	hot air balloon	1955	nuclear submarine
1800	bicycle	1957	unmanned satellite
1807	steam boat	1980s	space shuttle
1829	railroad	1980s	supersonic transport

2C.4 Some of the problems new transportation technologies will address are increased costs, environmental impacts, safety and dwindling resources.

Suggested Instructional Strategies
Grades 3 and 4: Transportation Technology: Past, Present and Future (2C)

Activities:

1. Make models of early water transportation (galleys, Viking ships, clippers, dug outs, rafts, nuclear subs).
2. Study Erie Canal boats and steam locomotives.
3. Study lock systems.
4. Make models of historical land transportation wagons: Conestoga, shay, concord coach, etc.
5. Study autos of the past: Deusenburg, Franklin, Model T.
6. Study airplanes: Wright Brothers model, Curtiss, Jenny, WW II bombers, DC 3, etc.
7. Study blimps and hot air balloons.
8. Study rockets.
9. Report on famous transportation pioneers: Dr. Robert Goddard, Wrights, Henry Ford, or Robert Fulton.
10. Study maps: map languages, scale, titles, etc.
11. Research and report on time factor to travel to America from Europe on the Mayflower, Lindbergh's Spirit of St. Louis, the Queen Mary, a DC 3, a 747, or the space shuttle.

Audio/Visual:

1. View films on transportation history.
2. View NASA space films.
3. View films from the auto industry.

Resource Persons:

1. Contact speakers related to career opportunities: pilot, truck driver, bus driver, lock tender, boat captain.

Visitations:

1. Tour the airport.
2. Visit the Erie Canal museum (Syracuse or Rome).

IMPLEMENTATION ACTIVITIES

TRANSPORTATION TECHNOLOGY: PAST, PRESENT AND FUTURE

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construction of models of old-fashioned transportation* GRADE 4

Overview of Activity

Students will become familiar with old-fashioned forms of transportation while studying the colonial times of our country. This activity will facilitate maintaining the students' interest in the subject.

Each student will choose a mode of travel, research it, and construct a model. Their models and research can be used as teaching aids with other classmates.

Primary Performance Objective

- *Transportation Technology: Past, Present, and Future (2C)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT4, RT5, RT6* • *Impacts of Technology: IT2, IT4, IT5* • *Safety: S1, S2, S5*

Resources

Materials/Supplies:

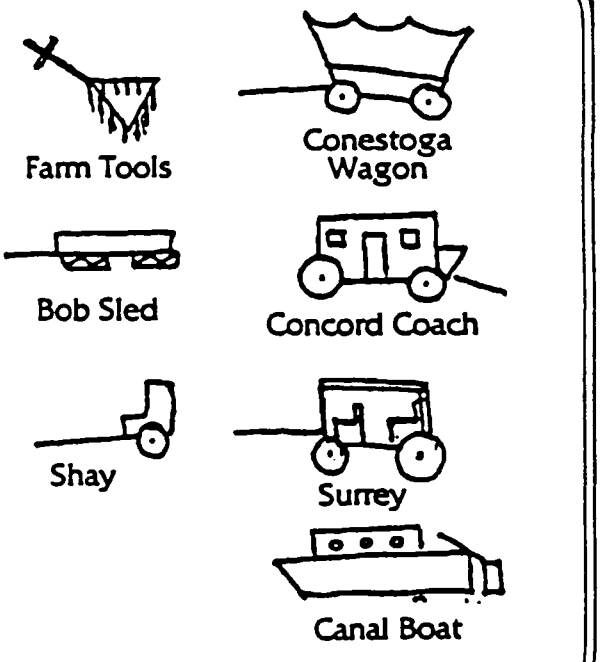
- *Sheets of cardboard, homosote, pine wood, glue, markers, paint and tools.*
- *Other materials students will need are odds and ends commonly found in the lab or the home.*

Equipment/Tools

- *Hammers, nails, jigsaw, coping saw, files, scissors, utility knives, rulers, tape, etc.*

References

Students will be doing research in the library. Any books they have used in class previously can serve as references.
"Historic Models of Early America" by Maginley.



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Present topic (Colonial Transportation) and explain activity. Use a worksheet to guide research in the library.	Listen to the teacher. Complete worksheet in the library. Select a project.
2	With each student: review choice of project and decide best approach to construction.	Decide on approach to construction. List and gather materials. Start construction of a model.
3-6	Work with students	Work on project.
7	Assign a short paragraph describing the use of a specific form of travel.	Write a paragraph. Read paragraph and explain model to class.
	COMMENTS: These stories and models can be displayed in the classroom.	

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Truck or Helicopter Bank* **GRADE** *3 and 4*

Overview of Activity

Students will learn about transportation technology while they construct a bank which represents a transportation design from the past, present or future.

Primary Performance Objective

- *Transportation Technology: Past, Present and Future (2C)*

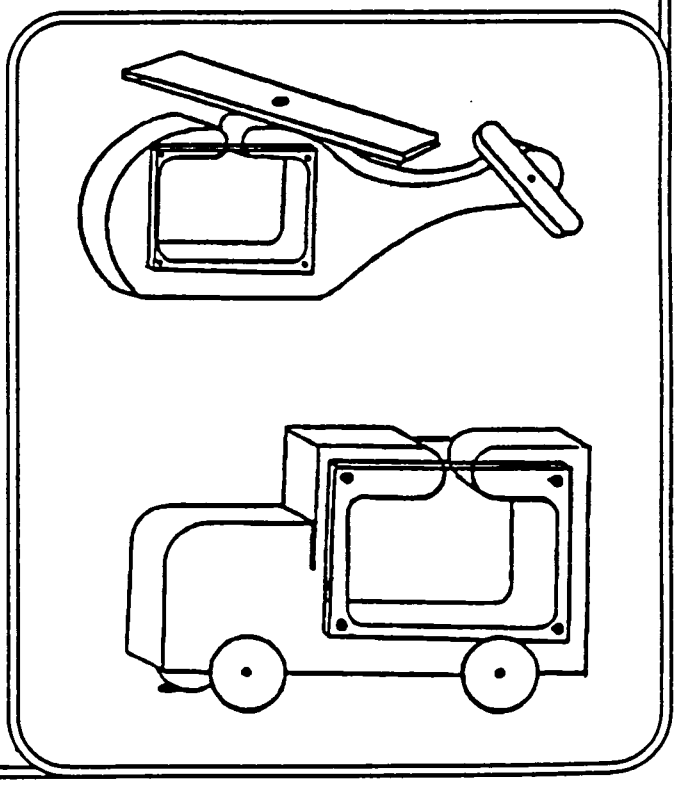
Secondary Performance Objectives

- *Decision Making: DM1* • *Resources of Technology: RT4, RT5* • *Impacts of Technology: IT4, IT5* • *Safety: S3, S5, S7*

Resources

- *1 piece pine, 1 1/4" X 6" X 12"*
- *2 pieces plexiglass, 1/8" X 5" X 5"*
- *4 wooden wheels for truck or car*
- *8 small screws to attach plexiglass*
- *Polyurethane and brush*
- *Scroll saw, crosscut saw, hammer, screwdriver, electric drill*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss how important transportation is in our lives.	Give examples of transportation vehicles and their importance.
	Introduce activity.	
	Demonstrate how to cut wood to length.	Cut wood to length.
2 - 3	Demonstrate how to draw and cut shape of transportation vehicle on wood.	Draw shape of transportation vehicle on wood. .
		Cut out shape of vehicle.
4 - 5	Demonstrate how to cut out inside shape of bank.	Cut out inside; smooth all surfaces.
6	Demonstrate how to apply polyurethane.	Apply polyurethane.
7	Demonstrate how to apply plexiglass.	Attach plexiglass.
8	Demonstrate how to attach wheels or propellers.	Attach wheels or propellers.
	Talk about the history of transportation and its impact on society.	Discuss ideas.

PERFORMANCE OBJECTIVE 2D

POWER TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of power technology, present-day power technology and future possibilities, the student will be able to discuss the major steps in the development of power and hypothesize on its future.

In order to do this, the student must be able to:

a. Define "energy," "power," and "power technology."
b. Name the major advances in the development of power technology.
c. State human needs that prompted the development of these technologies.
d. Identify present-day or future conditions that could benefit from more advanced power technology.
e. Brainstorm possible new sources and forms of power technology.

CONCEPTS TO BE DEVELOPED

2D.1 Energy may be defined as a source of power. All energy comes directly or indirectly from the sun.

2D.2 Power may be defined as putting energy to work.

2D.3 Power technology involves the application of knowledge, machines and devices to accomplish work.

2D.4 People develop power technology to provide for their needs and wants (food, clothing, shelter, transportation, communication).

2D.5 Major advances in the development of power technology include:

1 million to 3000 BC	human muscle power
	animal muscle power
400 BC	water power (water wheels)
600 AD	wind power (windmills)
1775 AD	steam power (Watt's engine)
1800 AD	electric power (Volta's battery)
1860 AD	internal combustion engine (Lenoir)
1888 AD	electric motor (Telsa)
1951 AD	nuclear power

2D.6 Increased demands and dwindling resources will be major considerations in the development of new power technologies.

Suggested Instructional Strategies
Grades 3 and 4: Power Technology: Past, Present and Future (2D)

Activities:

1. Construct models of waterwheels (overshot and undershot breast type).
2. Construct models of windmills from the past.
3. Construct models of replicas of power dams, such as Hoover Dam.
4. Research and build a scale model of a nuclear plant.
5. Construct a windloss wheel and axle.
6. Demonstrate a lever, parts of a lever, and classes of levers.
7. Construct a CO^2 propelled vehicle.
8. Trace the evolution of the wheel through illustrative models.
9. Produce gears and demonstrate their mechanical advantages.
10. Build pulleys and pulley systems.
11. Construct a model steam engine (Greeks).
12. Construct solar powered toy models.
13. Study jet and rocket propulsion and make a bulletin board display.
14. Draw pictures of nuclear powered travel.

Audio/Visual:

1. View power and energy films.

Resource Persons:

1. Contact a representative of Niagara Mohawk regarding their traveling display.
2. Invite collectors to give demonstrations of steam engine or early gas powered stationary engines.

Visitations:

1. Arrange a field trip to historical power facilities, e.g., old water powered mills.
2. Tour a modern factory, a hydroplant and a nuclear power plant.
3. Attend steam engine fairs.

Implementation Activities

Power Technology: Past, Present and Future

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Technological Invention Time Line* **GRADE** *3 and 4*

Overview of Activity

This activity can be done while students are studying famous inventors in social studies.

Each student will research an invention and construct a cardboard model to be hung on a time line to show the evolution of technology.

Primary Performance Objective

- *Power Technology: Past, Present and Future (2D)*

Secondary Performance Objectives

Resources of Technology: RT2 • Impacts of Technology: IT3, IT4

Resources

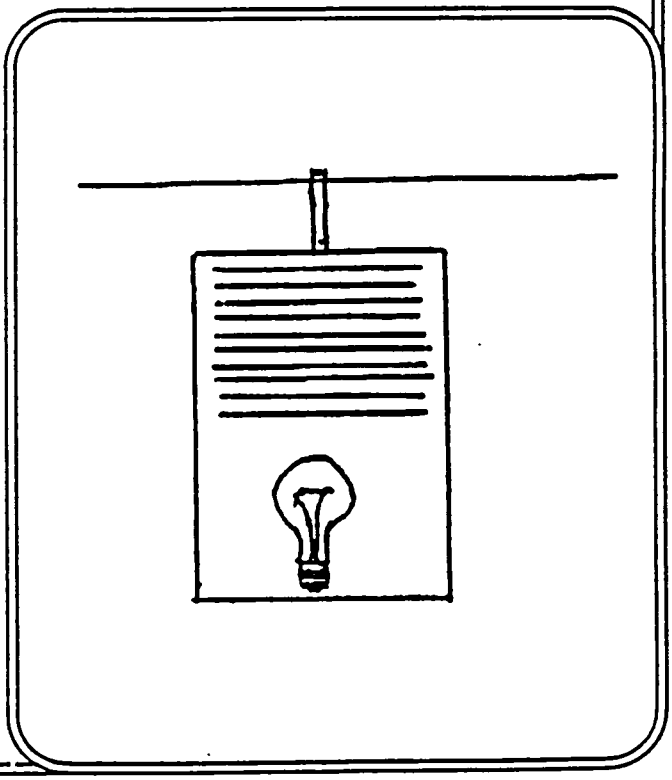
Materials/Supplies

- *Oak tag, clothespins, adhesive, wood, straws, paper cups, nails, 1/8" drill bit, 1/8" pop rivets, and other materials commonly found in the lab*

Equipment/Tools

- *Hammer, drill, scissors, pop rivet gun, utility knife, and other hand tools commonly found in the lab*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss how power technology changes over time. Review research procedures.	Choose an invention to explore.
2	Demonstrate use of materials for construction of models.	Plan steps.
3 - 4	Work with students as they construct models.	Work on models.
5	Install timeline wire in classroom. Guide discussion.	Describe individual models and hang on time line.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Wall Hanging Flower Pot Holder* **GRADE** 4

Overview of Activity

Students will learn about the development of power technology as they produce this project using both hand operated tools and power tools. As they compare the two forms of power they will experience the advantages of having present day power available.

This project will correlate well with a classroom science unit on growing plants.

Primary Performance Objective

- *Power Technology: Past, Present and Future (2D)*

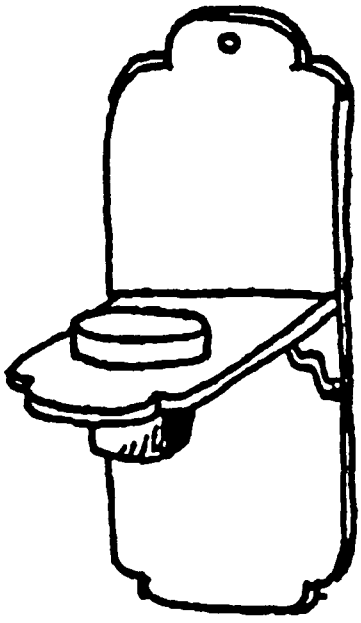
Secondary Performance Objectives

- *Resources of Technology: RT1, RT2, RT4, RT5, RT6* • *Impacts of Technology: IT4, IT5*
- *Safety: S1, S2, S3, S4, S5, S7*

Resources

- *For each project:*
  1 piece pine, 1/2" X 3 1/2" X 14"
  1 small red clay flower pot
- *Coping saws and electric vibrating (dremel) saws*
- *Sanding blocks and electric vibrating sanders*
- *Hand crank drills and electric drill press*
- *Hole cutting saw for drill press*
- *Claw hammers*
- *1 1/4", #16 brads*
- *Oil stain and brushes*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce "power technology" and the highlights of its development from past to present.	Define "power technology" and cite historical examples.
	Introduce project and explain its purpose (from Overview).	
	Demonstrate cutting the 14" board into a 10" back piece and a 4" shelf-like piece.	Perform measuring, marking and sawing operations.
2	Demonstrate pattern making for the ends of 10" piece and transferring it to wood.	Produce a pleasing design and trace it on the 10" piece.
3-6	Demonstrate basic woodworking skills needed using both hand tools and power tools.	Practice, then cut and smooth both pieces.
7	Assist students to cut the flower pot size hole in the 4" piece of wood.	Operate drill press with constant supervision from the instructor.
8	Demonstrate finishing with oil stain.	Stain both pieces.
9	Demonstrate assembling with glue and brads.	Assemble the project.
10	Lead discussion about the advantages of power technology.	Relate experiences using both hand and power tools.
	Describe some newer ways of cutting (e.g., laser beams, water streams and electric arcs).	

PERFORMANCE OBJECTIVE 2E

CONSTRUCTION TECHNOLOGY PAST, PRESENT and FUTURE

Given instruction in the history of construction technology, present-day construction technology and future possibilities, the student will be able to discuss the major steps in the development of construction and to hypothesize on its future.

In order to do this, the student must be able to:

a. Define 'construction.'

b. Name the major advances in the development of construction technology.

c. Identify some current and foreseeable problems related to shelter and roadways.

d. Suggest possible innovations in construction technologies to solve problems.

CONCEPTS TO BE DEVELOPED

2E.1 Construction technology is the application of tools and knowledge for the on-site production of such things as buildings, bridges, tunnels, airports, dams and towers.

2E.2 Early people lived in caves, tents and crudely fashioned structures. As technology evolved, more sophisticated buildings, monuments and roadways were made using wood, stone, mortar, glass, iron, concrete and steel. Present day construction technology allows people to build skyscrapers, domes, interstate highways, suspension bridges, canal locks and dams.

2E.3 Major considerations in the development of future construction technologies will be those of increasing demands and dwindling resources.

Suggested Instructional Strategies
Grades 3 and 4: Construction Technology: Past, Present and Future (2E)

Activities:

1. Hold discussions related to shelters and construction techniques used during the stone age.
2. Produce models of homes from the past, such as teepees, igloos, long houses, adobe and log cabins.
3. Construct models of famous landmarks from foreign lands.
4. Recreate manmade wonders of the ancient world.
5. Construct models of structures from the past.
   a. evolution of bridges
   b. aqueducts
   c. locks
   d. forts
   e. castles
   f. farms
   g. skyscrapers
6. Construct models of homes or cities of the future.

Audio/Visual:

1. View films dealing with other cultures.
2. Create bulletin board displays.

Resource Persons:

1. Contact contractor or builder.
2. Contact school superintendent of buildings and grounds.

Visitations:

1. Visit a construction site, new school, factory, or shopping mall.
2. Tour a home construction site.
3. Arrange visits to historical sites, such as homes, forts and public buildings.

IMPLEMENTATION ACTIVITIES

CONSTRUCTION TECHNOLOGY: PAST, PRESENT AND FUTURE

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct a Castle* **GRADE** *4*

Overview of Activity

This project will relate to a study of medieval times. Using information from social studies, students will work as a class to construct a model of a typical castle. Construction technologies of the Middle Ages will be discussed.

Primary Performance Objective

- *Construction Technology: Past, Present and Future (2E)*
- *Production Technology: Past, Present and Future (2B)*

Secondary Performance Objectives

- *Decision Making: DM1* • *Resources of Technology: RT4*

Resources

Materials/Supplies

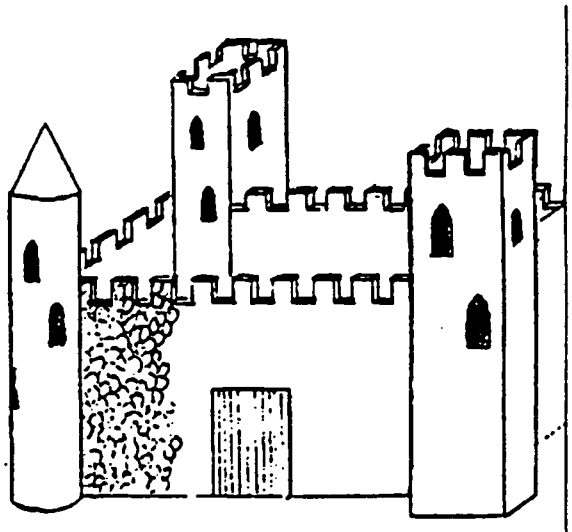
- *Wood, cardboard or cardboard tubes, glue, paint, rocks, craft sticks*

Equipment/Tools

- *Paintbrushes, abrasive paper and miterbox*

References

Social studies book on medieval times



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce the project. Assist with the research. Lead discussion on types of construction. Plan a general layout for a castle.	Conduct research on castles in social studies book.
2-6	Establish groups to work on various aspects of construction. Assist groups in planning and constructing.	Divide into work groups to construct various parts of the project.
7	Organize the assembly of all parts into the finished castle.	Assemble component parts.
8	Compare medieval construction, materials and methods to present-day technology.	

IMPLEMENTATION ACTIVITY

ACTIVITY *Construction of a grist mill with working parts* GRADE *3 and 4*

Overview of Activity

During their study of old-fashioned days, students will learn about various occupations and businesses of the past.

As students construct a model of a grist mill they will learn what the mill was used for and how it worked.

Primary Performance Objective

- *Construction Technology: Past, Present and Future (2E)*

Secondary Performance Objectives

- *Impacts of Technology: IT1*

Resources

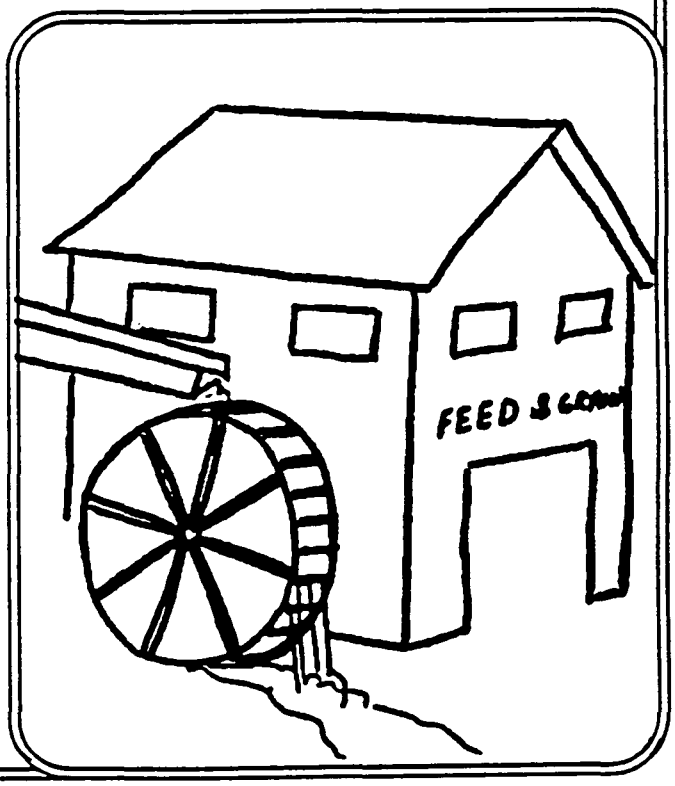
Materials/Supplies

- *Homosote, nails, glue, craft sticks, masonite, wood, rubberbands, sheet metal, dowel rods, paint*

Equipment/Tools

- *Coping saws, crosscut saws, hammers, paint brushes, scissors, rulers and pencils*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Research workings of a mill.	Conduct research.
	Plan construction of a mill.	List materials needed.
2	Divide students into groups to make (1) the outside of the mill, (2) the water wheel and (3) internal parts.	Decide how to construct parts and where to get materials.
	Have each group decide on the best construction method and materials needed.	
3-6	Work with students.	Work periods.
7	Help with assembly.	As some groups finish the assembly can take place.
		Combine all groups' efforts into the final mill.
8	Have students write a short story on how mills were run and for what purposes.	Write short stories and put on finishing touches.

PERFORMANCE OBJECTIVE 2F

BIOLOGICALLY RELATED TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of biologically related technology, present day methods and future possibilities, the student will be able to discuss some significant developments in biotechnology and speculate on future developments.

In order to do this, the student must be able to:

a. Define 'biologically related technology.'
b. Name some significant events in the development of biologically related technology systems.

c. Name several examples of biologically related technology, past and present, and tell how each affects:
   i. plants
   ii. animals
   iii. human life

d. Identify a biologically related problem and speculate on possible technological solutions.

CONCEPTS TO BE DEVELOPED

2F. 1 Significant events in the development of biologically related technology systems:

Food Processing		**Agriculture**	
3000 BC	fermentation	5,000 BC	plow
1500 BC	grinding grain	4,000 BC	irrigation
1850	pasteurized milk	1800 AD	McCormick's reaper
1906	freeze dried food	1900	combine harvester
1928	frozen foods		
1947	microwave cooking		
Medicine			
500 BC	artificial limbs	1900	blood transfusion
1673	microscope	1920	hearing aid
1798	smallpox vaccine	1967	heart transplant

Suggested Instructional Strategies
Grades 3 and 4: Biologically Related Technology: Past, Present and Future (2F)

Activities:

1. Construct an animal habitat and observe animal behaviors.
2. Build terrariums for plant studies.
3. Build replicas of past, present and future farming implements.
4. Assign reports on famous pioneers in medicine.
5. Explore the processes of:
   a. making cheese
   b. baking bread
   c. smoking meat
   d. drying fruit
   e. tanning hides
   f. making ice cream
   g. pressing grapes for juices
   h. making soap
6. Experiment with growing water plants, plankton or seaweed for alternative food source.
7. Build solar house for plant experiments.
8. Construct seed boxes and experiment with different soil types, water amounts and sunlight for growing plants.
9. Grow plants without soil (hydroponics).
10. Grow new plants from old plants (cuttings).
11. Build a maze to study the intelligence and learning abilities of animals.
12. Discuss hunting and fishing regulations.
13. Address safety in hunting and trapping.
14. Grow an herb farm and study herb medicine.

Audio/Visual:

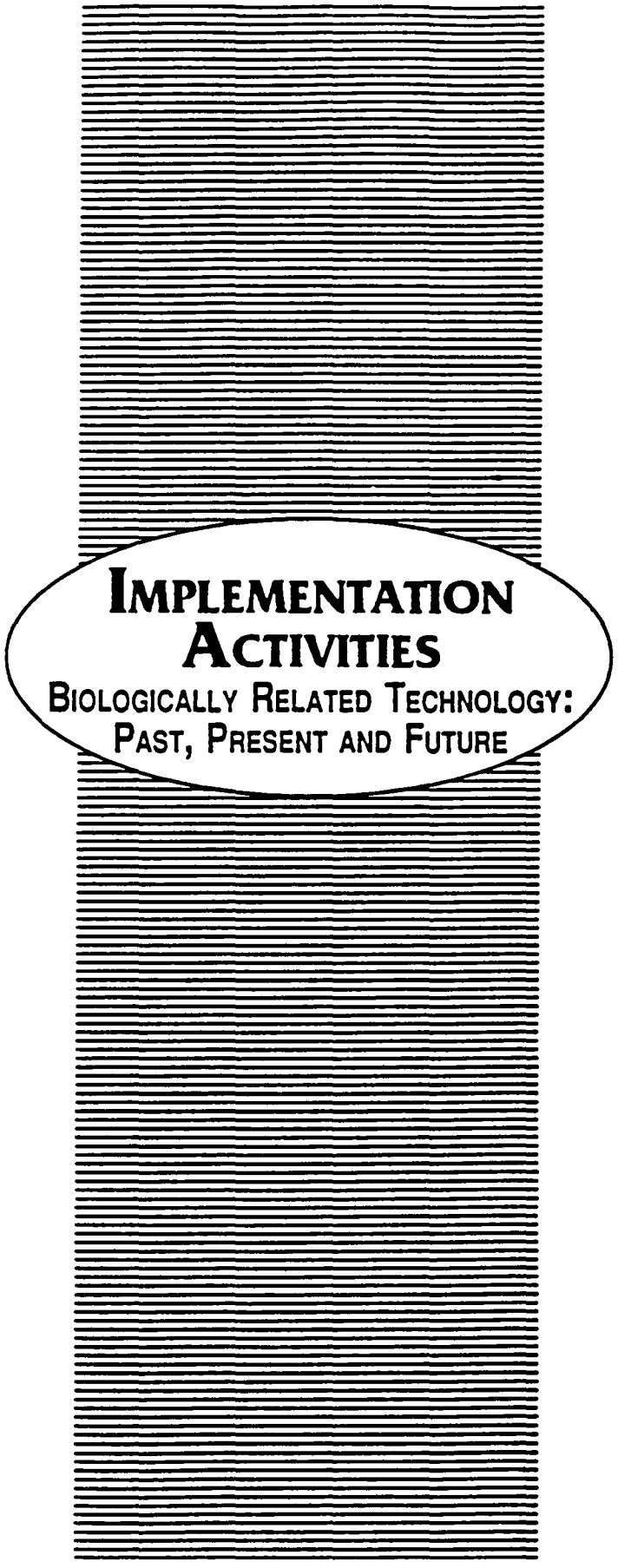
1. View films related to nature studies and food processing.

Resource Persons:

1. Contact doctors and pharmacists.
2. Contact a ranger or conservation officer.

Visitations:

1. Visit a food processing plant, such as Nestle's Chocolate or Birdseye canning factory.
2. Visit a soda bottling plant.
3. Visit a fish hatchery.
4. Arrange a field trip to a cider mill or fruit farm.



IMPLEMENTATION ACTIVITIES

BIOLOGICALLY RELATED TECHNOLOGY: PAST, PRESENT AND FUTURE

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Dental Hygiene Station* **GRADE** *3 and 4*

Overview of Activity

As students make these projects they will learn how people have developed technologies as simple as toothbrushes and as complicated as artifical organs, and that they continue to improve upon technology to meet their biological needs.

This activity will correlate well with a classroom health unit on personal hygiene.

Primary Performance Objective

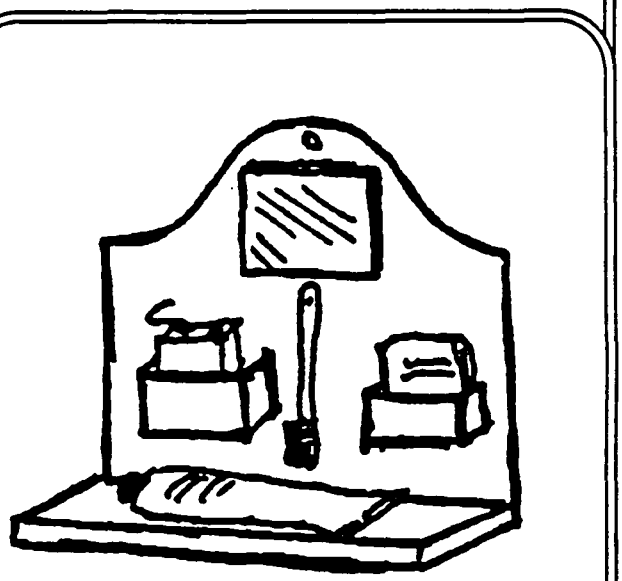
- *Biologically Related Technology: Past, Present and Future (2F)*

Secondary Performance Objectives

- *Resources of Technology: RT1, RT2, RT4, RT6* • *Impacts of Technology: IT2, IT5*
- *Safety: S1, S2, S3, S4, S5*

Resources

- *1 piece pine or plywood 1/2" X 8" X 8" for back piece*
- *1 piece pine or plywood, 1/2" X 3" X 8" for toothpaste shelf*
- *1 piece pine, 1/2" X 1/2" X 14" for railing around toothpaste shelf*
- *1 1/2" strips of 1/4" pine or plywood for boxes to hold interdental stimulators and dental floss*
- *1 mirror, 2 1/2" X 3 1/2", cut from 12" X 12" mirror tiles (from building supply store)*
- *1" #18 wire brads, glue, "L" hook for toothbrush*
- *Basic woodworking tools for cutting, smoothing, drilling, assembling and staining*
- *Glass cutter*
- *Oil stain or linseed oil*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Define 'biologically related technology.' Discuss the historical development of one or two things named.	Give examples of familiar biotechnology.
	Introduce project and outline basic construction steps.	Verbalize the impact of this technology on your own life.
	Demonstrate making a design for the back piece, tracing it onto the 8" X 8" piece and sawing it out.	Hear and read steps to follow.
2 - 3	Introduce new forms of biologically related technology and describe their evolution.	Make 'folded paper' design, transfer it to the wood, practice sawing, then begin to cut out the design.
	Demonstrate smoothing techniques.	Continue sawing and smoothing the back piece.
4	Demonstrate preparing shelf and attaching it to the back piece.	Sand the 3" X 8" piece and attach it to the back.
5	Demonstrate making a railing around the shelf (from the 1/2" X 1/2" stick).	Cut 2 short pieces and one 8" piece and attach them to the shelf.
6	(With school nurse if possible) Discuss the purpose for and techniques of using dental floss and gum stimulators.	
	Demonstrate making and attaching box-like holders for dental floss and interdental stimulators.	Use 1/4" wood to make boxes large enough for floss and gum stimulators.
7	Demonstrate staining.	Stain complete project.
8	Demonstrate inserting L hook for the toothbrush and gluing on the mirror.	Install L hook and mirror.
	Lead discussion relative to the history of biologically related technology.	Name technologies and how they evolved. Brainstorm for possible future technologies to solve some of our current biological problems.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Hydroponic Planter* **GRADE** *3 and 4*

Overview of Activity

With the construction of a hydroponic planter students will see the relationship between technology, the user and the environment. This activity is an example of growing plants utilizing alternative technologies in a controlled environment.

Primary Performance Objective

- *Biologically Related Technology: Past, Present and Future (2F)*

Secondary Performance Objectives

Problem Solving: PS1 • Decision Making: DM1 • Safety: S1

Resources

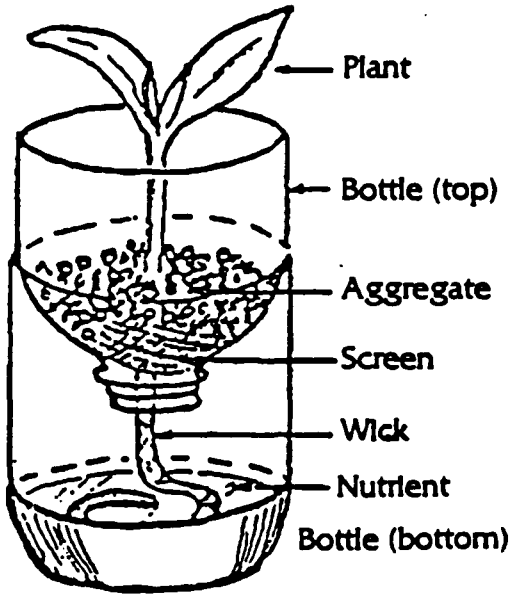
Materials

- *2 2-liter bottles (each person)*
- *1 box plant food*
- *10 packs radish seeds*
- *3 pounds vermiculite*
- *3 yards fiberglass screen*
- *10 yards wick (cotton rope)*

Tools

- *5 gallon pails*
- *Scoops*
- *Bottle cutting jig*
- *Scissors*
- *Empty milk jug*

References



AGGREGATE CULTURE Wick System

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduction to hydroponics as a form of biologically related technology. Describe major steps in making this project.	Read and discuss materials related to the development of hydroponics.
2-3	Demonstrate cutting plastic bottles. Demonstrate setting up hydroponic system using various growing media. Distribute data collection forms and discuss their uses.	Bring in a two liter bottle, seeds and various materials to use for growing media. Set up systems.

COMMENTS: Students will take these projects to their classroom to periodically observe, measure, record and discuss growth of plants.

Name _____

Hydroponics

Can you find these words?

1. HYDROPONICS
2. NUTRIENT
3. PLANT
4. ROOT
5. GROW
6. VEGETABLE
7. SOIL
8. FLOAT
9. WATER
10. SUN

N	S	U	N	A	X	D	H	O	C	Y	B	W	H
U	F	G	R	O	W	E	D	U	F	K	V	A	Y
T	P	H	A	C	S	F	A	D	O	M	Z	T	D
R	O	O	T	V	E	G	E	T	A	B	L	E	R
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V	N	S	L	S	O	I	L	Z	T	T	R	J	I
B	C	H	U	D	W	Q	S	D	F	H	B	G	C
E	G	Z	I	Y	T	O	M	K	I	C	E	Z	S

PERFORMANCE OBJECTIVE 2G

INFORMATION TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction in the history of information technology, present-day technology and future possibilities, the student will be able to discuss the major steps in the development of information technology and hypothesize on its future.

In order to do this, the student must be able to:

a. Differentiate between "information" and "information technology."

b. Name the major steps in the development of information technology.

c. State the needs that prompted the development of information technology.

d. Describe some ways information technology is used in the present.

e. Brainstorm possible new forms and uses of information technology in the future.

CONCEPTS TO BE DEVELOPED

2G. 1 Information is knowledge we obtain from study or instruction.

2G.2 Information technology utilizes knowledge and equipment to process information (data).

2G. 3 Some significant steps in the development of information technology are:

3,000 BC	abacus
1930	first electronic digital computer
1944	electromechanical punched card machines
1946	vacuum tube computer (ENIAC)
present	personal computers and main frames

2G. 4 As population increased and institutions became larger and more sophisticated, information technology helped people obtain and process more information at a faster rate.

Suggested Instructional Strategies
Grades 3 and 4: Information Technology: Past, Present and Future (2G)

Activities:

1. Use computer games or programs to learn or strengthen classroom academic subjects.
2. Key data into a simple data base program and, with assistance, arrange and sort it to produce new information.
3. Build a shoe box computer powered by a simple electrical circuit which matches answers to questions.
4. Make punch cards out of index cards to show how these were used.

Audio/Visual:

1. Arrange a bulletin board or display showing historic and present day computers.
2. View films, videos and books dealing with information technology.

Resource Persons:

1. Contact older people (e.g., technicians, engineers, military people, instructors) who have worked on computers in prior decades.

Visitations:

1. Take field trips to museums and science centers.

IMPLEMENTATION ACTIVITIES

INFORMATION TECHNOLOGY: PAST, PRESENT AND FUTURE

IMPLEMENTATION ACTIVITY

ACTIVITY *Construction of a hornbook or slateboard* **GRADE** *3 and 4*

Overview of Activity

While students make these projects they will learn about simple information technology used in the past and compare it to computers and other forms of technology used in present-day schools.

Primary Performance Objective

- *Information Technology: Past, Present and Future (2G)*

Secondary Performance Objectives

- *Resources of Technology: RT4, RT5* • *Impacts of Technology: IT2* • *Safety: S3, S5*

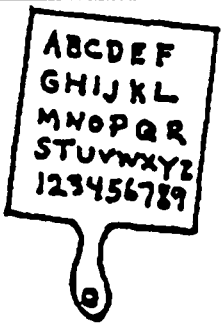
Resources

Materials/Supplies

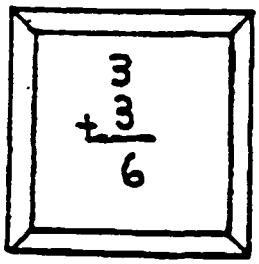
- *Hornbook: Quarter inch plywood markers*
- *Slateboard: Masonite, flat black paint strips of wood, glue, wire nails*

References

Dictionaries, encyclopedias



Hornbook



Slateboard

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss the differences between information technologies used in the schools of today and schools of the past.	Relate knowledge of one room schools through discussion.
	Direct the children in library research skills.	Gather information on colonial classroom tools.
2	Explain construction procedure.	Make sketches of slateboards and hornbooks.
3	Demonstrate sawing with a jigsaw and coping saw.	Saw wood to shape and smooth edges.
4	Demonstrate painting.	Paint projects.
5	Demonstrate making frame for slateboard using a miter saw.	Cut, paint and attach frames.
6	Introduce role playing activity regarding information technology in the schools of long ago and today.	Role play doing spelling or math as children did long ago with slateboards, and as they do now with calculators and computers.

COMMENTS: Special blackboard paint is needed for the slateboards. Options on the slateboards -- framed borders. Options on the hornbooks -- woodburn the letters.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Simple Computer* **GRADE** *3 and 4*

Overview of Activity

Students will make a simple computer consisting of a box (hardware) containing a series circuit (power supply) and questions and answers (software).

Students will learn that computers are machines which are very fast, but must be told (programmed) to do even the simplest tasks.

Students will become familiar with the basic series circuit used as a tester and later as the power supply of the computer. They will learn how to make repairs when needed.

Primary Performance Objective

- *Information Technology: Past, Present and Future (2G)*

Secondary Performance Objectives

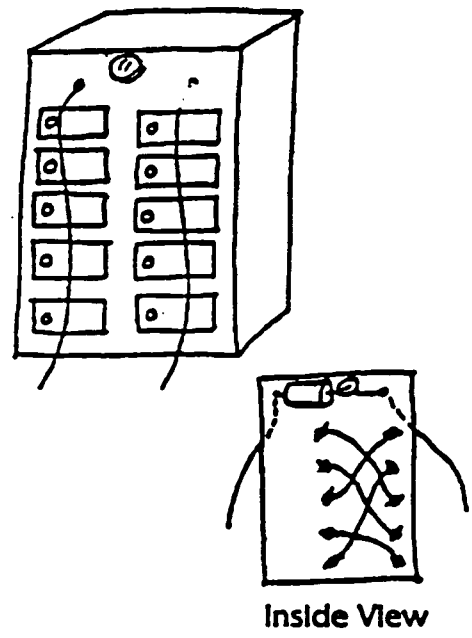
- *Decision Making: DM1*
- *Resources of Technology: RT5, RT6*
- *Impacts of Technology: IT3*

Resources

Materials/Supplies

- *Wood for box unit (8" X 10" X 2" or larger)*
- *1 D cell battery*
- *1 flashlight lamp*
- *10 paper fasteners for terminals*
- *Brads: 1 1/4", #16 and 3/4", #18*
- *Paint or stain if desired*
- *Soldering supplies*

References



Inside View

IMPLEMENTATION ACTIVITY

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Teach basic components of a computer. Compare project to other computers. Demonstrate sanding wood for box unit.	Sand pieces for box unit.
2	Review basic computer components. Demonstrate assembly of box unit using pilot holes, glue and brads.	Answer questions. Drill pilot holes and assemble box unit.
3-5	Introduce series circuit. Demonstrate layout of front using a template, drilling holes (one question hole and one answer hole at a time) and installing wires. Demonstrate using teacher-made series circuit tester.	Mark hole locations using template. Drill holes (one Q/A set at a time). Install paper fastener terminal and connect them with a wire. Test wire for proper installation.
6-8	Teach function of power supply circuit (how it works and how it communicated "You are right" and "You are wrong"). Demonstrate making and installing power supply. Solder wire to tip of lamp.	Install lamp and D cell. Connect wires to make the circuit.
9	Explain how to service or repair the computer when necessary. Demonstrate attaching back cover. Demonstrate making questions/ answers.	Glue service instructions to inside of back cover. Attach back with one long brad in one corner so it will swing open. Make paper questions and answers to tape near terminals.

COMMENTS: This project relates well to computer literacy, math or any other subject depending on the questions and answers used. The electricity is applied science.
Installing the bulb: Solder a "battery-to-lamp" wire to the tip of the lamp. Hook one end of a probe wire up through the bulb hole then push base of lamp into the hole from the front to make the lamp base connection.
D-Cell Connections: Stretch a rubber band (1/2" slice of bike tube) around battery. Snap fahnstock clip onto rubber band at each end of battery. Insert wire from other end of battery. Battery may be taped to the inside of box unit to hold it, or a simple battery holder can be made from a plastic 35mm film container (Cut off bottom and make slit down the side. Staple holder to box).

PERFORMANCE OBJECTIVE 2H

CAREERS IN TECHNOLOGY: PAST, PRESENT and FUTURE

Given instruction related to the history of technology used in occupations, the student will be able to discuss major changes in careers as a result of technology and the preparation needed for them.

In order to do this, the student must be able to:

a. Identify careers and occupations that have existed since early times.

b. Identify careers and occupations that have been reduced or eliminated as a result of technology.

c. Identify careers and occupations that have been created as a result of technology.

d. Discuss possible new careers and occupations that may be created to solve present and future problems.

e. Describe how career preparation has changed as technology has evolved.

CONCEPTS TO BE DEVELOPED

2H. 1 Careers and occupations that have existed since early times include farming, military service, sales, building, teaching, medicine and government.

2H. 2 Careers and occupations that have been reduced or eliminated as a result of technology include coopers, carriage makers, assembly line workers and telephone switch board operators.

2H. 3 New careers and occupations that have been created as a result of technology include computer programmers, astronauts, pilots and medical technicians.

2H. 4 New careers and occupations will develop as people address such problems as waste disposal, alternate energy, disease and dwindling resources.

Suggested Instructional Strategies
Grades 3 and 4: Careers in Technology: Past, Present and Future (2H)

Activities:

1. Role play service occupations of colonial times and experience some of the processes such as wigmaking, hatter, cooper or cobbler.
2. Construct a time line of careers.
3. Develop a brochure on the career of your choice. Try to convince others of its rewards and excite their interest in the career.

Audio/Visual:

1. View films on career education.

Resource Persons:

1. Contact parents and other working members of the community.

Visitations:

1. Tour a restored historical community.
2. Arrange visits to a museum, police station, firehouse, and a telephone company.

IMPLEMENTATION ACTIVITIES

CAREERS IN TECHNOLOGY PAST, PRESENT AND FUTURE

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construction of models of old fashioned tools* **GRADE** *3 and 4*

Overview of Activity

This activity can be done while students study the Colonial Era. Work done and tools used by the colonists are some of the many aspects they will study. Students will choose one tool used in a colonial occupation, construct a model of it and make a presentation to the class.

Primary Performance Objective

- *Careers in Technology: Past, Present and Future (2H)*
- *Production Technology: Past, Present and Future (2B)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT1*
- *Impacts of Technology: IT4* • *Safety: S7*

Resources

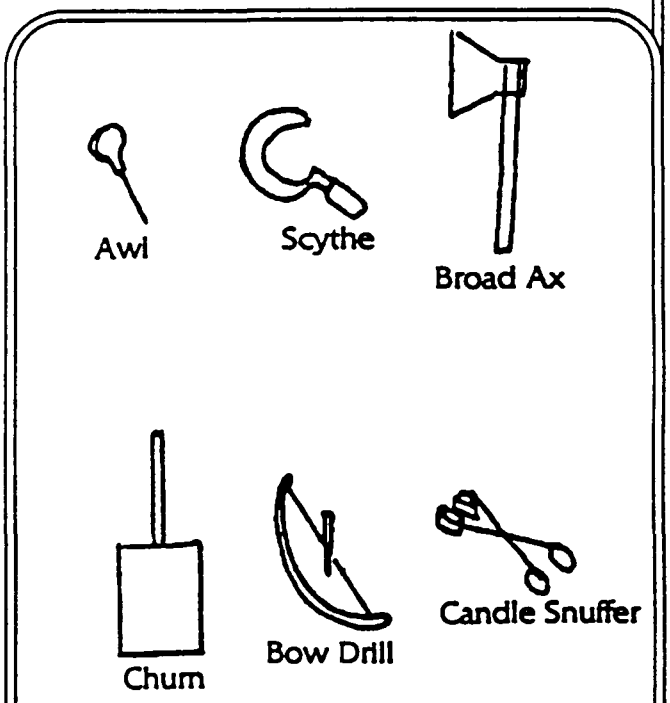
Materials/Supplies

- *Oak tag paper and cardboard*
- *Homosote, wood, craft sticks, etc.*
- *Markers and paint*
- *Glue and tape*
- *Other materials that students may need are odds and ends commonly found in the lab or at home*

Equipment/Tools

- *Claw hammers*
- *Jig saw and coping saw*
- *Abrasive paper and files*
- *Scissors and utility knives*
- *Rulers and tape measures*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Show examples of pictures of colonial tools. Lead discussion to show that as tools and technology change, occupations change.	Identify tool and in what occupation it was used.
2	Introduce research assignment.	Find facts about historical tools in library.
3	Lead class in discussion.	Share findings with classmates and choose one for study in depth.
4-7	Work with students individually to plan and develop reasonably authentic models.	Work on plan sheets. Construct models. Write a short paragraph describing uses of your tool.
8	Lead sharing of projects and information and relate change in technology to change in careers.	Show projects and share information about their uses.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Tool Carrier* **GRADE** *3 and 4*

Overview of Activity

Past and present day craftsmen place great value on their tools. As students are constructing this project they will learn to use and value tools. This carrier will be used at home to make simple repairs and perform preventative maintenance jobs.

Primary Performance Objective

- *Careers inTechnology: Past, Present and Future (2H)*

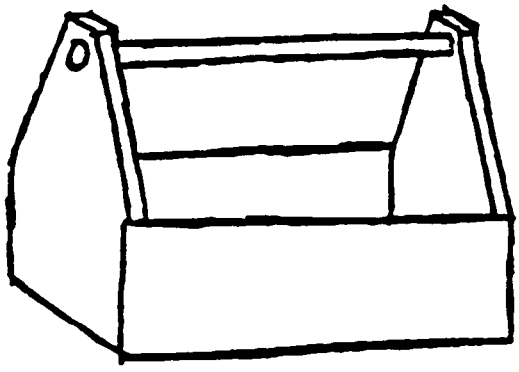
Secondary Performance Objectives

- *Decision Making: DM1* • *Resources of Technology: RT1, RT2, RT3, RT4, RT5, RT6*
- *Impacts of Technology: IT2, IT5* • *Safety: S1, S2, S3, S5, S6, S8, S9*

Resources

- *Pine or plywood, 3/4" thick*
  2 pieces 6" X 9" (ends)
  2 pieces 4" X 16" (sides)
  1 piece 6" X 14" (bottom)
- *1 piece dowel, 1" X 16" (handle)*
- *Wood screws, 1 1/4", #8*
- *Wire brads, 1 14", #16*
- *Coping saw crosscut saw, C clamp, electric hand drill, claw hammer, screwdriver, file, sandpaper, and stain brush*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Identify the need for tools.	Name examples of common tools and tell of family experiences with them.
	Describe home repair jobs which should only be done by qualified service people. Tell how to contact them. Describe some simple jobs (tightening screws on drawer handles, lubricating hinges, etc.) that can be done by young do-it-yourselfers.	Share examples of problems that may have occurred as a result of people attempting to do complicated jobs. Name appropriate tasks for young do-it-yourselfers.
	Introduce project and demonstrate designing and cutting the end pieces.	Make design for ends and cut them out.
2	Present a few more preventative maintenance type jobs and demonstrate how to accomplish them.	
	Demonstrate smoothing and drilling 1" holes in ends for handle.	Smooth all edges and drill 1" holes for the dowel handle.
	Demonstrate preparing bottom and side pieces.	Cut and smooth bottom and side pieces.
3 - 4	Demonstrate assembling project with screws and nails.	Drill pilot and shank holes for screws. Nail parts that do not need screws for strength.
5	Present more simple repair jobs that can be done at home.	
	Demonstrate finishing project with oil, stain or paint.	Apply finish to projects
6	Distribute a list of suggested tools for students to put into their tool carriers.	
	Review points presented on day one of this project.	Name jobs which should only be done by qualified service people.
	COMMENTS: Emphasize the importance of caring for tools.	

GRADES 5 AND 6
APPLYING TECHNOLOGY

3A: Applying Communication Technology

3B: Applying Production Technology

3C: Applying Transportation Technology

3D: Applying Power Technology

3E: Applying Construction Technology

3F: Applying Biologically Related Technology

3G: Applying Information Technology

3H: Applying Careers in Technology

PERFORMANCE OBJECTIVE 3A

APPLYING COMMUNICATION TECHNOLOGY

Given grade level appropriate instruction in the basic processes of communication technology, the student will demonstrate an ability to produce visual and electronic communications commensurate to his or her ability.

In order to do this, the student must be able to:

a. Explain some basic communication technology systems.

b. Identify appropriate tools and equipment.

c. Plan and produce information to be communicated.

d. Manipulate appropriate tools and equipment purposefully and safely.

CONCEPTS TO BE DEVELOPED

3A. 1 The two major areas of communication technology are graphic communication and electronic communication.

3A. 2 Basic graphic communication systems involve translating an idea or message into an image and processing it to produce a finished product (relief printing, offset printing, screen printing, photography, laser printing).

3A. 3 Basic electronic communication systems involve converting audio or visual messages into electrical impulses, frequencies or other signals and transmitting them to receivers, which make them comprehensible to other machines or people (radio, television, telephone, tape recorder, computer).

Suggested Instructional Strategies
Grades 5 and 6: Applying Communication Technology (3A)

Activities:

1. Print a school newspaper.
2. Prepare a radio or video program.
3. Print and bind student writings into books.
4. Conduct screen printing activity.
5. Investigate and work with various communication systems (e.g., smoke signals, flags, crystal radio, CB radio, telegraph, telephone, fiber optics, video).
6. Photography.

Audio/Visual:

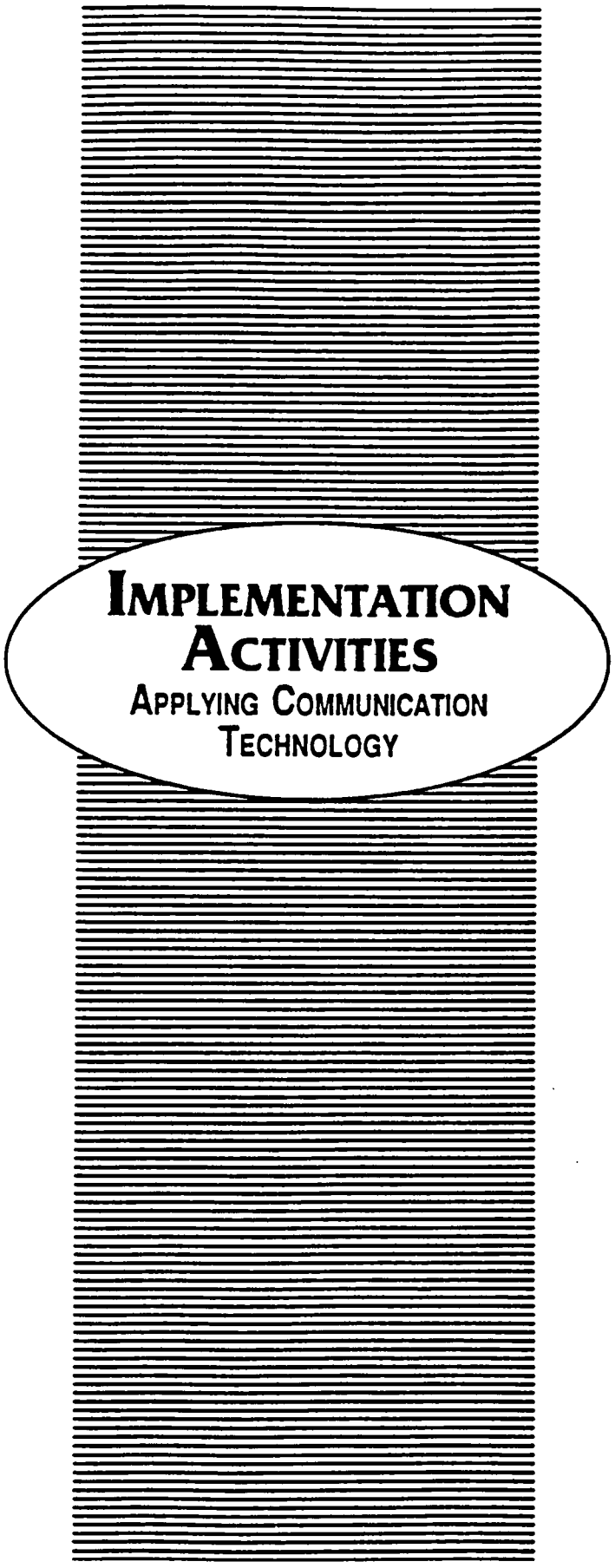
1. Create bulletin boards.
2. Put together displays of communication systems.
3. View films and video cassettes related to application and functions of communications systems.

Resource Persons:

1. Contact radio, television and phone company personnel.
2. Invite local people with expertise related to communication technology to speak to the class.

Visitations:

1. Tour a radio station, television station, phone company and newspaper publisher.


IMPLEMENTATION
ACTIVITIES
APPLYING COMMUNICATION
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Producing an Animated Video* **GRADE** *6*

Overview of Activity

Students will learn about communication technology as they organize into groups of 4 or 5 to (1) write a video script, (2) make clay characters, scenery, and titles, and (3) use a video camera recorder to produce a short animated video.

Primary Performance Objective

- *Applying Communication Technology (3A)*

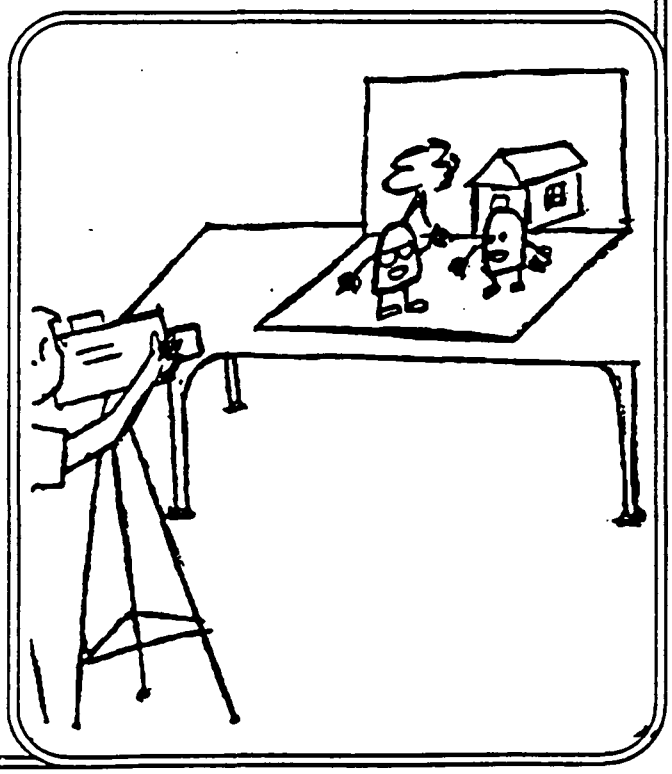
Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1*
- *Resources of Technology: RT1, RT2, RT4, RT6*
- *Impacts of Technology: IT2, IT4, IT5*
- *Safety: S1, S2*

Resources

- *Video camera recorder with tripod*
- *Television monitor and VCR (Video Cassette Recorder) unit*
- *Clay or other material to make characters*
- *Pipe cleaners for moveable arms*
- *Paper or cloth for backgrounds*
- *Computer system with graphic program similar to Print Shop*
- *Paint, markers, scissors, and glue*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Identify television production as a major system of communication technology.	Share experiences with home video production or observations of commercial video production.
	Describe the basic steps in video production: identify a message to communicate, write and develop a script, produce staging, select talent, rehearse, record and edit.	
	Organize students into groups of 4 or 5 and begin planning.	Form into groups and begin work on the message and a script.
2	Review steps from day 1. Help students develop scripts and determine needs.	Complete scripts and list staging and talent needs.
3 - 5	Provide individual instruction, assistance and materials needed by students.	Bring props from home or make props and staging.
6	Demonstrate operation of video camera and recording techniques.	Select a person to be the camera operator. That person must become familiar with the camera.
7 - 12	Schedule recording sessions and work with one group at a time.	Film titles, credits and talent in action. Produce an audio sound track and dub (or add) it to the video.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Publishing a Newspaper* **GRADE** *5 and 6*

Overview of Activity

Students will form a newspaper publishing group consisting of reporters, feature writers, advertising people, editors, graphic specialists, typists, duplicators and distribution people. They will use a computer program such as Newsroom, to generate the paper.

This will give students the opportunity to apply skills being taught in the classroom language program, and provide them with additional motivation.

Primary Performance Objective

- *Applying Communication Technology (3A)*

Secondary Performance Objectives

- *Problem Solving: PS1*
- *Decision Making: DM1*
- *Resources of Technology: RT4, RT6*
- *Impacts of Technology: IT1, IT4, IT5*

Resources

- *Computer systems with printers*
- *Publishing software such as Newsroom*
- *Clipboards and paper*
- *Light table*
- *Drawing markers*
- *Dictionaries*
- *Clip art*
- *Rubber cement*
- *Scissors*

References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Present the newspaper as a communication system and compare it to other communication systems. Describe personnel needed to publish a newspaper. Organize the students.	Name many communication systems (including electronic systems) and describe them generally. Work in groups to determine what each will do to contribute to the publication.
2-10	Demonstrate using the computer program for all to see. Provide instruction sheets for students who will be working on the computers. Have the classroom teacher work with students to prepare text and graphics as needed.	Gain a basic understanding of the computer capabilities and limitations. Typists and graphics people will begin to work on the computers. Reporters: gather information. Editors: proofread and make corrections. Feature writers: write articles. Advertising: solicit and compose ads using traditional methods and/or computer generated text and graphics.

Plan to have several feature writers who can write about topics of interest to them personally.

Students who are highly motivated during this activity will generate articles faster than they can be keyed into the computer system. Computer operators should have special instruction in 'touch typing' and access to the computers at times other than when the total group is working on the project. At some point, students will undoubtedly appreciate help from an adult typist.

PERFORMANCE OBJECTIVE 3B

APPLYING PRODUCTION TECHNOLOGY

Given grade level appropriate instruction in basic tools and processes employed in production technology, the student will demonstrate an ability to utilize them in the production of appropriate projects.

In order to do this, the student must be able to:

a. Identify tools, machines and equipment.

b. State the designed function of tools and machines.

c. Manipulate tools, machines and equipment effectively and safely.

d. Produce a product.

e. Evaluate various production methods and systems in terms of desired outputs.

CONCEPTS TO BE DEVELOPED

3B. 1 Tools are used by people to accomplish tasks they are unable to perform with their own hands and to make work easier.

3B. 2 Many machines have moving parts working together to make work easier and faster.

3B. 3 The individually handcrafted production method usually results in quality, custom made projects.

3B. 4 The team production method places several people with different skills together to produce a product. It combines human resources and provides faster results.

3B. 5 The assembly line production method evolved from the need to produce items in greater quantity, more quickly and with less expense. People and machines perform specific tasks as the product moves through the system.

Suggested Instructional Strategies
Grades 5 and 6: Applying Production Technology (3B)

Activities:

1. Utilizing the basic production materials (wood, metal, plastic, and ceramics), produce a product employing many hand and simple power tools. Products may include gifts, personal interest items or items related to and/or reinforcing academic learning in traditional classroom subjects, especially math and science. This can be done through individual or group production.
2. Investigate and study various production devices and strategies.
3. Manufacture a simple robot.
4. Use a computer to control a robotic device.

Audio/Visual:

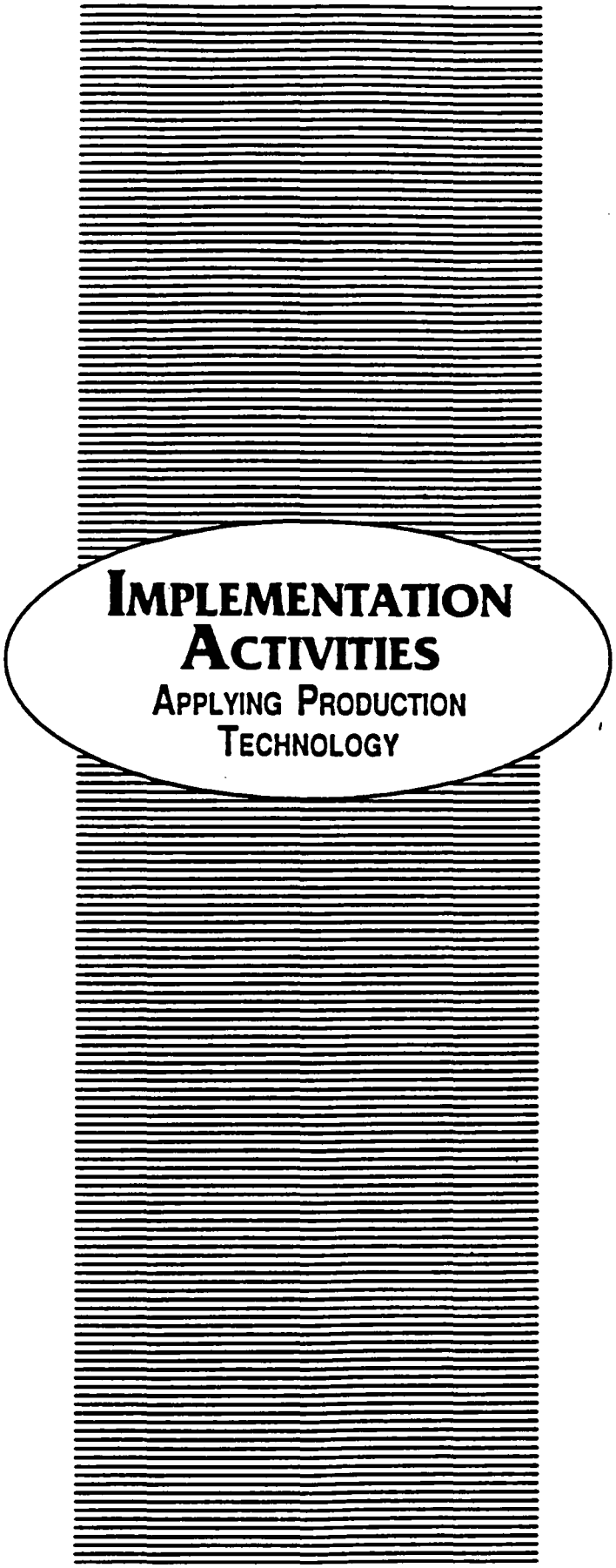
1. View films and video cassettes, related to various production technologies.

Resource Persons:

1. Invite members of the community involved with the various production areas to speak to the class.

Visitations:

1. Visit local production facilities, for example, a furniture shop.


IMPLEMENTATION ACTIVITIES
APPLYING PRODUCTION TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Stand Up Creature* **GRADE** *5 and 6*

Overview of Activity

While involved in this activity students will learn about problem solving as it occurs in a production situation. They will be challenged to design and build a "creature" which must stand by itself, held together only by notched interlocking pieces.

Primary Performance Objective

- *Applying Production Technology (3B)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT1, RT2, RT5, RT6*
- *Impacts of Technology: IT5* • *Safety: S1, S3, S4, S5*

Resources

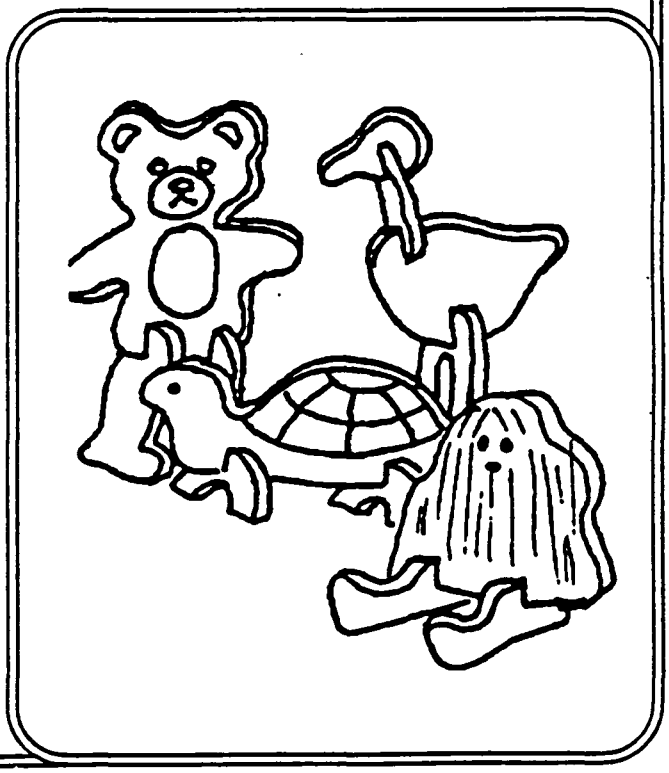
Materials/Supplies

- *Pine or plywood, 5/8" or 3/4"*
- *Latex paint*
- *Spray polyurethane*

Machines/Tools

- *Pencils*
- *Jig saws*
- *Files and sandpaper*
- *Paint brushes*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Describe how new products are developed for industry. Introduce project: Outline criteria for project development (a stand up project with at least two parts which must hold together with interlocking notches only).	Name possible new products which may now be in the process of design and development.
2	Demonstrate making sketches and a cardboard model to be used as a template.	Translate ideas into sketches, then make a full size standing model of corrugated cardboard.
3-5	Demonstrate tracing basic parts onto wood, and sawing.	Trace parts onto wood and saw them out.
6 - 7	Demonstrate techniques of designing notches to hold parts together.	Make notches in parts and refine them so they will fit snugly.
8-10	Demonstrate smoothing and painting. Review the role of this kind of design and development in industrial production.	Paint base colors and add details and decorations.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Sandblasting mirrors or glass pieces and constructing wooden bases* **GRADE** *5*

Overview of Activity

The students will design a sandblasting project and complete it.

Each day the students work on this project, they will discuss its relationship to technology and the role of technology in society. They will also gain exposure to such manufacturing devices and materials as sandblasting and woodworking.

Primary Performance Objective

- *Applying Production Technology (3B)*

Secondary Performance Objectives

- *Decision Making: DM1* • *Impacts of Technology: IT4* • *Resources of Technology: RT4*
- *Safety: S7*

Resources

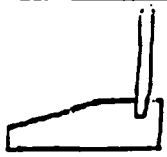
Materials/Supplies

- *Various shapes of mirror glass approximately 5" X 8"*
- *Masking tape*
- *5" X 7" index cards*
- *Rubber cement*
- *Exacto knives*
- *3/4" wood stock cut into 2' X 2" lengths*
- *Stain*
- *Sandpaper*
- *Cloths for staining*
- *Newspaper and paper towels*
- *Sand*

Equipment/Tools

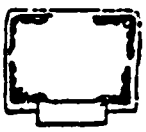
- *Glasscutters (for teacher's use)*
- *Sandblaster, compressor*
- *Table saw (for teacher's use)*
- *Miter boxes*
- *C clamps and handscrews*

References

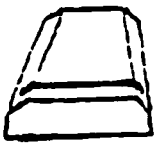


Side View

Front View
GLASS



Front View
MIRROR



Top View of
WOODEN BASE

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Talk about technology–what it is, who uses it, etc.	Make a list of what you think technology is and who uses it.
	Introduce sandblasting by relating to science class • three ways of rock formation • erosion of rocks to sand • sand relation to glass • use of sand as tool	Read about rock formation and erosion.
	Talk about procedures for project • samples • woodworking • developing a design	Develop a design for a project.
2	Introduce the wood base • stress safety when using saws • demonstrate how to cut wood, sand and stain	Develop list of safety rules that you feel are important. Saw base, then sand and stain it.
3	Demonstrate techniques in masking.	Continue developing design. Add to safety list rules concerning use of an exacto knife. Work on taping or gluing card to glass or mirror, then start cutting designs.
4	Review safety rules and masking techniques.	Continue working on cutting design.
5	Discuss use of safety glasses and other safety rules.	Add new safety rules to list.
	Demonstrate use of sandblaster and removal of tape or index cards.	Sandblast. Remove tape or index cards and put glass/mirror in base to display.

PERFORMANCE OBJECTIVE 3C

APPLYING TRANSPORTATION TECHNOLOGY

Given grade level appropriate instruction in the basic components utilized in land, water, air and space transportation, the student will demonstrate an ability to apply simplified versions of these systems in practical situations.

In order to do this, the student must be able to:

a. Describe the functions of such things as wheels, sails, and airfoils.

b. Construct simple working models or devices utilizing systems identified.

c. Perform very simple preventative maintenance and/or make very simple repairs to personal items such as bicycles and models.

CONCEPTS TO BE DEVELOPED

3C. 1 In developing transportation technology people need to overcome and control forces of nature (centrifugal force, friction and gravity).

3C. 2 All transportation vehicles have a power source, a system for the transfer of power controls and pathways to travel along.

3C. 3 Transportation systems require maintenance for proper operation.

Suggested Instructional Strategies
Grades 5 and 6: Applying Transportation Technology (3C)

Activities:

1. Develop and implement an activity utilizing CO_2 or rubberband powered land vehicles. Investigate and address such aspects as design, aerodynamics and friction.
2. Develop and implement activities related to space travel. Construct working model rockets, investigating and studying the various aspects of this area.
3. Develop and implement activities related to other areas of transportation (e.g.,water, land). Construct working or non-working models, investigating and studying various aspects of the area.
4. Have students bring in bicycles for repair and routine maintenance.
5. Design a vehicle utilizing at least two forms of movement systems.
6. Investigate a transportation system (e.g., air, land, water) and the methods people use to control its operation.

Audio/Visual:

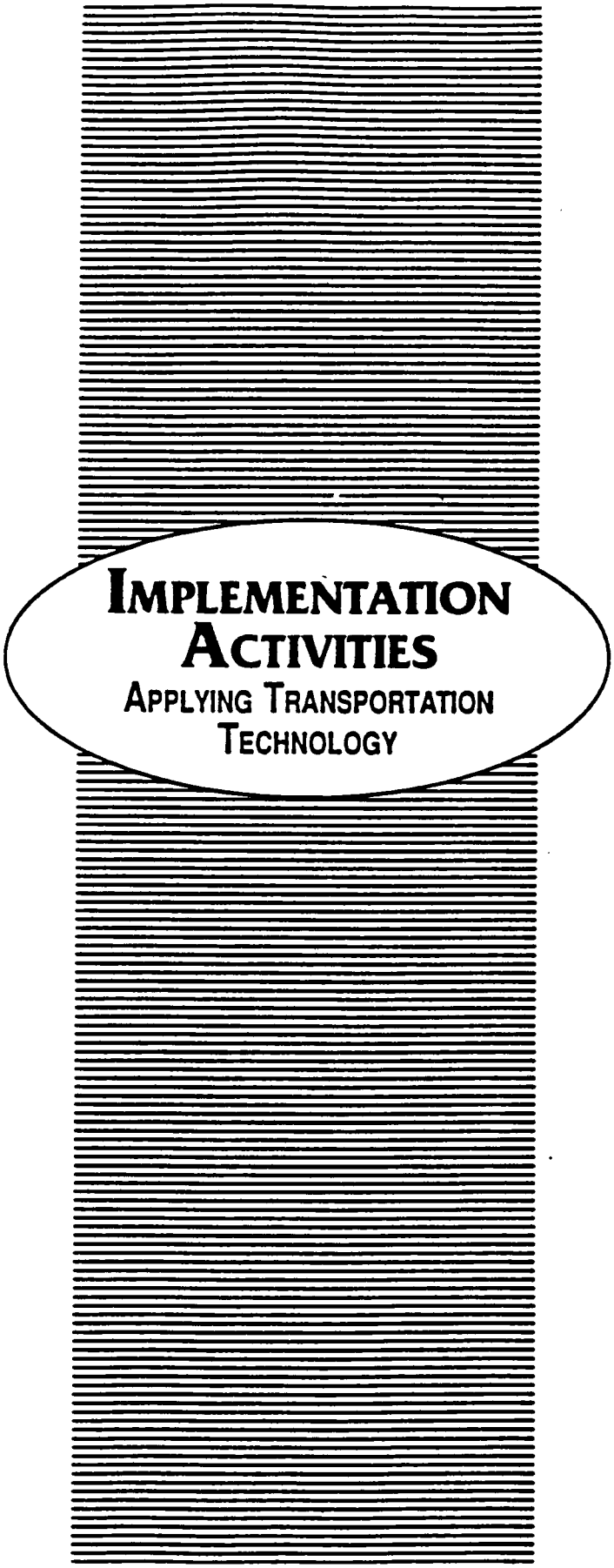
1. Obtain films, filmstrips, or video cassettes depicting various aspects and applications of transportation systems and technologies.

Resource Persons:

1. Invite members of the community involved with various aspects of transportation technology into the classroom to discuss their professions.

Visitations:

1. If available locally, plan a field trip to an industry related to transportation technology (e.g., land, air, water, space).


IMPLEMENTATION
ACTIVITIES
APPLYING TRANSPORTATION
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Re-inventing the Wheel: Creative or Historic Models* **GRADE** *5 and 6*

Overview of Activity

Students, working in teams of two, will be given a set of wheels and challenged to construct a unique land transportation vehicle. They will plan their own projects and construct them using materials from the school or things brought from home.

This can be adapted to correlate with a current Social Studies unit by restricting the vehicles to reasonably authentic models of transportation used during a prescribed period of history or a geographic location.

Primary Performance Objective

- *Applying Transportation Technology (3C)*

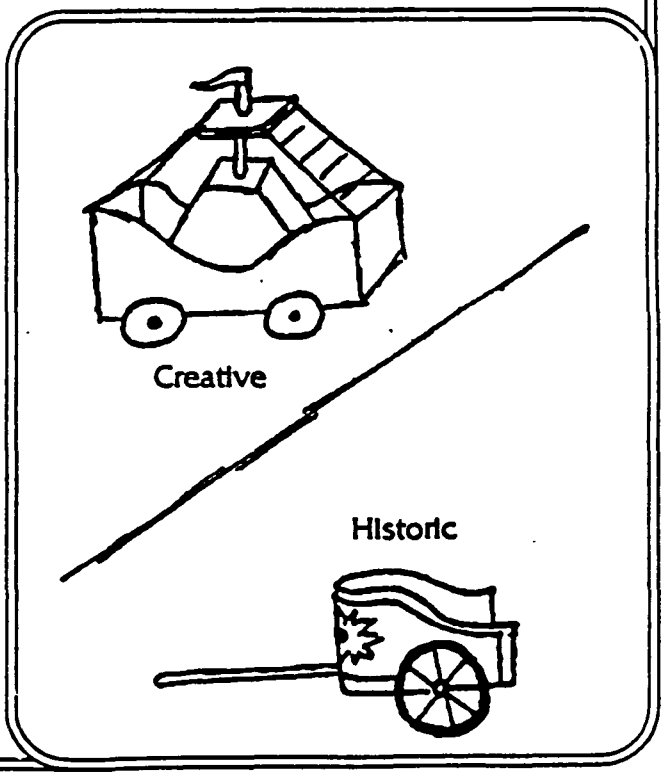
Secondary Performance Objectives

Problem Solving: PS1 • Decision Making: DM1 • Resources of Technology: RT2, RT5, RT6 • Impacts of Technology: IT1, IT4, IT5 • Safety: S1, S2, S4, S5, S7

Resources

- *Wheels cut from wood or purchased commercially*
- *A variety of sticks, rods, straws and other things which can be used to make axels*
- *Scraps of wood, cardboard, cloth, styrofoam, thin metal, thick and thin plastic, string, wire, etc., for bodies of vehicles*
- *Boxes of many sizes and shapes*
- *Miscellaneous tools for cutting, drilling and shaping materials*
- *Glues, tapes, nails, latex paint*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss discovery and early applications of the wheel. Demonstrate basic wheel and axle theory.	Name examples of land transportation from earliest times.
	Describe purpose of this activity (creativity or historic application) and challenge students to work creatively, cooperatively and with a reasonable degree of craftsmanship.	Demonstrate understanding of the purpose of the activity and brainstorm ideas relative to overall design features and adaption of materials to achieve desired results.
	Describe materials available from the school and initiate discussion of other useful materials and things from home or the community.	Name possible uses for materials and suggest household scraps or objects which could be utilized.
	Provide planning materials and work areas.	Divide into teams and make sketches of your ideas.
2-7	Provide materials, tools, encouragement and individual instruction as needed.	Assemble basic wheel and axles and construct vehicles around them.
8	Provide forum for students to show their projects and demonstrate them.	Demonstrate and explain your projects.
	Initiate discussion of possible future applications of wheels and/or technologies that may make the wheel obsolete.	Relate things you have learned from science programs or lessons about wheels. Brainstorm about things such as anti-gravity technology.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Genius Kit Vehicles* **GRADE** *5 and 6*

Overview of Activity

Given instruction in the elements of vehicle design (aerodynamics, drag and friction) and the proper and safe use of simple hand tools and equipment, the students will construct an air powered vehicle using the items included in the teacher prepared Genius Kit.

Primary Performance Objective

- *Applying Transportation Technology (3C)*
- *Applying Power Technology (3D)*

Secondary Performance Objectives

Problem Solving: PS1 • Resources of Technology: RT1 • Safety: S3

Resources

GENIUS KIT

- *1 soda straw, 2 paper clips*
- *18" of string, 8" of wire, 12" of masking tape*
- *2 popsicle sticks, 2 balloons, 2 rubber bands*
- *1 sheet of heavy paper (5" X 8")*
- *1 piece of foamcore board (4"X 6")*
- *Sandpaper and the kit envelope*

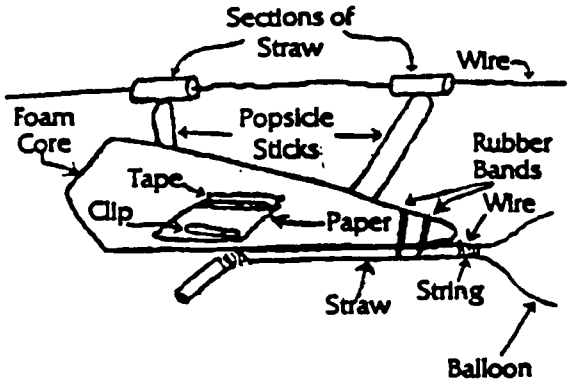
Equipment and Tools

- *Hot glue gun*
- *Scissors*
- *Coping saws*
- *Hand drill and assorted bits*
- *Scratch awls*
- *Digital scale*
- *Tape measure*

Teaching Aids

- *Wind tunnel and 2 sample cars*
- *Display board (kit parts)*
- *Certificates*

References



All joints glued with hot glue gun

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1-2	Introduce activity with a demonstration of the wind tunnel.	Listen attentively and observe results of wind tunnel demonstration.
	Discuss elements of aerodynamics including friction and drag.	Respond to lesson.
	Discuss types of power and transportation sources.	Participate in discussion and ask questions.
	Explain power sources and the action/reaction principle.	Ask questions.
	Introduce and explain the contents of the Genius Kit including tools and equipment.	Participate in discussion and ask questions.
		Review the handout.
		Work on sketches.
	Discuss the three basic steps of problem solving.	Name basic problem solving steps.
	Discuss safety in general and in relation to the tools and equipment the students will be using.	
	Review assignment (sketches for vehicle design).	Ask questions and make comments.
3-4	Review all objectives–check students sketches and help them as required.	Construct vehicles, following your design sketches.
5	Connect wire for racing vehicles,weigh vehicles and administer the competition. Record distances and present certificates.	Race your vehicles and discuss the outcome.

COMMENTS: Monofillment fishing line can be substituted for the wire. It works as well and is less expensive. Balloons in the range of 12" - 14" in diameter are appropriate for this activity.

The Genius Challenge

Name_____

DO YOU LIKE TO HAVE FUN?
DO YOU LIKE TO INVENT THINGS?

Then this is the place for you!

We have a challenge for you. All you have to do is think about the elements of vehicle design we talked about in class -- aerodynamics, drag, and friction -- and use the materials we will provide to build your own air powered vehicle. Follow the directions below.

1. Everyone must build their own air powered vehicle.
2. Use all of the materials in your genius envelope.
3. Shape at least one edge of the foamcore board using tools we will provide.

Problem Solving

There are three steps we need to consider when we want to solve a problem or meet a challenge.

1. **Identify** the problem. In other words understand what it is you need to do. (Design and build an air powered vehicle.)
2. **Brainstorm** ideas. (Come up with as many different ideas for an air powered vehicle as you can.)
3. **Select** your best idea (design). Be prepared to begin construction during the next class meeting.

Think about this list of materials to be used as you brainstorm vehicle ideas.

- Soda straw
- 2 paper clips
- 18" string
- 8" wire
- 12" tape
- Kit envelope
- 2 Popsicle sticks
- 2 balloons–different shapes
- 2 rubber bands
- 1 sheet heavy paper
- 1 piece foamcore board
- Sandpaper for finishing

Air Powered Vehicle Assignment

Due Thursday

Name_____

Directions: Brainstorm and sketch at least 5 ideas for an air powered vehicle. When you choose the design to build also decide on a name for your vehicle.

Vehicle Name _____

Certificate of Merit

Awarded to

_____

Weight _____ Distance _____

PERFORMANCE OBJECTIVE 3D

APPLYING POWER TECHNOLOGY

Given grade level appropriate instruction in the basic devices used to convert energy to power, the student will demonstrate an ability to apply this information in a real or simulated situation.

In order to do this, the student must be able to:

a. Identify energy sources.

b. Identify basic methods of converting energy to power.

c. Convert energy from wind, water, heat, light, chemicals, etc., into power.

d. Construct a device for harnessing some form of energy (e.g., wind, water, heat, light, chemical).

CONCEPTS TO BE DEVELOPED

3D. 1 Energy sources include muscles, wind, water, the sun, geothermal action, the tides, gravity, fossil fuels, magnetism, electricity and nuclear sources.

3D. 2 The two basic forms of energy are "potential" (stored) and "kinetic" (in motion).

3D. 3 Power is measured by the amount of work done in a certain amount of time. The unit of measurement is termed "horsepower."

3D. 4 Basic methods of converting energy to power include mechanical, chemical and electrical.

3D. 5 All systems for producing power involve harnessing energy and converting it into a useful output.

Suggested Instructional Strategies
Grades 5 and 6: Applying Power Technology (3D)

Activities:

1. Construct a hot air balloon from a plastic bag.
2. Produce a solar hot dog cooker.
3. Construct a model of a hydroelectric plant.
4. Produce animated lawn ornaments that spin and turn with the wind.
5. Construct kites and wind chimes.
6. Produce a simple solar heated greenhouse of plastic bags attached to a framework.
7. Construct a display related to various forms of power technology (e.g., internal and external combustion engines, solar, nuclear).
8. Investigate a power system (e.g., solar, geothermal, nuclear) and the methods people use to control its safe operation.

Audio/Visual:

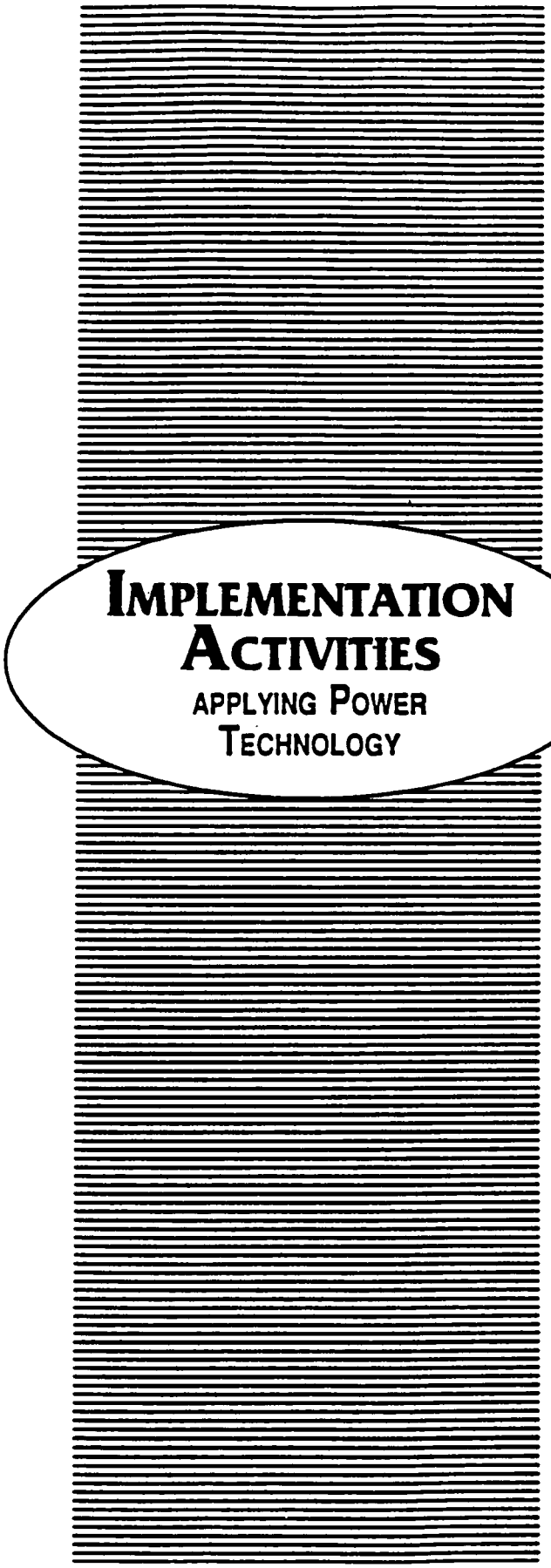
1. Obtain films, filmstrips and video cassettes depicting various aspects and applications of power and energy technology.

Resource Persons:

1. Invite members of the community involved with power and energy technology into the classroom to discuss their professions.

Visitations:

1. Plan and conduct field trips to industries related to power and energy technology, for example, nuclear, hydro, and fossil.


IMPLEMENTATION
ACTIVITIES
APPLYING POWER
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct Homemade Kites* **GRADE** *5*

Overview of Activity

The students will use the library to research kite history and learn to identify various kinds of kites. They will design a particular style of kite, construct it , decorate it and fly it in a contest. The students will also complete a research booklet.

Primary Performance Objective

•Applying Power Technology (3D)

Secondary Performance Objectives

• Resources of Technology: RT4 • Problem Solving: PS1 • Decision Making: DM1

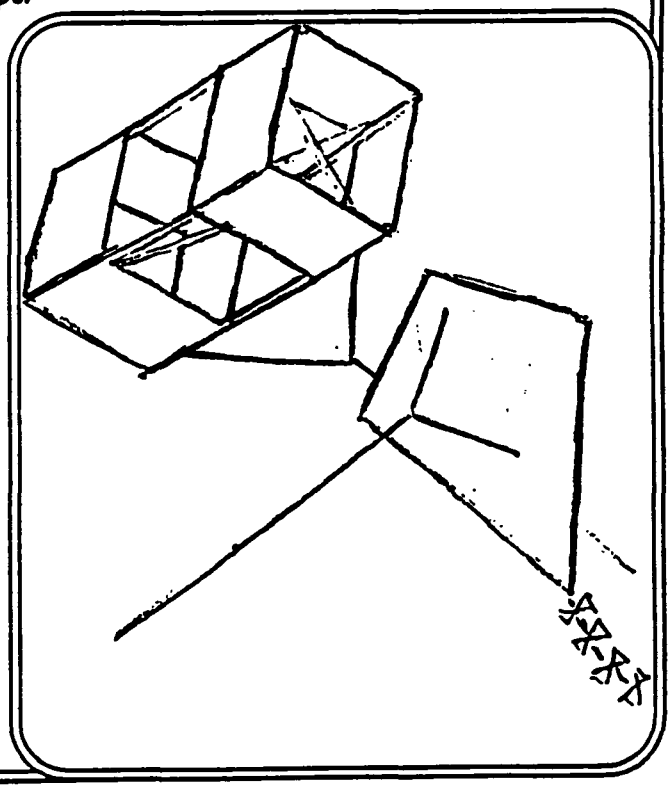
Resources

Materials

- *1/8" dowels*
- *1/4" X 1/8" strips of bass wood*
- *Balls of string*
- *Tissue paper (tails)*
- *Glue or paper paste*
- *Assorted rolls of colored bulletin board paper*

Tools

- *Coping saws*
- *Yard stick*
- *Scissors*



References

- *"Kites," by Larry Kettel Kamp*
  World Book Encyclopedia

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce kite unit. Distribute a working research document.	Research questions on a worksheet dealing with... • Kite history. • Kinds of kites. • Kite terms.
2	Group discussion: Tie the research together and share findings. Help the students make working plans.	Develop a working plan of a particular style.
3-6	Provide materials for kite construction. Assist in the construction phase	Construct a kite from your plan sheet. Paint and decorate kite. Build a kite line holder.
7	Go over safety in kite flying. Lead the class in kite flying.	Fly the kite.
	COMMENTS: Make kite flying a contest. Award prizes for the first one in flight, the longest flight time, and the best looking kite.	

Worksheet

Name_____

Kite History

Date	Event

Kinds of Kites

Type	Description	Diagram

Vocabulary

My Kite Plan Sheet

Materials

PICTURE

Steps

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct a circuit board to hook up parallel and series circuits* **GRADE** *5*

Overview of Activity

Students will learn about electricity as a source of power and how it is put to use with circuits.

This activity will correlate well with the sixth grade science curriculum.

Primary Performance Objective

- *Applying Power Technology (3D)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT2, RT6*
- *Impacts of Technology: IT2, IT4* • *Safety: S3, S7*

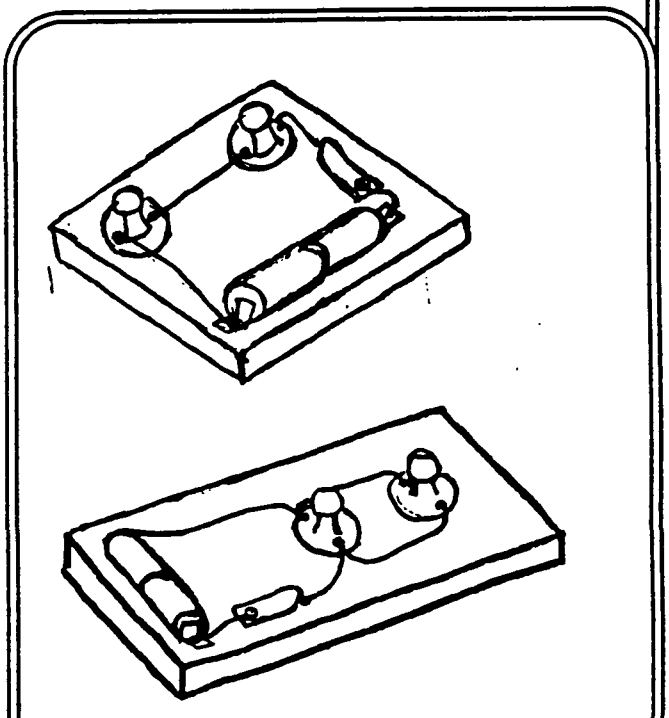
Resources

Materials/Supplies

- *Wood, sheet metal, screws, batteries, alligator clips, bell wire, flashlight bulbs, sockets and switches.*

Equipment/Tools

- *Crosscut saws, screwdrivers, punch awls, files, abrasive paper, tinsnips and needlenose pliers.*



References

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Discuss sources of power. Introduce electricity as a form of power and 'circuitry' as the method of putting electricity to work (series and parallel).	Name sources of power. Draw schematics of series and parallel circuits.
2	Demonstrate preparing a wood base.	Cut, smooth and finish wood bases.
3-5	Demonstrate assembly of component parts to make circuits. Assist students as needed.	Prepare wires, mount components and connect series and parallel circuits.
6	Review power technology concepts.	Answer questions.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Producing energy from raw materials and nature* **GRADE** *5 and 6*

Overview of Activity

This activity will demonstrate that living plants and animals have potential energy which can be converted into other forms of energy. Students will learn how many common items contain and store potential energy. They will construct a potato powered battery, power a small electrical device with it and be able to explain how the potato battery works.

Primary Performance Objective

- *Applying Power Technology (3D)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT4, RT6* • *Safety: S5*

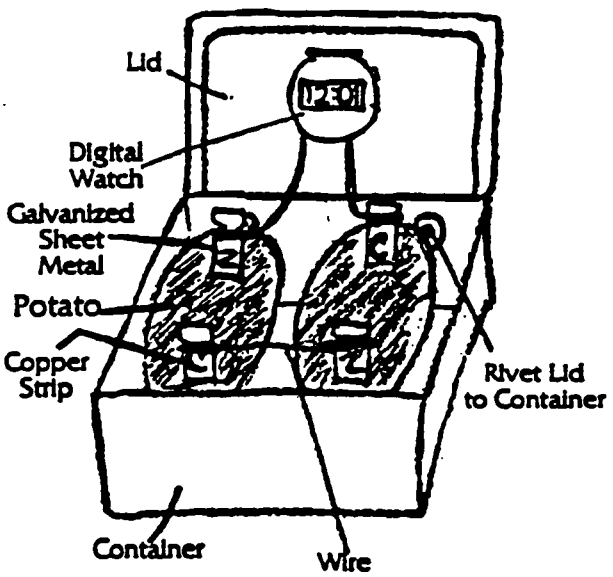
Resources

Materials

- *2 potatoes, medium size*
- *1 pint size plastic container with lid*
- *2 strips copper approx. 1 1/2" X 1/2"*
- *2 strips galvanized sheet metal (zinc coated) approx. 1 1/2" X 1/2"*
- *1 length 20-22 gauge wire 4 inches long*
- *1 digital watch with wire leads attached*
- *2 rivets with shortest grip range possible*

Equipment

- *Drill press* • *1/16" drill bit* • *1 exacto knife* • *1 pop rivet gun* • *1 soldering iron* • *Electric solder* • *Wire strippers*



References

- *Energy and Safety - Science Activities for Elementary Students, Level 3, grades 5 and 6. Energy Education Project S.U.N.Y. at Albany, Albany, N. Y. 12222*

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce the topic of energy to students. Show filmstrips on energy. Show basic examples of forms of energy. Ask students to bring in 2 potatoes for next class.	Listen for information. Watch filmstrips. Ask and answer questions.
2	Review last class meeting. Introduce this potato battery as an alternate form and source of energy. Explain the principles involved. Explain series/parallel circuits. Discuss safety. Demonstrate construction of potato batteries.	Listen for information. Construct the potato battery by following the diagram on the front of this activity plan and connecting it to a watch.
3	Supervise students and assist them in construction.	Finish construction of battery and watch. Experiment with other devices hooked to potato battery. Answer questions.

COMMENTS: This activity will result in the students having constructed a unique project. The activity can be run in 2 to 3 days, depending on the length of the class and how fast the students work.

Name _____

Energy

How many of the following words can you fine? Can you discover any other 'Energy Words' in the puzzle that are not on the list?

1. NINE MILE POWER
2. NIAGARA MOHAWK
3. NUCLEAR
4. ROTOR
5. WOOD
6. NATURAL GAS
7. SOLAR
8. WATER
9. DARK
10. HOME
11. ELECTRICAL
12. VOLTS
13. FOSSIL
14. BOIL
15. TURBINE
16. FIRE
17. DAM
18. LEMON
19. ROAD
20. REACTOR
21. HYDRO
22. WIND
23. NEW
24. FUEL
25. BATTERY

N E W F I R E N I B R U T
I I E R E S N E D N O C O
N B A T T E R Y S M D B N
E S A G L A R U T A N O O
M O W E A N N U L E I I M
I L Y O E R I M I T W L E
L A G M O W A F O S S I L
E R R O A D S M V O L T S
P E E R E A C T O R E A L
O M N I L O R D Y H E A D
W O E L E C T R I C A L A
E H X R O T O R E T A W R
R E A L C U N Y L E U F K

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct a working model of a solar powered car* **GRADE** *6*

Overview of Activity

This activity will introduce the students to the idea and possibility of using solar energy to power vehicles. Using a photovoltaic cell and an electric motor provided by the teacher, the students will attach this assembly to a wooden block type vehicle. Axles and wheels will also be provided.

Primary Performance Objective

- *Applying Power Technology (3D)*

Secondary Performance Objectives

- *Applying Transportation Technology: 3C* • *Resources of Technology: RT1*
- *Problem Solving: PS1* • *Safety: S3*

Resources

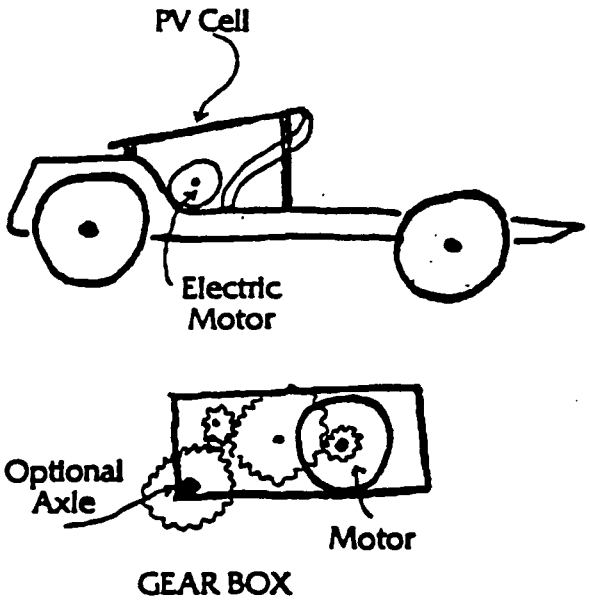
Materials/Supplies

- *Photovoltaic cells*
- *Electric motors with reduction gears*
- *Wood for body of vehicles*
- *Wood for wheels*
- *1/4" dowel for axles*
- *glue*
- *Small wood screws to attach motors to wood body*

Equipment/Tools

- *Coping saws*
- *Block planes*
- *Scratch awls*
- *Hand drill and assorted bits*
- *Sandpaper*
- *Voltmeter*
- *Drill press with hole cutting saw*

References



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity and discuss alternative power sources and solar energy.	Listen, answer and ask questions.
	Demonstrate the potential of a photovoltaic cell. Explain what a voltmeter can do.	Observe demonstration and measure the output of a PV cell using a voltmeter.
	Discuss materials to be used, basic design ideas and safety with tools.	Participate in discussion, ask questions and provide answers.
	Discuss problem solving, for example, weight versus power in transportation vehicles.	Participate in discussion, ask questions and provide answers.
2 - 3	Review all objectives and safety with tools.	Ask questions.
	Begin construction period. Help students as required and cut wood for wheels.	Shape and sand wood for cars. Attach PV cell and motor. Drill holes for axles. Attach wheels.
4	Supervise students as they demonstrate their cars actually working.	Test each car (PV cell) for proper output. Operate cars inside or outdoors. Discuss results and any problems. Hold session of questions, answers and comments.

COMMENTS: Photovoltaic cells and small electric motors are available from a number of sources at a reasonable cost. Among them is the Solar Components Corporation of Manchester, N.H.

The electric motor comes housed in a bracket with reduction gears attached to shafts that can be used as the rear axle.

PERFORMANCE OBJECTIVE 3E

APPLYING CONSTRUCTION TECHNOLOGY

Given grade level appropriate instruction on basic tools and processes of construction technology, the student will demonstrate an ability to apply selected techniques and tools in real or contrived situations.

In order to do this, the student must be able to:

a. Identify construction tools and machines.

b. Identify construction processes and materials.

c. Manipulate appropriate tools and materials purposefully and safely.

d. Produce appropriate projects.

CONCEPTS TO BE DEVELOPED

3E. 1 Tools and materials as simple as hammers and saws, and as complex as specialized cranes and bulldozers, are designed to aid in specific construction processes.

3E. 2 Technological processes and materials are chosen to meet the requirements of construction. Some components can be prefabricated and delivered while others must be constructed on site.

Suggested Instructional Strategies
Grades 5 and 6: Applying Construction Technology (3E)

Activities:

1. Investigate samples of construction materials and discuss tools and procedures used in working with them.
2. Implement activities which use hammers, saws, and other tools and equipment used in construction.
3. Produce items from the various construction materials (e.g., plywood, bricks, dimensional lumber) and discuss construction applications of these materials.
4. Use simplified, but actual, construction methods to make puppet theaters, flats and scenery for plays, child-size stores, bank windows, etc.

Audio/Visual:

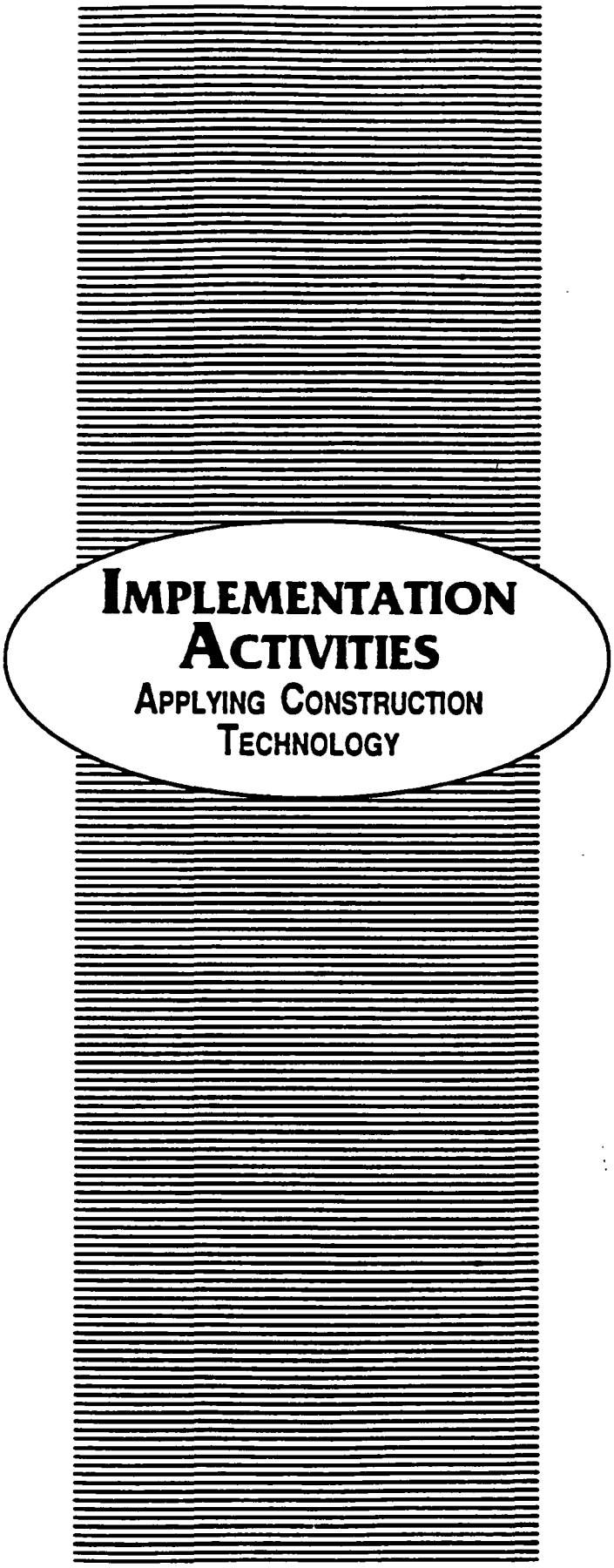
1. Obtain films, film strips or video cassettes depicting various aspects and applications of construction technology.
2. Develop displays and bulletin boards related to various construction techniques and applications.

Resource Persons:

1. Invite members of the community involved with various aspects of construction technology into the classroom to discuss their professions.

Visitations:

1. Plan and conduct field trips to local construction sites.


IMPLEMENTATION
ACTIVITIES
APPLYING CONSTRUCTION
TECHNOLOGY

IMPLEMENTATION ACTIVITY

ACTIVITY *Construct a model of a famous site or monument of a foreign country* **GRADE** *6*

Overview of Activity

Sixth grade students study many foreign regions of the world, including South America, Western Europe and the Middle East. This project involves constructing models of famous sites or monuments.

Primary Performance Objective

- *Applying Construction Technology (3E)*

Secondary Performance Objectives

- *Decision Making: DM1* • *Impacts of Technology: IT1*
- *Resources of Technology RT3, RT5* • *Safety: S3, S7*

Resources

Materials/Supplies

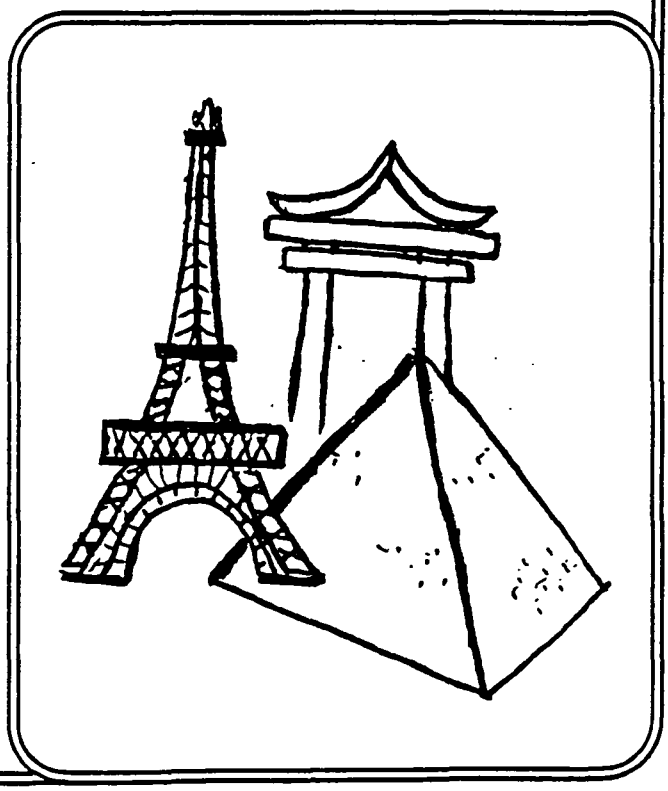
- *Cardboard, homosote, dowel rods, glue, paint, wood. Other materials students will need can be found commonly at home or in the lab.*

Equipment/Tools

- *Coping saw, scissors, jigsaw, clamps, utility knives, hammers, nails, abrasive paper, etc.*

References

Encyclopedias and books specifically pertaining to the country being studied.



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce activity. Design a worksheet to help students choose a site or monument. Supervise work in library.	Choose a country to study. Complete worksheet in the library.
2	Help students choose a project and select the best approach to its construction.	Choose project related to the country of your choice. Decide on how to build it. Prepare a plan sheet.
3-6	Work with students and give demonstrations and individual help as needed.	Work on projects.
7	Assign the writing of a short paragraph explaining their project.	Complete writing assignment. Share writing assignment and project with the class. Set up display in the school.

COMMENTS: This implementation activity can be applied to all geographic regions that the students study.

Design a worksheet for library research. Include information about the country's capital, major cities, waterways, topography, neighbors, natural resources, industry and places to visit.

PERFORMANCE OBJECTIVE 3F

APPLYING BIOLOGICALLY RELATED TECHNOLOGY

Given grade level appropriate instruction in biologically related processes, the student will demonstrate the ability to utilize the processes in the execution of activities.

In order to do this, the student must be able to:

a. Produce a biologically related system to support or improve life.

b. Identify some specialized tools and equipment used in a specific biologically related process.

c. Write an essay on the pros and cons of biologically related technologies and their possible effects upon life in the future.

CONCEPTS TO BE DEVELOPED

3F. 1 Biologically related technological systems are developed to improve the quality of human, animal and plant life (e.g., artificial limbs, organ transplants, cross breeding, controlled growing environments, cloning, eliminating disease).

3F. 2 People working with biologically related technology utilize a variety of specialized tools and equipment (e.g., microwave ovens, pressure cookers, plows, milking machines, test tubes, microscopes, stethoscopes, CAT scanners, pace makers, artificial organs).

3F. 3 Although there are many advantages which result from the use of biologically related technologies, there are also disadvantages to consider (e.g., cost, social impacts, moral implications).

Suggested Instructional Strategies
Grades 5 and 6: Applying Biologically Related Technology (3F)

Activities:

1. Investigate and construct various types of hydroponic gardens.
2. Develop a device in which live organisms convert materials and produce by-products (e.g., cheese production, fermentation).
3. Research, construct, and operate an ant colony, studying and exploring the various biologically related applications.
4. As a class project, develop bulletin boards and displays related to biologically related technologies (e.g., bioprocessing, medical technology, genetic engineering).

Audio/Visual:

1. Obtain films or video cassettes depicting various aspects and applications of biologically related technologies.
2. Develop displays and bulletin boards concerning biologically related technologies.

Resource Persons:

1. Invite members of the community involved with the various aspects of biologically related technologies (veterinarian, doctor, nurse) into the classroom to discuss their professions.

Visitations:

1. Plan and conduct field trips to local enterprises involved with biologically related technologies.

IMPLEMENTATION ACTIVITIES

APPLYING BIOLOGICALLY RELATED TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Building a terrarium with stand* **GRADE:** *5*

Overview of Activity

In science, the students study about plants and their functions. Students will learn about biologically related technology through the fabrication of a simple terrarium.

Primary Performance Objective

- *Applying Biologically Related Technology (3F)*

Secondary Performance Objectives

- *Impacts of Technology: IT4* • *Safety: S1*

Resources

Materials/Supplies

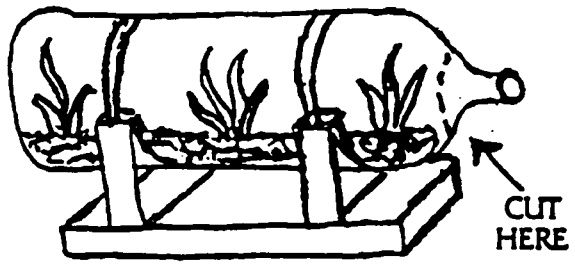
- *Lumber: 3/8" to 1/2" thick and 6" wide*
- *Screws, glue, 3 liter soda bottle, strapping, nails, soil, gravel, seeds, tape, and stain.*

Equipment/Tools

- *Coping and crosscut saws, files, abrasive paper, hammers, drills, scissors, and pen knives.*

References

- *Library reference books*
- *Books about plants*



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce the activity and assign research in the library.	Go to the library and research... a. types of terrariums. b. steps in making one. c. plants suited to each type.
2	Introduce steps in designing a terrarium.	Design and draw a plan (include measurements).
3-5	Give demonstrations and individual help as needed.	Work on projects.
6	Demonstrate setting up the terrarium.	Fill the terrariums, water lightly and seal.
7	Lead discussion on the systems used in other biologically related technologies.	Contribute to the discussion.

COMMENTS: The students may have problems cutting the bottle with a pen knife. The teacher will assist, paying close attention to safety.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Charts and models pertaining to systems of the human body* GRADE *5 and 6*

Overview of Activity

This activity can be done while students are studying the human body in science class. The students will study the six major systems of the body: circulatory, respiratory, muscular, skeletal, nervous and digestive systems. Also to be studied are the senses, which could be used as options to the body systems.

The students will become familiar with these systems, choose one and construct a chart or model to show what they have learned.

Primary Performance Objective

- *Applying Biologically Related Technologies (3F)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Decision Making: DM1* • *Resources of Technology: RT5, RT6*
- *Impacts of Technology: IT5* • *Safety: S1*

Resources

Materials/Supplies

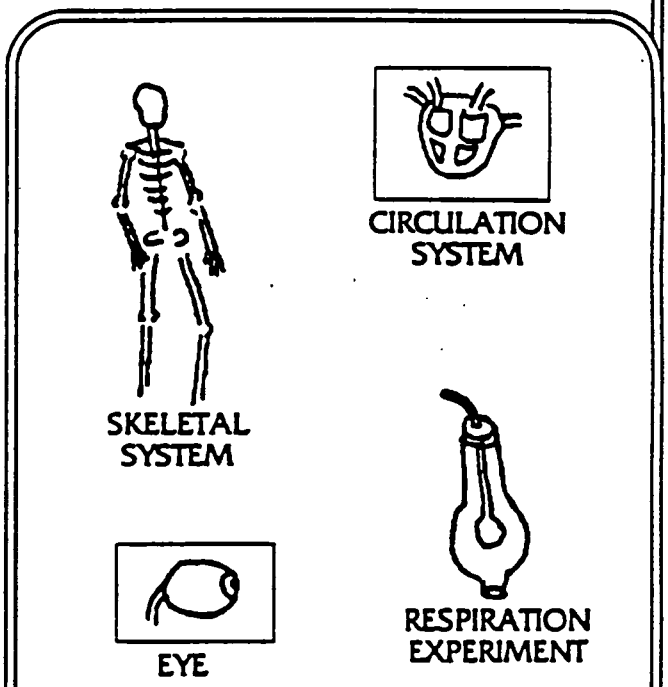
- *Oak tag paper and cardboard*
- *Homosote, wood, and craft sticks*
- *Markers and paint.*
- *Other materials commonly found in the lab, home or purchased at the store.*

Equipment/Tools

- *Claw hammers*
- *Jig saw and coping saw*
- *Files and abrasive paper*
- *Scissors and utility knife*
- *Rulers*

References

Students will be doing research in the library. Any book they use can serve as a reference. Encyclopedias are excellent reference sources.



IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Present topic and explain activity. Use a worksheet to guide research. Visit library.	Listen attentively. Complete worksheet in the library. Select a project dealing with a particular system.
2	Review student choices and plan for construction.	Investigate approach to construction. List and gather materials.
3-6	Assist students with projects.	Work on projects.
7	Assign writing of a short paragraph describing the function of the body system chosen for the project.	Complete assignments.
8	Help students with presentations. Describe applications of biologically related technology affecting human systems.	After practicing with the teacher, make presentation to the class.

COMMENTS: These activities should facilitate a child's learning and interest towards the subject being studied.

The worksheet should cover organs of a system and functions of systems. It should also cover such questions as what is a cell? an organ? a system?

PERFORMANCE OBJECTIVE 3G

APPLYING INFORMATION TECHNOLOGY

Given grade level appropriate instruction in the use of appropriate computer software and calculating equipment, the student will demonstrate an ability to generate information.

In order to do this, the student must be able to:

a. Perform mental estimates or paper and pencil computations to verify that the equipment is generating reasonable, accurate and desired information.

b. Select software and hardware which will generate the type of information desired.

c. Operate equipment to produce the desired information.

d. Utilize information produced in a practical or hypothetical application.

e. Write a simple program in BASIC or other computer language.

CONCEPTS TO BE DEVELOPED

3G. 1 Information processing involves collecting data, and recording, classifying, calculating, storing and retrieving it.

3G. 2 Software is commercially developed programs available on floppy disks, hard disks or tape.

3G. 3 Hardware is the equipment needed to run software programs.

3G. 4 Basic computer systems consist of input devices (e.g., disk drives, keyboards, joy sticks, mouses), processing units (computers) and output devices (e.g., monitors, printers).

Suggested Instructional Strategies
Grades 5 and 6: Applying Information Technology (3G)

Activities:

1. Operate computers with software designed to teach or strengthen classroom subjects.
2. Operate computers to solve technical problems or to control equipment.
3. Write a simple BASIC program which does arithmetical computations from numbers the student has entered.
4. Write a simple BASIC program utilizing 'READ' and 'DATA' commands.
5. Using a data base program, such as Appleworks, input data and arrange it to provide new information.
6. Use a calculator to check math assignments.

Audio/Visual:

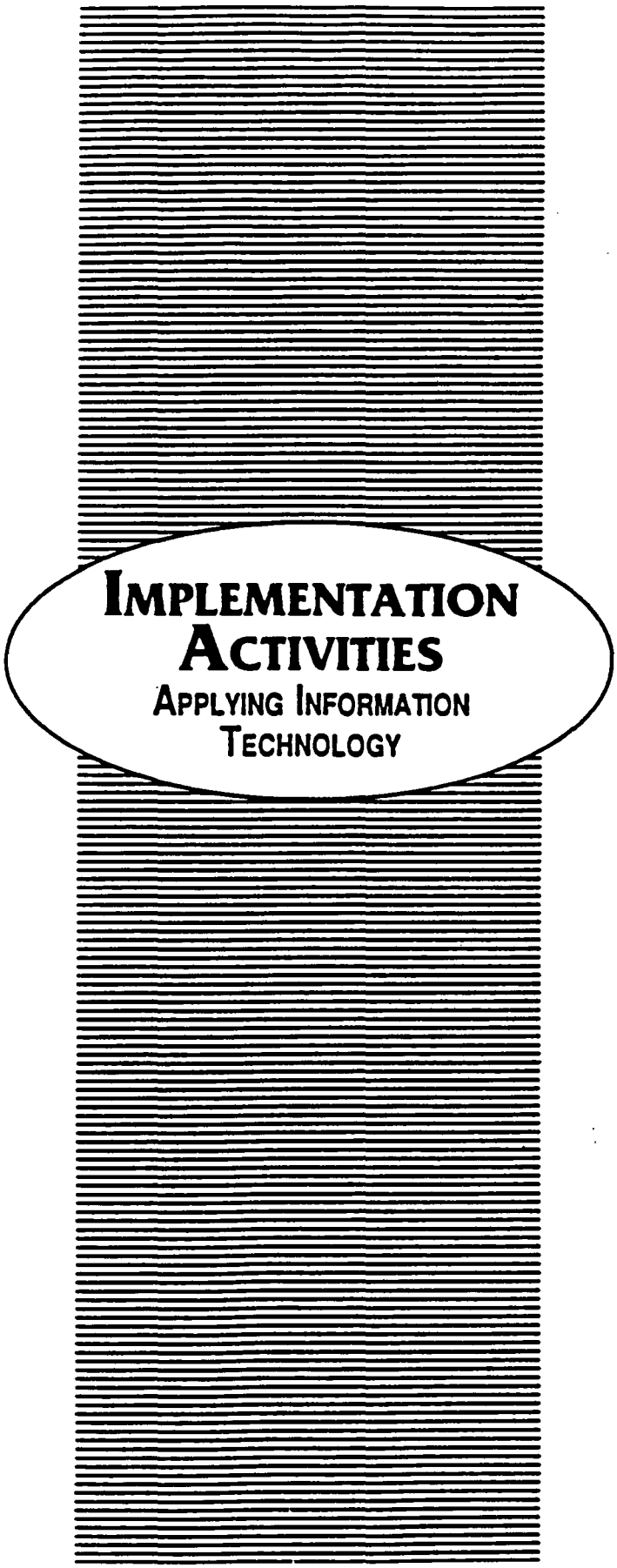
1. View video productions, films, and pictures related to computers, robotics, etc.

Resource Persons:

1. Contact parents or others from the community who work with computers.
2. Invite engineers, or others who use computers or robotics in industrial applications, to speak to the class.

Visitations:

1. Arrange a field trip to a local industry using computer controlled equipment.


IMPLEMENTATION
ACTIVITIES
APPLYING INFORMATION
TECHNOLOGY

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Writing a BASIC program for math* **GRADES** *5 and 6*

Overview of Activity

Each student will learn enough about programming in BASIC to write a simple program which performs calculations using information entered.

This activity can be correlated with and should take its content from the classroom math program.

Primary Performance Objective

- *Applying Information Technology (3G)*

Secondary Performance Objectives

- *Problem Solving: PS1* • *Resources of Technology: RT3, RT4, RT6*
- *Impacts of Technology: IT2, IT3, IT5* • *Safety: S2*

Resources

- *Computer system*
- *Manual on programming in BASIC*
- *Paper and pencil*
- *Calculator*

References

```
10  REM : BILL'S MATH PROGRAM
20  FOR K = 1 TO 20
30  PRINT "WHAT IS THE FIRST NUMBER?"
40  INPUT A
50  PRINT "WHAT  IS THE SECOND NUMBER?"
60  INPUT B
70  LET C = A * B .
80  PR# 1
90  PRINT A" X "B" = "C
100 PR# 0
110 NEXT K
120 PR#1
130 PRINT "THAT'S ALL FOLKS!"
```

OUTPUT

```
1.25 X 2 = 2.5
8.75 X 10.5 = 91.875
6 X .5 = 3
22.5 X 2 = 45
4.25 X 2.5 = 10.625
```

IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce the computer as one type of information technology. Describe its capabilities and basic operation.	Name several kinds of information technology. Recognize the computer as a very fast and accurate machine.
	Demonstrate booting up the system and entering a one line program such as: **10 PRINT "MY NAME IS BETH."**	Enter a simple program and run it.
2	Present more information on program writing, demonstrate keying a program into the computer and saving it on a disk.	Write 3 or 4 lines together with the class. Key these into the computer and run them.
3-5	Present information needed and assign the writing of a program using the INPUT command.	Begin writing a program on paper. Have it checked, then key it into the computer.
6	Introduce a math assignment which involves pencil and paper calculations and a print out of computer generated calculations.	Write 10 or 20 math problems which can be solved by your computer program. Run them with your program, print out the results and turn them in to the teacher.

PERFORMANCE OBJECTIVE 3H

APPLYING CAREERS IN TECHNOLOGY

Given grade level appropriate instruction in decision making skills, the student will demonstrate the ability to utilize selected procedures in relation to career choices.

In order to do this, the student must be able to:

a. Evaluate current interests and aptitudes in relation to careers.

b. Utilize effective research skills.

c. Communicate with others in regard to jobs and careers.

CONCEPTS TO BE DEVELOPED

3H. 1 People work best at the things they like and can do well.

3H. 2 It is normal for people to have both strengths and weaknesses.

3H. 3 It is important to understand what one's strengths and weaknesses are.

3H. 4 Career information may be obtained from many sources, for example, books, libraries, tapes, films and people involved in jobs.

Suggested Instructional Strategies
Grades 5 and 6: Applying Careers In Technology (3H)

Activities:

1. Research and explore various careers. Include such aspects as duties, education needed, job availability and rewards.
2. Utilizing such techniques as role playing and simulation, explore various aspects of occupations.
3. Research and prepare a class report related to a career of the student's choice.
4. Develop a brochure or booklet on a career or occupation.
5. Interview people to find out about their careers or occupations.
6. Produce a short video production dealing with careers.

Audio/Visual:

1. View films or video cassettes depicting various aspects of careers.
2. Develop bulletin boards and displays related to various occupations.

Resource Persons:

1. Invite members of the community involved with various occupations into the classroom to discuss their professions.

Visitations:

1. Plan and conduct field trips to sites where it is possible to observe people working in jobs/careers using technology.

Implementation Activities

Applying Careers In Technology

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY *Career Role Playing* **GRADE** *5 and 6*

Overview of Activity

Students will explore various career opportunities through interviewing, library research, model making and demonstrating to the class. From their activities, students will learn about the qualifications, duties, rewards and drawbacks of various careers.

Primary Performance Objective

- *Applying Careers in Technology (3H)*

Secondary Performance Objectives

- *Decision Making (DM1)*
- *Resources of Technology (RT5)*

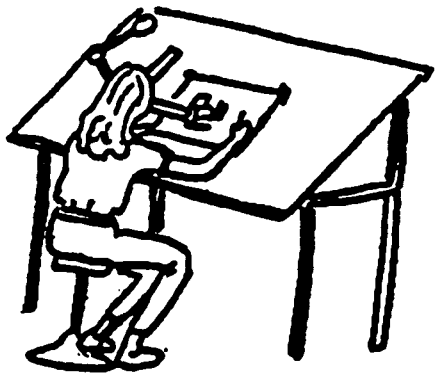
Resources

- *Tape recorders*
- *Poste oard*
- *Video camera*
- *Cardboard*
- *Wood*
- *Papier mache*
- *Tools*
- *Paints*

References

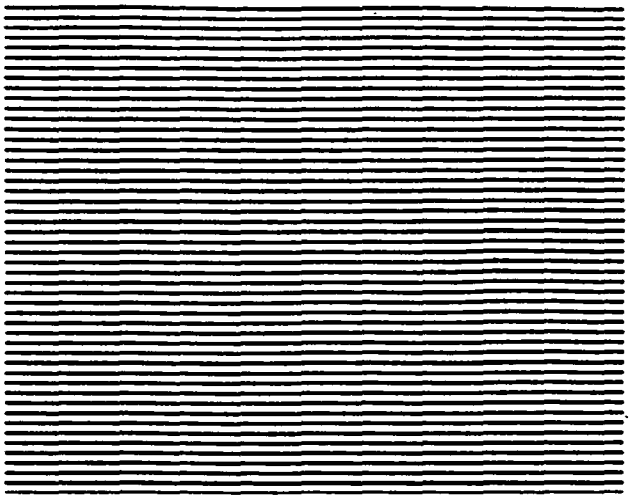
Library reference books

CAREERS IN DRAFTING
CAD Systems
Architecture



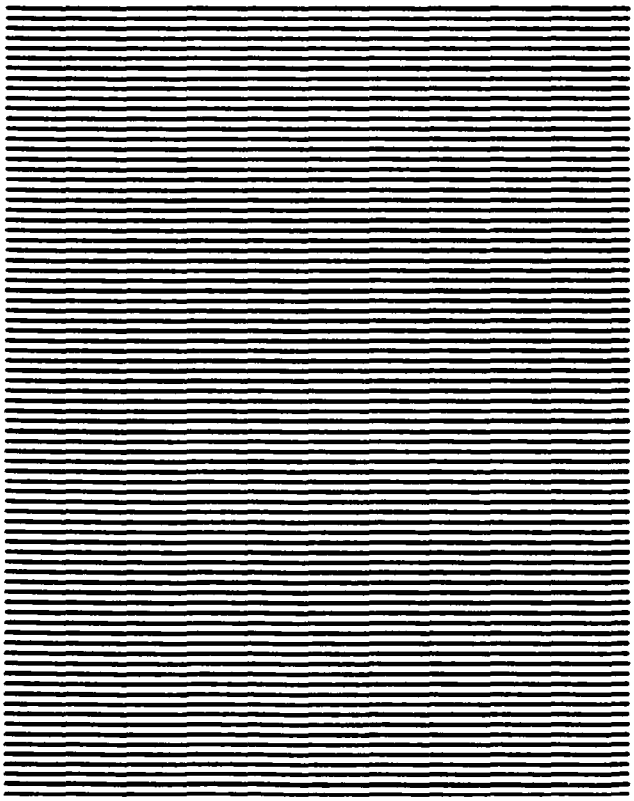
IMPLEMENTATION ACTIVITY PLAN

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY
1	Introduce the topic of careers. List various occupations of students' parents on the board (group in categories). Lead discussion.	Identify occupations of your parents. Participate in discussion. Select an occupation to study.
2	Have a prepared worksheet for library research. Go over worksheet with students. Supervise library work.	Discuss worksheet and helpful library books. Do library research.
3	Introduce interview activity. Help students to create an interview format.	Plan and develop an interview worksheet. Create questions. Conduct interviews outside of class.
4	Help students plan and prepare demonstrations.	Plan a demonstration incorporating knowledge from research and interviews. Build visual aids and models to enhance the presentation.
5	Supervise demonstrations. Videotape the students' work so it can be critiqued.	Conduct demonstrations. Share demonstrations with other classes.



Part II: Performance Objectives Infused At All Levels

Problem Solving and Decision Making
Resources of Technology
Impacts of Technology
Safety



Problem Solving and Decision Making

PERFORMANCE OBJECTIVE PS1

Problem Solving

Given a specific problem involving the use of technology, and instructions in an effective problem solving approach, the student will follow the problem solving method and arrive at a successful solution to the problem.

In order to do this, the student must be able to:

a. Identify and define the problem.
b. Set goals and identify criteria.
c. Generate alternatives and consider limitations.
d. Select the optimal course of action.
e. Implement the action.
f. Evaluate the results and make modifications if necessary.

PERFORMANCE OBJECTIVE DM1

Decision Making

Given a variety of choices related to the use and/or impact of specific technologies, the student will follow an effective procedure related to the decision making process.

In order to do this, the student must be able to:

a. Investigate the choices.
b. Identify the positive and negative impacts of each choice in relation to the environment, society, and personal factors.
c. Select an appropriate course of action.
d. Evaluate the results and make modifications if necessary.

RESOURCES OF TECHNOLOGY

PERFORMANCE OBJECTIVE RT1

Identifying Tools and Equipment

Given a specific tool or piece of equipment, the student will cite the correct name of the tool or piece of equipment and its components.

In order to do this, the student must be able to:

a. Recall names of tools and equipment and their components.
b. Associate names with the actual object, graphic representations and verbal descriptions.
c. Match names to representations and descriptions.

PERFORMANCE OBJECTIVE RT2

Identifying Functions of Tools and Equipment

Given instruction on the functions of a specific tool or piece of equipment and its components, the student will describe the function of a particular tool or piece of equipment and its components.

In order to do this, the student must be able to:

a. Use resource materials (e.g., information sheets, texts).
b. Comprehend information.
c. Identify specific tools and pieces of equipment and their components.
d. Distinguish parts and functions.
e. Convey information accurately.

PERFORMANCE OBJECTIVE RT3

Maintenance of Tools and Equipment

Given a set of specific tools or equipment to use in a series of work tasks and appropriate instructions, the student will be able to perform both preventative and corrective maintenance on the tools or pieces of equipment.

In order to do this, the student must be able to:

a. Identify the tool or piece of equipment.
b. Describe use including normal functioning of tool.

c. Define limits of functioning of specific tool.
d. Distinguish between basic care and procedures for preventive and corrective maintenance.
e. Evaluate tool/equipment needs.
f. Apply judgment to practice.
g. Perform routine care procedures.

PERFORMANCE OBJECTIVE RT4

Using Information

Given a task, the tools/equipment essential to its performance and instructions, the student will select and apply the information in the completion of the task.

In order to do this, the student must be able to:

a. Use specific tools and equipment.
b. Follow directions.
c. Comprehend information.
d. Put theory into practice.

PERFORMANCE OBJECTIVE RT5

Selecting and Using Tools/Equipment

Given a specific task to perform and access to a variety of tools/equipment and information about their use, the student will select the appropriate tools/equipment and apply them in the completion of the assigned task.

In order to do this, the student must be able to:

a. Identify various tools and equipment by name and function.
b. Comprehend information.
c. Make choices and decisions.
d. Assess needs.
e. Choose an appropriate tool for the job.

PERFORMANCE OBJECTIVE RT6

Using Systems

Given a task involving the use of technology, the student will develop and work within an appropriate system.

In order to do this, the student must be able to:

a. Generally define a 'system' as a method of accomplishing a task.
b. Become aware of the three components of a 'system' (input, processing and output).
c. Recognize that some systems are very simple while others are complex.
d. Define 'processing' as making changes in materials or other things to produce a desired output.
e. Evaluate the actual output or results of a system in terms of the intended output.
f. Suggest changes in the input or processing necessary to obtain the desired output.

PERFORMANCE OBJECTIVE RT7

Information Technology in the Home

Following instruction, the student will identify ways the family/home now serves as an information center and how it will in the future.

In order to do this, the student must be able to:

a. Identify the traditional role of the home as an information center.
b. Identify the components necessary to make the home a technological information center.
c. Recognize the types of information which could be available and/or transmitted through the home computer and related network systems now and in the future.

IMPACTS OF TECHNOLOGY

PERFORMANCE OBJECTIVE IT1

Human Responsibility for Technology

Given instruction on the benefits and problems resulting from several technological systems, the student will be able to generalize, to the satisfaction of the instructor, that people have a responsibility to weigh these factors as they utilize existing technologies and develop new ones.

In order to do this, the student must be able to:

a. Identify improvements in people's lives resulting from technology, such as . . .
   - Improved human services.
   - Increased availability of material goods.
   - Increased leisure or optional time.

b. Recognize problems created by technology, such as . . .
   - dehumanization implications.
   - environmental impacts.
   - pressure on natural resources.

c. Consider pros and cons of each issue and evaluate information fairly.

d. Identify personal moral values which are bases for evaluation of technologies.

PERFORMANCE OBJECTIVE IT2

Impacts of Technology on Life-style

Following instruction, the student will identify ways technology influences his or her current life-style and may influence it in the future.

In order to do this, the student must be able to:

a. Identify inner feelings concerning the use and control of machines.

b. Identify personality traits which will be essential in a world of technology.

c. Recognize how machines will affect individual relationships with others.

d. Identify how machines will affect family and individual use of time.

e. Recognize guides and rules for the responsible use of machines and technology.

PERFORMANCE OBJECTIVE IT3

Relationship Between People and Technology

Given instruction on the relationship between people and the technologies they create, the student will recognize that people must retain the management and control function.

In order to do this, the student must be able to:

a. Recognize that all machines and technologies are the result of the superiority of humans.
b. Recognize that some machines can perform certain tasks as well as, or better than, humans.
c. Identify machines as machines, even though they may possess human-like features and awesome capabilities.
d. Cite examples of how people sometimes feel controlled by machines and technology.
e. Name examples of products or services which are delivered to people in an inferior form because it is more convenient for the technological system.
f. Name methods of recourse for people who do not understand what a machine or technology is doing or saying to them, or when they feel threatened by it.
g. Discuss the responsibility of designers and technicians to consider the humans who will use or be affected by technology.

PERFORMANCE OBJECTIVE IT4

Impacts of Technology

Given a task involving the use of technology, the student will be able to assess its impacts.

In order to do this, the student must be able to:

a. Recognize "impact" as effects or consequences on the environment, the economy, the culture or on humanity.
b. Distinguish between immediate and long range impacts.
c. Categorize impacts as "desirable" or "undersirable."
d. Suggest ways for minimizing "undesirable" impacts.
e. Feel or experience the impacts or consequences of actions in real situations.

PERFORMANCE OBJECTIVE IT5

Advantages of Technology

Given a real or hypothetical task to accomplish, the student will describe several advantages of having tools or technology available to help accomplish the task.

In order to do this, the student must be able to:

a. Name the steps necessary to complete a given task.
b. Explain difficulties (anticipated or encountered) when trying to accomplish a task without tools or technology.
c. Identify tools and equipment according to their functions.
d. Apply knowledge of tools and equipment to a specific task.
e. Describe advantages of having technology to help people accomplish tasks.

SAFETY

PERFORMANCE OBJECTIVE S1

Understanding Safety

Given a work or leisure activity, with its parameters, safety rules and regulations fully defined, the student will give reasons for performing the activity within the limits outlined.

In order to do this, the student must be able to:

a. Define a safety-conscious attitude.
b. Evaluate information.
c. Form conclusions.
d. Apply safety rules willingly.

PERFORMANCE OBJECTIVE S2

Effects of Stress and Personal Emotions on Safety

Given a series of work assignments, appropriate directions and instructions on the effects of stress and certain potentially hazardous personal emotions (e.g., anger, upset, fear, over joy) on safety in work situations, the student will identify these as they arise and demonstrate an ability to cope with them.

In order to do this, the student must be able to:

a. Identify forms of stress and potentially dangerous personal emotions.
b. Recognize stress or potentially hazardous personal emotions as they become evident in oneself and others.
c. Predict possible harmful outcomes of stress and potentially hazardous personal emotions in work situations.
d. Formulate a plan of action which will eliminate the potential danger.
e. Take appropriate actions to alleviate the potentially unsafe situation.

PERFORMANCE OBJECTIVE S3

Complying With Safety Rules

Given a set of safety rules and regulations, the student will identify rules and regulations and demonstrate the ability to consistently apply them in the performance of the assigned task.

In order to do this, the student must be able to:

a. Read and follow directions.
b. Demonstrate listening skills.
c. Locate available pertinent resources.
d. Act safely in a work situation.

PERFORMANCE OBJECTIVE S4

Dressing for Safety and Grooming

Given a specific work or leisure activity, access to a variety of dressing and grooming accessories and information about their use, the student will select the appropriate accessories to perform the assigned activity safely.

In order to do this, the student must be able to:

a. Comprehend information.
b. Follow directions.
c. Understand functions of dressing and grooming accessories for various activities.
d. Offer rationale for using appropriate dressing and grooming accessories for various work or leisure activities.
e. Assess needs.
f. Locate materials.
g. Make judgements.

PERFORMANCE OBJECTIVE S5

Selecting and Utilizing Safety Equipment

Given a specific work or leisure activity with its parameters fully defined and access to a variety of equipment and accessories for safe performance of the activity, the student will select the necessary and appropriate safety equipment and use it in the performance of the activity.

In order to do this, the student must be able to:

a. Comprehend information.
b. Understand functions of various types of safety equipment.
c. Scrutinize situations and make assessments.
d. Make choices appropriate to the task.

PERFORMANCE OBJECTIVE S6

Identifying Physical and Environmental Hazards

Given a setting for work or leisure activity, with a complete description of its environmental features (e.g., physical layout, structural qualities, chemical composition of materials/matter), the student will identify potential hazards and describe how they might affect the performance of the activity.

In order to do this, the student must be able to:

a. Comprehend information.
b. Identify various environmental hazards by sight, sound, smell and touch.
c. State possible outcomes of identified hazards if unchecked.
d. Relate appropriate measures to be taken to avoid or correct various identified hazards.

PERFORMANCE OBJECTIVE S7

Creating a Safe Work Place

Given a specific work or leisure activity and access to all its necessary equipment, materials and environmental accessories, the student will adapt these materials and equipment to create a safe setting in which to perform the activity.

In order to do this, the student must be able to:

a. Define a safe environment for the given activity.
b. Manipulate materials.
c. Identify goals.
d. Make judgements.
e. Plan and organize a safe environment.

PERFORMANCE OBJECTIVE S8

Hazardous Substances and Devices

Given instruction regarding the harmful effects and potential dangers (to people and the environment) resulting from the use, processing or mishandling of familiar hazardous substances and devices, the student will identify and describe methods of avoiding the potential hazards.

In order to do this, the student must be able to:

a. Identify sources of danger to people and animals (e.g., electric shock, effects on skin or internal organs).

b. Identify sources of pollution and/or destruction of the environment.
c. Tell how to determine if a substance or device is potentially hazardous.
d. Comprehend manufacturers' precautionary instructions and warnings.
e. Name people, agencies or services which can control or respond to hazardous situations.

PERFORMANCE OBJECTIVE S9

Avoiding Injury While Lifting and Moving Objects

Given an object to be moved within a specified area and the necessary information and/or tools to accomplish the task, the student will demonstrate the ability to apply proper body mechanics for safe movement of the object.

In order to do this, the student must be able to:

a. Define proper body mechanics.
b. Assess situations.
c. Make judgements.
d. Demonstrate proper body mechanics.

ELEMENTARY SCHOOL TECHNOLOGY EDUCATION

IMPLEMENTATION ACTIVITY

ACTIVITY _____ GRADE:_____

Overview of Activity

Primary Performance Objective

Secondary Performance Objectives

Resources

References

Implementation Activity Plan

DAY	TEACHER ACTIVITY	STUDENT ACTIVITY