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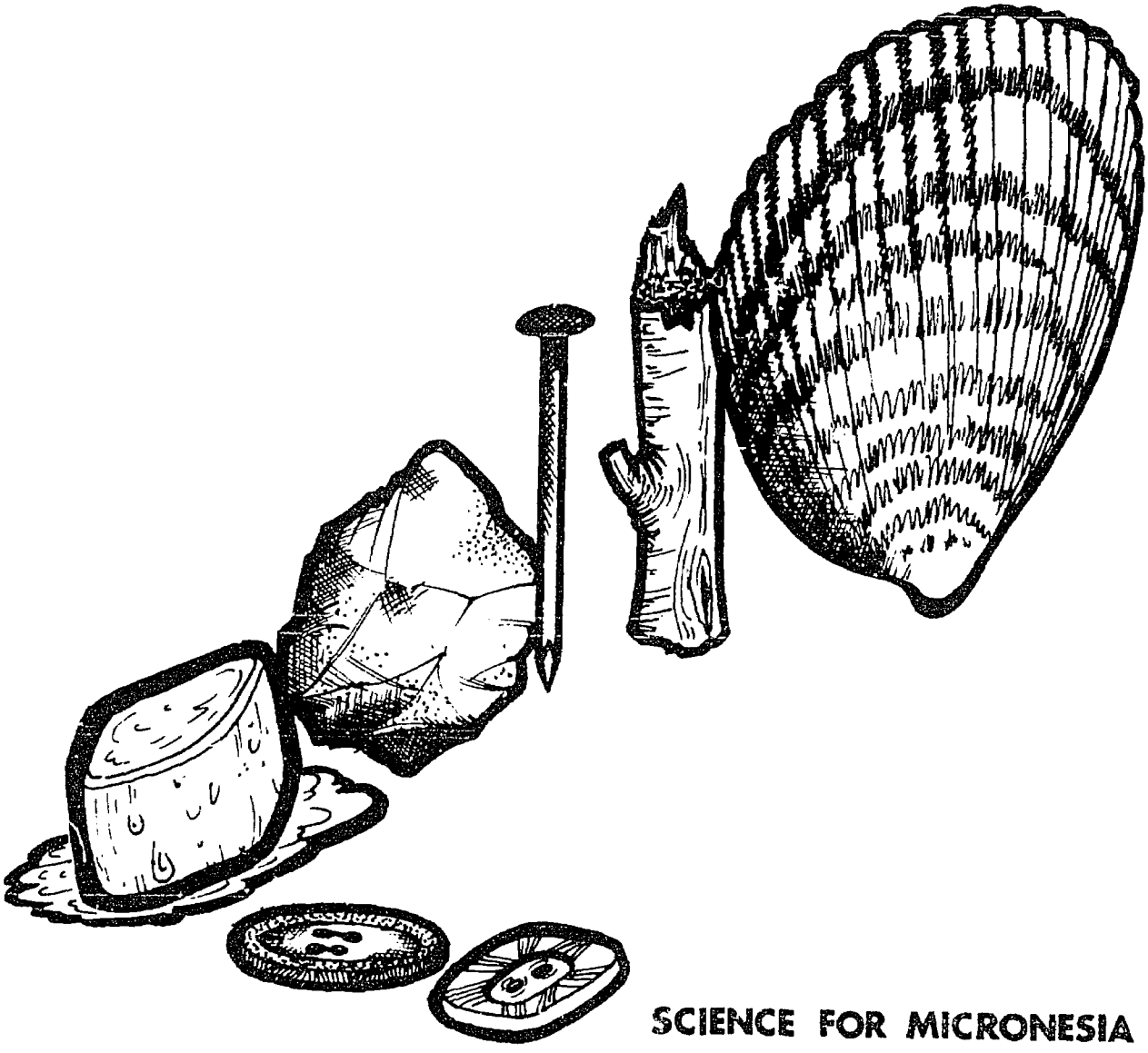
ABSTRACT

Presented is a teacher's guide for an elementary science unit designed for use with first grade students in the Trust Territory of Micronesia. Although there is a degree of similarity to the curriculum materials developed for the Science Curriculum Improvement Study, this Micronesian unit does not purport to be an adaptation or edition of the SCIS materials. Designed to be taught in the vernacular language, it is suggested that this unit follow a free play unit and that it be used for about one half of the school year. The rationale for the period of free play is that children can gain experiences in sharing as well as in acquiring science and mathematics information through the free play activities. Activities are designed for active student participation with the teacher acting as a guide. This unit involves the concepts of object, attribute, material, change, and evidence and the science processes of observing, communicating, discriminating, and describing. The guide contains information concerning objectives, teacher and student activities, rationale for these activities, needed materials, teaching suggestions (provided on a day by day basis), and questions to be posed in class discussions. (PEB)

MATERIAL OBJECTS

Basic Edition



SCIENCE FOR MICRONESIA

CONTENTS

FREE PLAY UNIT

IT IS RECOMMENDED THAT THIS "FREE PLAY" UNIT BE USED FOR ABOUT ONE HALF YEAR BEFORE STARTING THE "MATERIAL OBJECTS" UNIT, OR MATH EASY GAMES UNIT.

SYNOPSIS

Before children come to school they learn most things by playing. They play with other children, with water, with sticks, with mud, and many other things. Psychologists and teachers have found that this is the best method also to teach young children while they are at elementary school.

Think a few minutes about the words FREE and PLAY. What do they mean.

Put them together.....Free Play. What is Free Play?

In your classroom it will mean the children playing on their own. They will be playing with many different objects. Playing as freely as possible.

WHY HAVE FREE PLAY?

Math and science use many, many objects - objects that a lot of the children may not be familiar with. If you wanted them to do something with the objects, they may want to do something else. They're curious. They like to play. They are creative. Instead of forcing them to do what you want and getting mad at them when they do something else, let them play their own games. Free Play lets them do what they want, until they want to listen to you and your ideas. It takes a long time. Children don't get tired of playing with objects quickly. But it is fun for them and maybe you want to play too. If you want, it's fun just to observe.

During Free Play, children learn to share. They learn to share objects; they learn to share ideas; they learn to share words. Children have different vocabularies. In Free Play they share words, learning new words as they play. They learn to describe objects, and name objects. They learn about relationships of objects and about comparing objects: long to short: big to little: round to square to rectangular, rough to smooth, and many more. You don't have to tell them anything. They are learning from each other.

ORGANIZING THE CLASS

From the very beginning you will need a set of rules. The shortest set of rules possible. The more rules you have the more work you have. But if you don't have any rules you will have discipline problems. The children can help you to make the rules. Once they are made, the students will be expected to follow the rules and you'll have to remind them often about the rules. Later they will know what you expect and you will have few problems. Here are some suggestions:

1. Ask the children not to throw objects, and let them tell why they should not be thrown.

2. Ask the children to play quietly. Some noise is to be expected as the children are playing. Tell them that too much noise will disturb other children and other classes. Find other reasons.

3. Ask the children not to bother each other. Remind the children that they will be playing with these objects for many days and later they will have a chance to play with the objects another student may be using.

4. At the end of the class period tell the children that they will be responsible for returning the objects to their place. Ask them to return the objects when Free Play is over.

Free Play should be scheduled for 30 minutes every day. Sometimes the children may want to spend more time, sometimes less time. That is up to you, and them.

Make sure that each day you have more than enough materials for the children to play with. The materials should be easy to set up in the room. Have the children help you collect the materials. Maybe you will want to spend the first week or two going on field trips collecting sticks, stones, shells, etc. Ask the kids to bring things from home. Maybe go around the village asking for objects from homes, stores, bars. Until you have trillions of everything. The more the better, unless of course you can't get in your room.

Now, say you've collected everything. You've explained the rules to the class. Then let them play.

What does the teacher do during free play period?

The teacher can visit with the children. He can talk to the children. He can ask questions. Children like to talk to the teacher and to each other. Children like to show the teacher their games. The teacher can give the children more materials to play with---but the teacher must not tell the children what to do. He must not tell the children what to play. He must not tell the children how to play. He must not tell the children that this game is better than that game. All the games are good. In the free play period the children must play what they want. They must play how they want.

Activity groups

At first you will want to group your students into five or more groups, depending on the size of your class. Later you may want to let your students choose their own group (on page H is a suggestion on how to organize your class for this). Be sure that when you group the children, yourself, that you change the groups about once a week. The students will then have a chance to play with other students.

Make different activity stations in the classroom. Maybe by putting a numbered or colored card at each station. When the students become familiar with the stations they will know which part of the room to go. It will also be easy for them to set up the stations.

It will take time for students to accept the freedom and responsibility of Free Play. Be patient. It takes time. Probably at least 6 weeks. Some learn and regulate themselves quickly. Others are too used to being told what to do. Keep trying.

Classroom Suggestions - General

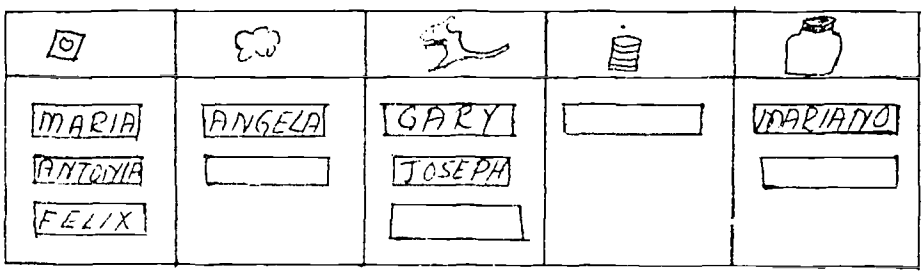
1. Make a daily record book for Free Play. Maybe with your students names on the side. As you observe the children each day, you can write down your observations. Example:

Name	Activity	Date
Maria	Used the scale to weigh rocks.	
Augustine	Strung beads	
Bernardo	Made patterns with rocks.	
Carmen	Molded a pot with the clay.	
Francis	Sorted the rocks.	
Jerome	Didn't want to play today.	
Lino	Used words square and circle	

You probably won't be able to write down something about each student every day. Once in a while is good enough if you can see where each student is, -if he is playing creatively, learning new words or just getting along well with the other students.

2. A few weeks after school starts children should be able to recognize their names. They are probably also familiar with Free Play and how it works. They should know they are to go to an area and play. They should also know that if they cannot play with the objects today, they can play with them some other day. You may want them at this time to choose their own groups. Maybe you have five activity areas in your classroom. Instead of assigning each child a certain group, let them choose.

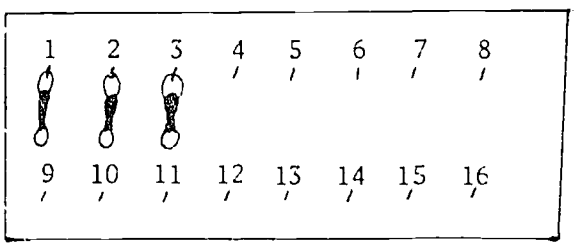
   Someplace in the room put up a board divided into the number of stations you have in your class. Above each station division put up a picture of the objects that will be at the station. Then let the students one by one come up and put their names under the objects they want to play with. Example:



   You may want to limit the number of names under each station division at first. Later, when they get used to this new freedom, you may let them change stations during the day by putting their name under a different station division. The more freedom you give your students, the more Free Play will be a learning experience for them.

CLASSROOM SUGGESTIONS: SCIENCE

1. Each 1st grade teacher should have enough magnifiers for every student in her class. 1st graders usually get excited about playing with magnifiers and want to use them a lot. You can make the magnifiers available to the students whenever they want to use them. Mark the magnifiers first. Maybe put a number on them with something the student can't easily remove. Tie a string to the magnifiers and make a place in the classroom where the magnifiers can be hung. Maybe a board with nails and numbers, like this:



You might have better ideas.

Then assign each student a magnifier. Explain that it is his magnifier for the rest of the year. He can use it whenever he wants during the school day but at the end of each day he must return it to the board.

CLASSROOM SUGGESTIONS - MATH

The 1st grade course is divided into 3 sections:

Section One - Free Play

September thru Christmas
Approximately 70 lessons

There are 70 Free Play Activities or more.

The Free Play Cards are for the teacher. They will help you. They are not for the children. The Free Play Cards do not show all the games. They are examples. The children can play other games. The children can play different games. They can play the games with different materials. The children must play with the materials as they want to. Do not tell them what to do.

Section Two - Easy Games with simple rules

30 math periods

The purpose of this section is to get the children to play games with rules. The easy games are played for about six weeks. They are played from Christmas until the end of the first semester. The children must have at least 30 math periods for easy games. You can use the same materials you used for the Free Play Period.

Children learn by playing games. They played a lot of games in the Free Play Period. These games had no rules. Now we must ask them to play some easy games with rules. These games are harder than free play. Many of the easy games were played in the Free Play Period. They had no Rules. Now they will have rules. Now these are new games.

At first the children will want to play games with no rules. Some children will want to make the rules. Let them do this. The teacher must make his games interesting. Then the children will want to play the teacher's games. Each child can play alone, but it is better to play with other children. The best games are played with a small group of children. Every child must play. Children learn by playing. They do not learn by watching children play.

Section Three - Structured Games

100 math periods

The purpose of this section is to help the children understand:

Sets and Logic

Relations

Geometry

Measurement

There are 100 Structured Games. These structured games are played in the second semester. They will take all the second semester. Each child needs 100 math periods for structured games.

The Structured Games have rules. There are 100 cards for the Structured Games. Each card has rules for a game. Children must follow the rules for each game. This is very important.

The Structured Games Cards have rules for the games. They also have information for the teacher. The cards tell the teacher how to play the game. They tell the teacher what materials to get. The teacher must read the card the day before the lesson. He must prepare all the materials. All the learning materials must be ready before the lesson.

The teacher gives the children the materials. Then the teacher tells the children what to do. He tells them in their own language. They do not understand much English yet. The children play the game. They must follow the rules.

There will be no tests or examinations in Grade One. The teacher must observe and watch the children. He must see how they play the Games. Playing these games is work for children.

BUT NOW YOU HAVE TO SET UP YOUR CLASS.

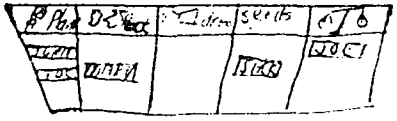
The first days of school you'll probably want to spend with your class collecting objects for the classroom, taking them on field trips around the school, taking them on field trips in the neighborhood and to the beach, or to wherever they can collect objects.

These objects should be put in places in the room where they will not get in your way or the students' way. They should be easy to get at and easy to put away. If you have a place for everything, it will be easy for the children to find and they will know where to put the objects away.

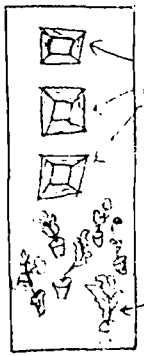
On page 11 is a drawing of a Free Play classroom, showing how it might be set up.

Front of Classroom

Blackboard



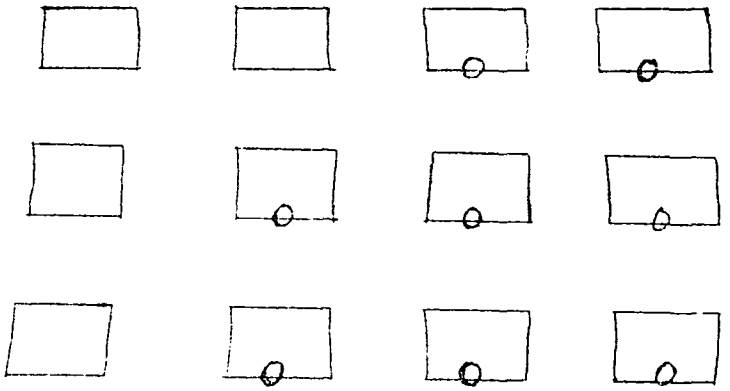
child with name card - place on board



small aquarium

5

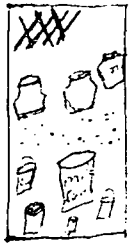
plants

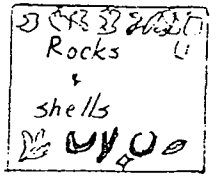


2-3 students playing with string & beads mat to sit on

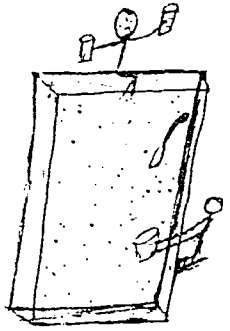
sticks

jars seeds cans





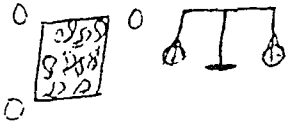
Large aquarium



4

containers

3



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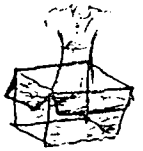


box of old clothes

2-3 students dressing up

A Suggested Free Play List of Materials

Any of these suggested materials that you decide to use should be obtained in large quantities with different kinds of each. Examples: long, short, big, small, red, green, yellow, square, thick, thin, rough, smooth. This is so that the children handle many different things.

The number of items are for a group of 5 children.

Teacher or School provides:

Sand box or boxes - Taiwan desks turned over and without legs make good small sand boxes. You will need 3 to 5 if you use the Taiwan desks. Children can sometimes bring the sand for the boxes.

String - 1 roll
Scissors - 5
Paper - depends
Glue - 5

Science Department Supplies (Returnable):

Magnifiers - 5 or 1 per student in class to be used any time the student wants.

Buttons - about 500

Math Department Supplies (Returnable):

Balance Scales (20 available form Math Dept.)
Balance Beams
Attribute Blocks
Multi-base Blocks
Cusinaire Blocks

All of these items are in limited supply. (Ever think of making these yourselves?)

Manufactured materials in very limited supply: Unifix, Polyatom, Geometric Shape Blocks, other commercial construction materials--Lego Sticks, Measuring Equipment.

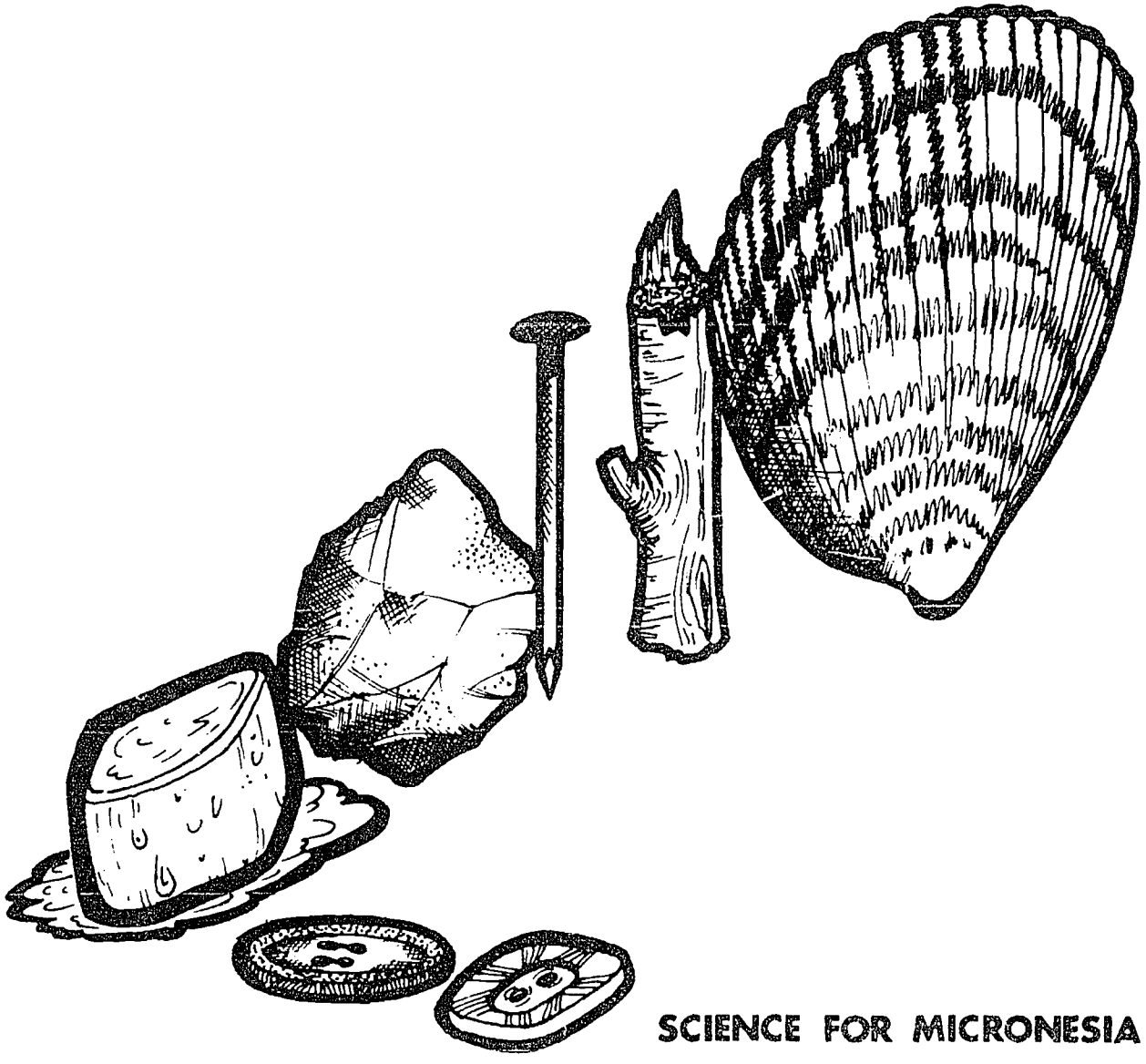
STUDENT SUPPLY from Home or on Field Trips: (Teacher helps supply)

Cans - 200 can be used for building or for trays and colleting items.
Jars - 100
Stones - 1 carnation milk carton
Coral - 1 carnation milk carton
Sticks - 150 - 175
Nuts or seeds - hundreds of each kind
Leaves - 75

Plants - 25
Flowers - 75 Bring when needed
Fruit - 25
Enpty Coconut Shells for Pouring - 15-25
Magazines (Suggestion: ask PCV's if they have old newspapers or
Newspapers magazines. Some of them get a lot from home when the ship comes in and might be willing to give them to you when they are finished reading them.) About 30 of each. They can be used for just looking, for art, etc.
Boxes - large and small - 20
Beads - 200
Bottle tops - 200
Nails
Marbles - 50 to 100
Thread Spools - 100
Clothes pins - 100
Wood Blocks
Rubber Balls - 3-5
Bottles - 3 cases
Plastic Cups and other Plastic Containers: 100
Examples: meat trays from store
Small Toys (Cars, Animals, etc.)
Pieces of wood - 1 Carnation Box
Pieces of wire
Rope
Pieces of Cloth - 200
Empty Cigarette Packs - 200
Paper Bags - 100
Plastic Bags - 50
Cloth Bags - 50
Metals: All sorts and varieties - aluminum, brass, steel, copper, tin
Pieces of plastic
Pull Tabs - 300
Straws - 150
Feathers - 100
Tires - 5
Paper Clips - 1,000
Hoops - 5
Bats and Balls
Wood, Nails and Hammers'
Rubber bands, inner tubes or pieces of
Crayons
Pencils
Spoons - plastic, metal - 20
Clay
Cotton
Toilet tissue
Napkins - paper towels
Big shoes and old dresses
Mirror
Needle and thread
Syringes
Fishing pole and line
Screen
Paper plates, cups
Buckets

MATERIAL OBJECTS

Basic Edition



SCIENCE FOR MICRONESIA

The compilers and editors gratefully acknowledge the encouragement and cooperation of the Science Curriculum Improvement Studey staff at the University of California, Berkeley, in the preparation of this unit.

"SCIENCE FOR MICRONESIA"

MATERIAL OBJECTS-Basic Edition

The teaching concepts utilized in this unit have been adapted from similar programs currently in use in the United States,Africa and other areas of the world. This unit has been adapted for use here by teachers and science educators in the Trust Territory who have considered the local environment, language, educational structure, local materials and culture.

It has gone through the following process:

1. Adaptation for experimental use done by representatives from all districts at a writing conference in Yap during the summer of 1970. Printed in August 1970.

2. Implemented in selected elementary grades in most districts during the school year 1970-71 and 1970-72. Emphasis was placed on implementation in grades one and two.

3. Rewritten by representatives from all districts at a writing conference in April 1971.Printed in April 1971.

4. Basic Edition printed in October 1972 as a result of feedback obtained from two years of classroom use in the districts, special feedback obtained by the Community College of Micronesia, and cooperation with the Rota Bilingual Project. Rewritten and printed under the coordination of the Curriculum Task Force in conjunction with the Title III "Elementary Science Improvement Project".

CURRICULUM TASK FORCE

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Trust Territory Printing Dept.

WORDS FOR THE TEACHER ABOUT MATERIAL OBJECTS

What grade is it to be used at? It is designed to be used in the first grade, but it could be used in any of the upper grades.

What language should be used to teach it? Most of the lessons should be taught in the vernacular. You will have to use some English words like "attributes" and others that are not found in the vernacular.

How long will this unit "MATERIAL OBJECTS" take? When should I start it? If you use this unit after "free play" and with the unit "ORGANISMS" it will be enough material for more than a school year. This unit is designed to follow almost a half year of "free play" activity. MATERIAL OBJECTS should not be used until after the "free play". The unit ORGANISMS can be used throughout the school year. You could use ORGANISM activities while you are doing "free play" and MATERIAL OBJECTS.

How fast should the activities be done in class? The unit gives some suggestions for time. Many activities will take more time than suggested if the students are interested in doing other things having to do with that activity. Don't rush the students. It is better to do the activity well than to rush through it.

What kind of science is this? In this science program the children do science activities. We call this "sciencing". Instead of "reading about" science the children "do" science.

What does the teacher do in class? The teacher should act as a guide. You should guide the students to find the answers themselves instead of telling them the answers. To be a good guide the teacher must: ask inquiry type questions, listen to the students, let the students find their own answers.

Does this unit, MATERIAL OBJECTS, have special things it teaches?
Yes, the activities in the unit are designed to let the children do activities that develop the big ideas (concepts) of:

object	change
attribute	evidence
material	

The unit also gives the children opportunities to develop skills that are used in sciencing. For example the skills of: observing, communicating, discriminating and describing.

Is there any connection between MATERIAL OBJECTS and ORGANISMS?
Yes, they both develop the same skills and are concerned with CHANGE. This CHANGE can be seen when objects interact or as the growth and development of plants and animals.

Is this kind of science harder to teach? You must be prepared. It will be harder if you do not know what you are doing. To prepare the teacher workshops are given and these units are written to make the teaching directions easy to understand.

Instead of using your time grading papers, making tests and filling out lesson plans, you will now use it in preparing materials. It should not take any more time than with the old science program, if you were properly prepared when you taught the old science program.

It should be easier to plan for because the units are lesson plans that tell you what to do and what materials you need to do it.

It should be easier to teach because you will be supplied with most of the materials needed for the lessons.

It should be easier to teach because it is interesting for you and the children.

The hardest part of teaching this kind of science is for you to learn to be a guide instead of always telling and showing.

Is this kind of science used anywhere else? Yes,the teaching concepts used in this unit were adapted from similar programs now used in the United States, Africa,Papua and other areas of the world. This unit has been adapted for use here by teachers and science educators in the Trust Territory. They have considered the local environment, language,educational structure, local materials, and culture.The program is now being used in all of the districts in some way. All teachers who now graduate from the Community College of Micronesia are prepared to teach "Science For Micronesia".

How does this unit, MATERIAL OBJECTS, fit with the other units?

MATERIAL OBJECTS should be used after the "Free Play" activities. Below is a diagram showing all the units in grades one through six.

SCIENCE FOR MICRONESIA PROGRAM

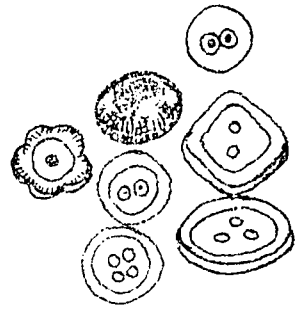
PHYSICAL SCIENCE UNITS	LIFE SCIENCE UNITS
MATERIAL OBJECTS	Organisms
Interaction and Systems	Life Cycles
Systems and Variables	Populations
Relative Position and Motion	Environments
Energy Sources	Communities
Models: Electrical and Magnetic Interaction	Ecosystems

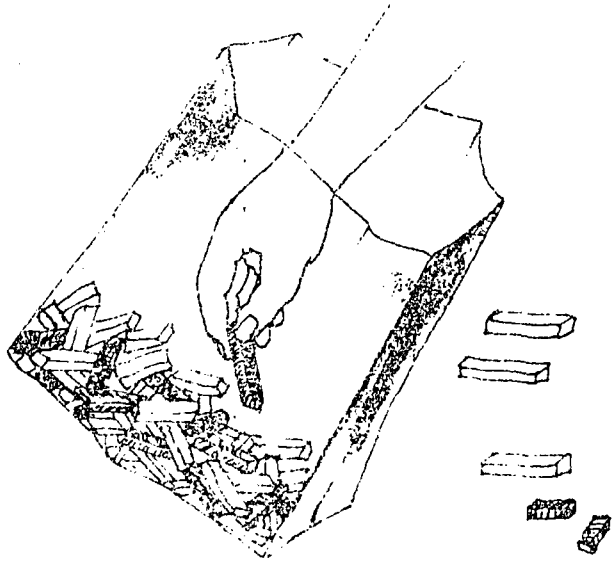
PART 1
INTRODUCING OBJECTS AND THEIR ATTRIBUTES

OBJECTIVES

At the end of Part One the children should be able to:

- Use the word OBJECT to talk about any piece of matter.
- Describe objects by their ATTRIBUTES.
- Sort objects by their attributes.





ACTIVITY 1 OBJECTS IN THE CLASSROOM

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children talk about the objects in the classroom. They discuss the attributes of these objects. (The word ATTRIBUTE is used for any characteristic of a piece of matter. The word OBJECT is used for any piece of matter.) A chart of ATTRIBUTES is made. Several ATTRIBUTE games are played.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity introduces the children to the experience of talking about and looking at their environment. By looking at the attributes of objects they start to see their environment in new ways. Many objects have attributes the child has never noticed. Many children have never thought of objects as having attributes.

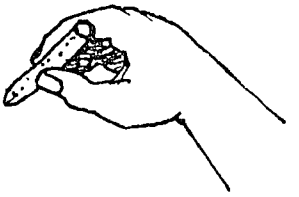
MATERIALS

For the class:
one piece of chart paper

PREPARATION

Put the heading "ATTRIBUTES of OBJECTS" on the chart paper.

TEACHING SUGGESTIONS

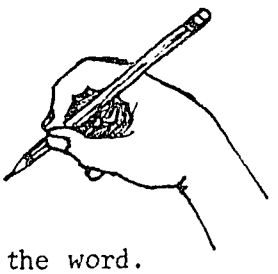


First Day-Looking at Classroom Objects

1. Show the class a piece of chalk.

   Say: "Tell me about this object."

   Let the children tell you the attributes they know.



   Show the class a pencil:

   Say: "Tell me about this object."

   Use the word OBJECT in your discussion. Do not define the word.

   Use the word ATTRIBUTE in your discussion.
   For example: If the child says, "It is white."

You say, "White is an attribute of this object."

If the child says, "It is long."

You say, "Long is an attribute of this object."

If the child says, "It is round."

You say, "Round is an attribute of this object."

2. Choose ten objects in the classroom.

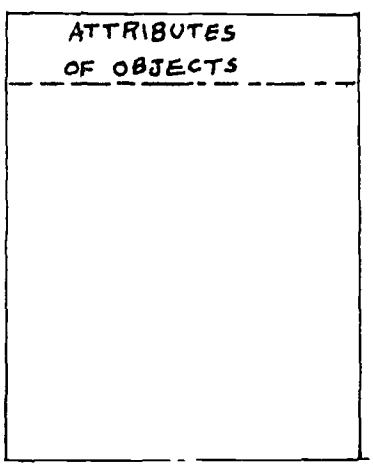
   Say about each object:

   "Tell me about this object."

   Spend a short time on each object.

3. Tell the class:

   "Tomorrow each child can show the class an object. You can bring the object from home, or you can find an object in the classroom."



Second Day-Making an Attribute Chart

1. Put up the "ATTRIBUTES of OBJECTS" chart.

2. Ask the class:

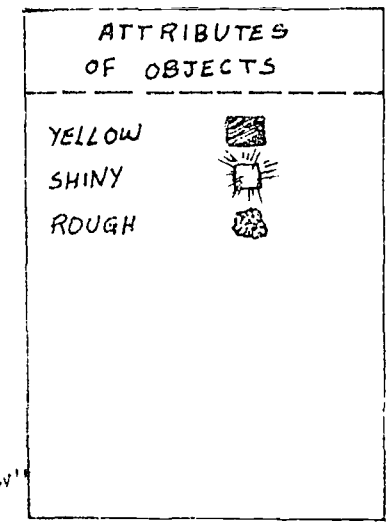
   "Who wants to show their object to the class?"

   Let a volunteer show his object to the class.

   Ask: "What attributes does this object have?"

Encourage the children to name attributes. Do not encourage talking about the use of the object.

Write on the chart each attribute the children name. Use the vernacular word unless the children use the English word.



2. Do the same thing for each child's object.

   Ask: "What are the attributes of this object?"

   Then write the attributes named on the chart.

   Do not list an attribute twice. For example: if "yellow" is on the chart. Do not put "yellow" on the chart again.

3. Have the children put an example of each attribute beside the word on the chart. For example: Put a "yellow" piece of paper beside the word "yellow".

   Put a piece of mirror beside the word "shiny".

   Put a piece of sandpaper beside the word "rough".

4. Keep the chart on the wall. More ATTRIBUTE words can be added to it at any time. When the children say attributes that are not on the chart, add the new words.

Third Day-Object Games in the Classroom

Game #1

Pick a volunteer as a leader to start out the game.

Let the volunteers whisper to you the name of an object in the room.

The leader then tells the class in which part of the room, (front, back, near a window), the object is located.

He tells the class an attribute of the object without letting them know what the object is.

After each attribute has been given the class should guess what object the leader has selected.

It is best to allow only one or two guesses before the leader gives another attribute. Do not let one child do all the guessing.

The first child to correctly guess the object becomes the next leader.

Game #2

Ask the class to stand up.

The teacher or a leader holds up an object. Those children who correctly name an attribute of the object may sit down. Count the pupils sitting down to show how many attributes were named.

WORDS TO YOU FOR ACTIVITY TWO.

ACTIVITY 2 OBJECT HUNT

SYNOPSIS (WHAT WILL YOU BE DOING?)

Children collect OBJECTS around the school. They sort these objects using one ATTRIBUTE at a time.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

The children use one attribute to sort objects. This is a simple way to start sorting. It also gives them more experience talking about attributes.

MATERIALS

For each child:
- magnifier
- bag-paper or plastic
- ten objects collected from around the school

PREPARATION

Choose the place for the OBJECT HUNT the day before you do this activity. This place should have many objects for the children to choose from. This place should be safe. You should be able to tell the class the boundaries of the place. Pick up your own collection of ten objects for use on the Third Day.

TEACHING SUGGESTIONS

First Day-The Object Hunt

1. Tell the children that today they will go on an object hunt.

   Tell them:

   "We are going out to find some interesting objects to bring back to class."

   "Do not collect objects that are all the same. Collect many different kinds of objects."

   "I will give you a bag to put the objects in. Collect only ten objects. The objects must fit into the bag."

"When we get to the hunting place I will give you your bag. Stay in the hunting place. I will show you where the hunting place is."

Ask the children questions ab
know their responsibilities?

2. Take the class to the hunting place.

   Show them the boundaries of the hunting place. Tell them to stay inside these boundaries.

   Give each child a bag.

   Return to the classroom when each child has found ten objects.

3. Give each child a magnifier. Let them observe their objects.

4. Let the children put their objects into their bags. Keep the bags of objects for tomorrow's lesson.

Second Day-Sorting By One Attribute

1. Let the children get out their bags of objects.

   Ask a volunteer to show the class one of his objects. Ask the class:

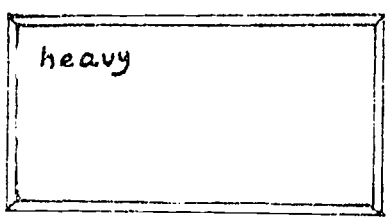
   "Can you name an attribute of that object?"

   Write on the chalkboard an attribute of the object.

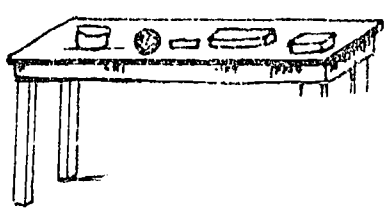
   Say to the class:

   "Who has an object with this attribute?"

   "Hold up objects that have this attribute."



THIS PILE OF OBJECTS HAS THE ATTRIBUTE "HEAVY."



"Put all these objects into the same pile on your desk."

"Do all the objects in this pile have the attribute that we wrote on the board?"

2. Ask another volunteer to show the class one of his objects. Ask the class the above questions.

   Continue doing this until the end of the lesson.

3. Keep the bags of objects for tomorrow's lesson.

Third Day-Letting the Children Sort by Any Attribute

1. Let each child get out his bag of objects.

   Tell the children:

   "Yesterday you sorted (separated) your objects."

   "Today you can sort (separate) your objects in any way you choose."

   Let the children sort their objects.

2. Walk around the class.

   Stop at a child's desk. Give the child an object from your bag.

   Ask the child:

   "Where would you put this object?"

   Let the child place the object. Listen to him, but do not question him.

   Do this to five children.

3. Ask the class:

"Can someone show the class how he sorted his objects?"

Let several volunteers show their sorted objects to the class.

4. Tell the class:

"Mix up your objects on your desk."

"Sort them in a new way."

5. Walk around the class. Give objects from your bag to five more children.

Ask: "Where would you put this object?"

6. Ask the class:

"Can someone show the class how he sorted his objects?"

Let several volunteers show their sorted objects to the class.

7. Tell the class:

"Mix up the objects on your desk."

"Sort them in a new way."

"Let your neighbor guess how you sorted your objects."

8. For the rest of the lesson, repeat any of the above activities (sorting in a new way, showing how the objects were sorted, guessing how the objects were sorted).

ACTIVITY 3 MOTHER'S BUTTON BAG

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children separate buttons by size, shape, color and other attributes. They group buttons according to different attributes chosen by the teacher. They compare attributes of different objects found in the classroom.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity is a continuation of sorting objects from Activity 2. The children use more attributes to sort the buttons. This gives more experience in sorting, talking about and comparing attributes.

MATERIALS

For each child:
30 buttons or pieces of construction paper of different shapes, colors, and sizes
can for the buttons

TEACHING SUGGESTIONS

First Day-Sorting by Color

1. Give each child a can with thirty buttons in it. Ask:

"What attributes do your buttons have?"

"How are they the same?"

"How are they different?"

2. Say: "Sort your buttons by color."

Let the children choose their own ways of sorting and their own number of groups. For example: Some may group all red buttons in one pile and all other colors in another pile. Some children may make a pile of red buttons, blue buttons, green buttons and other colors.

Accept all sorting as correct.

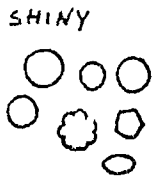
3. Ask volunteers to tell the class how they sorted their buttons.

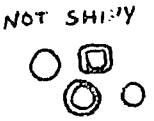
4. Collect the cans of buttons at the end of the lesson.

Second Day-Sorting By Other Attributes

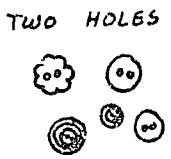
1. Give each child his can of buttons.

2. Say: "Sort your buttons by any attributes you want to."

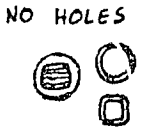


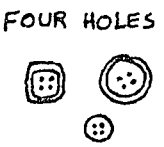


"Group the buttons in as many ways as you can think of."



"Show your neighbors how you sorted their buttons."





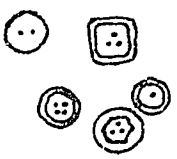
3. Ask volunteers to tell the class how they sorted their buttons.

4. Collect the buttons at the end of the lesson.

Third Day-Introducing Opposite Attributes

1. Give each child his can of buttons.

2. Say: "Put all the big buttons in one pile."



"Put all the small buttons in another pile."

"You have sorted your buttons by opposite attributes."

"Put all the thick buttons in one pile."

"What buttons go in the other pile?"

3. Let the children put five objects from somewhere in the room with their buttons. These objects could also be from their desk or pocket.

   Say: "Put all the big objects in one pile."

   "Put objects with the opposite attribute in another pile."

   Let volunteers show the class how they sorted their objects.

4. Let the children sort their objects into piles with opposite attributes. Let volunteers show the class how they sorted their objects. For example:

   Large - small
   Thick - thin
   Heavy - light
   Rough - smooth

5. Collect the buttons at the end of the period.

ACTIVITY 4 OBJECT GRAB-BAG GAME

SYNOPSIS (WHAT WILL YOU BE DOING?)

Children play a game in which they compare objects. In this game they look for two objects that have the same attributes.

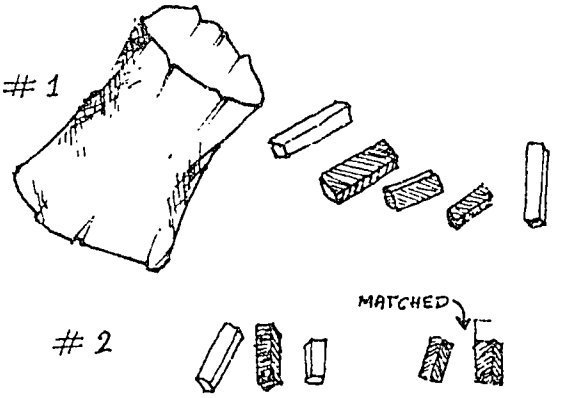
OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This game gives the children practice in observing and comparing attributes. It is a fun way to give them more experience with attributes.

MATERIALS

For each group of four children:

grab bag - paper or cloth bag
set of 36 colored blocks

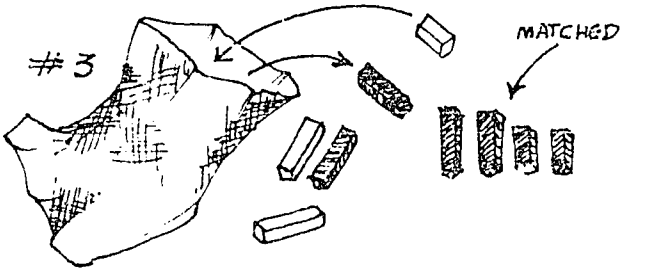


TEACHING SUGGESTIONS

1. Divide the children into groups of four.

2. Explain the rules carefully. Play the game with one group of children, while the class watches.

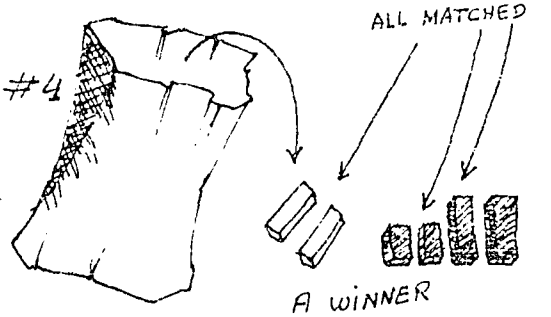
Rules for the game:



Each child in the group takes five blocks from the bag without looking into it.

They put together any two blocks that are the same in all attributes. These are called "MATCHED" and are put aside.

The bag is passed around the group. Each child takes one block from the bag and returns one block to the bag from his pile of blocks.



The children put aside new pairs that are matched.

The bag is passed around the group until a player has all his blocks in matched pairs and no block to return to the bag. He wins the game.

3. Give each group a Grab-Bag.

   Let each group play at their place.

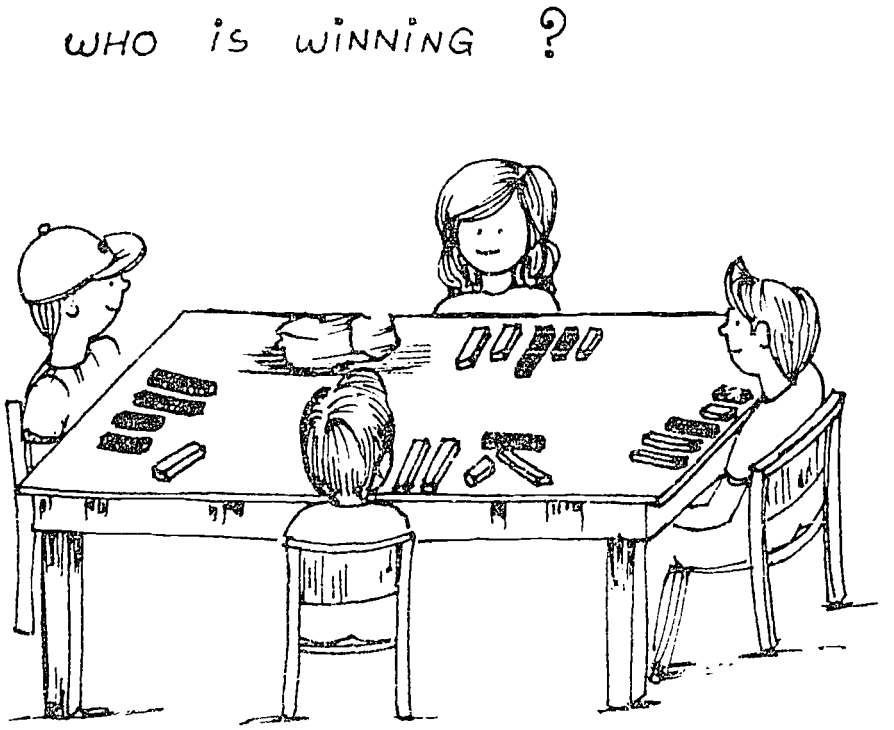
   Give the winner of each game a bottle cap.

   The child who has the most bottle caps at the end of the game is the "grand winner".

4. Encourage the children to make their own rules to play the game.

5. If the game is too hard for some children, let them pick blocks from the bag and match them.

6. This "Grab-Bag Game" can be played at other times. Use it when you want to do a fun activity.

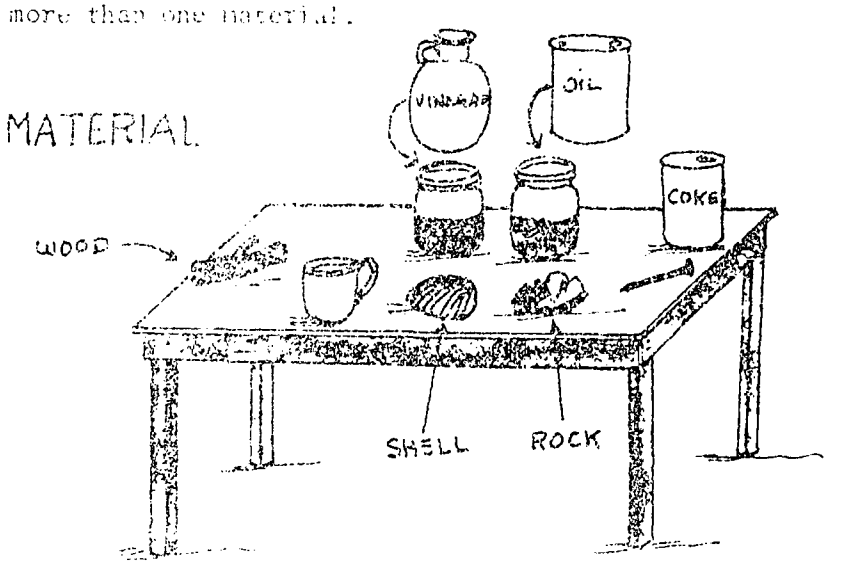


PART 2
INTRODUCING THE CONCEPT OF MATERIAL

OBJECTIVES

At the end of Part Two the children should be able to:

- Talk about solids, and liquids as objects.
- Identify some of the materials objects are made of.
- Realize that an object's form can change while its material remains the same.
- Sort objects by the material they are made of.
- Identify objects made of one material and objects made of more than one material.



ACTIVITY 5 INVENTION OF THE CONCEPT OF MATERIAL

SYNOPSIS (WHAT WILL YOU BE DOING?)

You sort fifteen obejcts into piles of woods, plastics and metals. The children sort fifteen more objects into the same piles. The concept of MATERIAL is then invented. The children sort the objects again into piles of three different materials.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

The concept of MATERIAL (what is is made of) is invented. This is an important concept which the children can use in observing and understanding their environment.

MATERIALS

For the class:

- ten pieces of plastic
- ten pieces of wood
- ten pieces of metal
- bag for the pieces

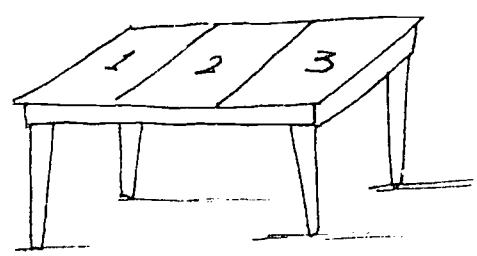
The pieces should be familiar to the students. The pieces should be different in size and shape.

TEACHING SUGGESTIONS

First Day-Inventing the Concept of Material

1. Gather the children around the demonstration area. This may be a table, desk or the floor.

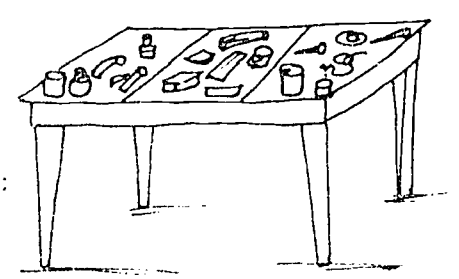
   Mark three sections with chalk.



2. Tell the children:

   "Watch what I do."

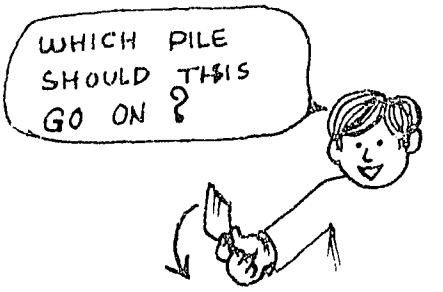
   Take fifteen (15) of the pieces out of the bag. Sort them into the three sections you marked off. Sort them into piles of metals, plastics and woods. Do not tell the children what you are doing.



3. Take another object out of the bag. Ask:

   "Which pile should this go on?"

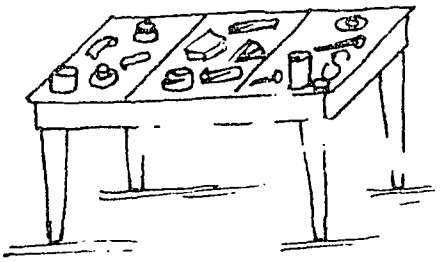
Place the object on the pile the student's select. It should be the pile that is made of that kind of material. For example: A piece of wood should go on the pile with the other places of wood.



Do the same thing with the rest of the objects in the bag. Each time ask the class:

"Which pile should this go on?"

You can let volunteers put the objects in the pile.



4. Ask the children:

"How are the objects sorted?"

"What do you call the objects in this pile?" Point to the first pile.

"What do you call the objects in this pile?" Point to the second pile.

"What do you call the objects in this pile?" Point to the third pile.

The children should give you the vernacular names for plastic, wood and metal. Write these words on a card and place a card on each pile.

5. Tell the class:

"Each pile is a different MATERIAL." Use the English word material if there is no vernacular word for material.

"What is this kind of material?" Point to the first pile.

"What is this kind of material?" Point to the second pile.

"What is this kind of material?" Point to the third pile.

6. Put the objects back into the bag.

Pass the bag around the class. Let each child take an object.

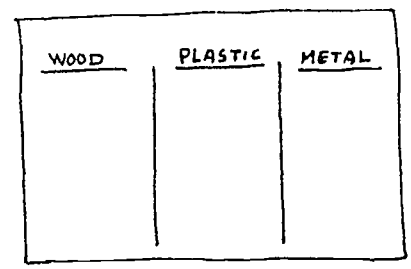
Tell the children:

"Put your object in the correct pile. Each pile should be made of objects of the same material."

Let them put their objects into piles in the three marked off sections.

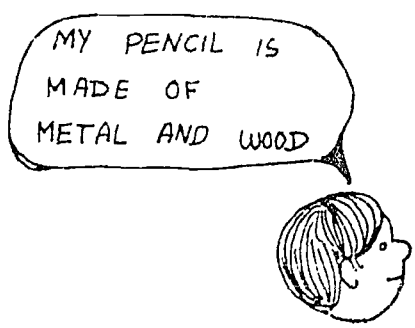
Each time a new object is put on the pile, ask the class:

"What kind of material is that?"



7. Ask: "What other objects in the room are the same kind of material as in the three piles?"

Let the children point out other plastics, woods, and metals in the classroom.



ACTIVITY 6 SORTING WOODS AND METALS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children observe pieces of wood and metal. They talk about their attributes. They are asked to sort the pieces. The sorting by material is encouraged.

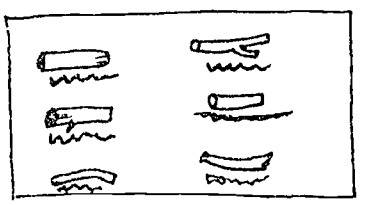
OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity encourages the children to observe local materials. It gives them experience in sorting by material.

MATERIALS

For each group of two children:
- ten pieces of wood - there should be four or more kinds of local wood used.
- two magnifiers
- can for the pieces of wood
- ten pieces of metal - there should be four or more kinds of local metals used.
- can for the pieces of metal

For the class:
- six labeled display sets of woods



TEACHING SUGGESTIONS

First Day-Sorting Woods

1. Divide the class into groups of two children each.

   Give each group a can with ten pieces of wood in it.

   Give each child a magnifier.

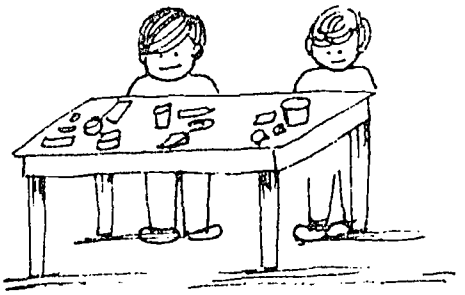
2. Tell the class:

   "Look at the woods. Can you find out how they are the same? Can you find out how they are different?"

   "Sort the woods."

After the children sort the woods, ask:

"How many piles do you have?"

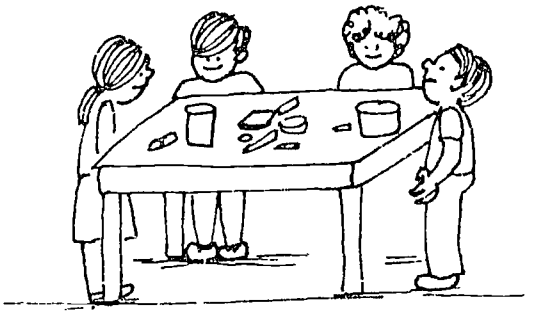


Let the class discuss the number of piles each group has.

3. Let each group join with another group. Now each group

Tell the children:

"Each group should put their woods together."



"Sort your woods."

Walk around the class. Talk with the groups. Ask questions like:

"How is this pile different from the other piles?"

"How many kinds of woods do you think you have? How do you know?"

4. Have a class discussion:

"What kinds of woods do you have?"

"How many kinds do you have?"

"How are the woods different?"

5. Give each group a labeled display set of woods. Let them match their woods with the display set.

6. Leave the woods and display set out for the children to use during their free time.

Second Day-Sorting Metals

1. Divide the class into groups of two children each.

   Give each group a can with ten pieces of metal in it.

   Give each child a magnifier.

2. Tell the class:

   "Look at the metals. Can you find out how they are the same? Can you find out how they are different?"

   "Sort the metals."

   After the children sort the metals, ask:

   "How many piles do you have?"

   Let the class discuss the number of piles each group has.

3. Let each group join with another group. Now each group has four studetns in it.

   Tell the children:

   "Each group should put their metals together."

   "Sort your metals."

   Walk around the class. Talk with the groups. Ask questions like:

   "How is this pile different from the other piles?"

   "How many kinds of metals do you think you have? How do you know?"

   "How are the metals different?"

4. Have a class discussion:

   "How many kinds of metal do you have?"

   "How are the metals different?"

   "Does anyone know the names of these metals?" (Accept all answers for this question. Do not say they are right or wrong.)

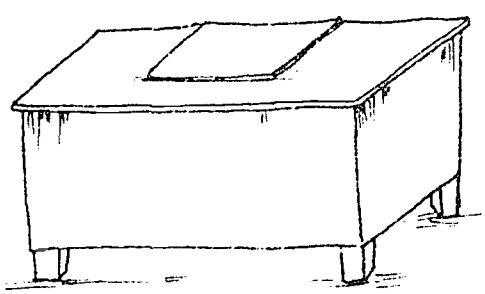
OPTIONAL ACTIVITY-FINDING OTHER METALS AND WOODS

You might do some of the following activities if the children are interested:

1. Let the children go on a field trip to find more metals and/or words.

2. Let the children bring objects from home to add to the kinds of metals and/or woods they have in the classroom.

3. Let the class try to count how many different materials are in an object. For example: How many different materials are used in making a desk?



HOW MANY DIFFERENT MATERIALS CAN YOU FIND ?

ACTIVITY 7 OBSERVING AND SORTING ROCKS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children observe and sort the rocks found in the room. They take a field trip and collect more rocks. The children observe and sort the new rocks.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity gives more opportunity for observing and sorting. By collecting rocks from around the island the children become more aware of the materials around them.

MATERIALS

For each child:
- magnifier
- can
- five rocks - these should be rocks used by the class in "free play" activities.

For the class:
- hammer - optional

PREPARATION

Read the section on "How To Take A Field Trip". If you choose to go on field trip #2, make your transportation arrangements one week ahead.

TEACHING SUGGESTIONS

First Day-Observing And Sorting Rocks

1. Give each child a magnifier and five rocks.
   Let them observe the rocks. Let them exchange rocks with their neighbors.

2. Let the children sort their rocks:

   Say: "Sort your rocks by some attribute."

   "What attribute did you use?"

"What other ways can you sort your rocks?"

"How many different materials are in one rock?"

"Are any rocks made of only one material?"

3. Tell the class they will be taking a field trip tomorrow to find different rocks.

Second Day-What Rocks Are Around?/A Field Trip

CHOOSE ONE OF THESE FIELD TRIPS. THE TRIP YOU CHOOSE WILL DEPEND ON:

HOW MUCH TIME YOU HAVE,
THE INTEREST OF THE CLASS,
WHERE YOUR SCHOOL IS LOCATED,
WHETHER YOU CAN GET TRANSPORTATION,
THE PLACES WHERE YOU CAN FIND ROCKS.

FIELD TRIP #1 - Rocks Around The School

1. Give each child a can.

   Say: "We will take a field trip to see what new kinds of rocks you can find."

   "Each person can bring back ten rocks in their can."

2. Discuss the field trip rules with the class.

3. Take the children to the rock hunting area.
   Return to the classroom after they have found enough rocks.

4. Let the children observe their rocks for the rest of the period.
   Let them look at the rocks their neighbor found.

If you have a hammer, let the children break open some rocks to see the inside.

Let each child keep his rocks in his can for tomorrow's lesson.

FIELD TRIP #2 - Rocks On The Beach And Rocks On The High Land

1. Give each child a can.

   Say: "We will take a field trip to see what new kinds of rocks you can find."

   "We will go to two places: the beach and a high place on the island."

   "You can collect some rocks from both places. Keep them in the can."

2. Discuss the field trip rules with the class.

3. Take the class to each rock hunting area. Go to areas where the kinds of rocks are different.

   Return to the classroom after both places have been visited.

4. Let the children observe their rocks for the rest of the period. Let them look at the rocks their neighbor found.

   If you have a hammer, let the children break open some rocks to see the inside.

   Let each child keep his rocks in his can for tomorrow's lesson.

Third Day-Observing The Rocks And Discussing The Field Trip

1. Let each child get his can of rocks.

   Say: "Are the new rocks different from the rocks in the room?"

   "Did you find any rocks with new attributes?"

"Can you tell where you found each rock?"

"Sort your rocks by any attribute you choose."

"Would someone show how they sorted their rocks?"

2. Let the class observe and sort the rocks for the rest of the period.

   You could continue observing rocks tomorrow if the children are still very interested. Some children may bring rocks from home. You might find some rocks from other islands or countries to show the class.

ACTIVITY 8 SORTING SHELLS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children observe and sort shells found in the room. They take a field trip and collect more shells. The children observe and sort the new shells.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity gives more opportunity for observing and sorting. By collecting shells from the beach, the children become more aware of the materials around them.

MATERIALS

For each child:
- magnifier
- can
- eight shells-these should be shells used by the class in "free play" activities.

PREPARATION

Read the section on "How To Take A Field Trip". If you need transportation, make arrangements one week ahead.

TEACHING SUGGESTIONS

First Day-Observing And Sorting Shells

1. Give each child a magnifier and eight shells. Let them observe the shells. Let them exchange shells with their neighbor.

2. Let the children sort their shells:

   Say: "Sort your shells by some attribute."

   "What attribute did you use?"

   "What other ways can you sort your shells?"

3. Compare the shells:

   Say: "Which two shells are the most alike?"

   "Does anyone have two shells that are exactly the same?"

   "Which shell do you like the best? Why?"

4. Tell the children they will be taking a field trip to the beach tomorrow to find different shells.

Second Day-A Field Trip To The Beach For Shells

1. Give each child a can.

   Say: "We will take a field trip to see what new kinds of shells you can find."

   "You can put the shells in the can."

2. Discuss the field trip rules with the class. Be sure to tell them not to disturb the beach area. Tell them the boundaries they should stay inside of.

3. Take the class to the beach.

   Return to the classroom after they have collected enough shells.

4. Let the children observe their shells for the rest of the period. Let them look at the shells their neighbors found.

   Let each child keep his shells in his can for tomorrow's lesson.

Third Day-Observing Shells And Discussing The Field Trip

1. Let each child get his can of shells.

   Say: "Did you find any new kinds of shells?"

   "Did you find any shells with new attributes?"

   "Sort your shells by any attribute you choose."

   "Would someone show how they sorted their shells?"

2. Let the class observe and sort shells for the rest of the period.

ACTIVITY 9 COMPARING WOOD IN DIFFERENT FORMS

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children change the form of several pieces of wood. They compare each piece of wood with small pieces cut from it and dust sanded off it. The children also change the form of pieces of paper and soft rock. During the whole activity the children are encouraged to notice: that the form changes but the material remains the same, and some attributes of an object stay the same after its form is changed.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity gives the children experience in changing the form of an object. Each time they change the form they are asked, "Is it the same material?". This is done to introduce the idea that the form of an object can change while its material remains the same. This is a basis for a later understanding that matter (material) can exist in different states (forms).

MATERIALS

For each child:
- magnifier
- piece of sandpaper
- tray or sheet of paper taped to the desk - it is easier to observe the wood with paper or a tray under it.
- three pieces of wood, each a different kind - you can use the woods from Activity 6.

For the class:
- knife

TEACHING SUGGESTIONS

1. Get out the first kind of wood.

   Give each child a piece of this kind of wood, a piece of sandpaper, and a tray (or piece of paper taped to the desk).

   Ask the class:

   "Can this kind of wood be changed into wood dust?"

   Let the children sand the wood.

Ask: "How is the piece of wood different from the dust?"

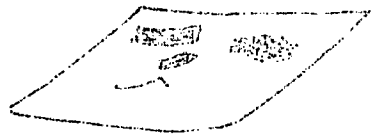
"How is the piece of wood the same as the wood dust?"

"Which is wood?"

Walk around the class. Cut a small piece of wood off of each child's piece of wood. Do not give the knife to the children.

Ask: "How is the piece of wood different from the small piece of wood?"

"How is the piece of wood the same as the small piece of wood?"

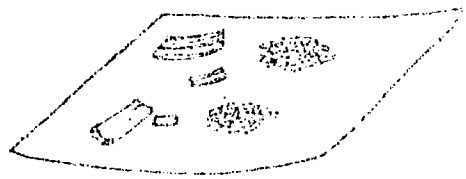


"Which is wood?"

2. Get out the second kind of wood.

Give each child a piece of the second kind of wood.

Ask: "Can this kind of wood be changed into wood dust?"



Let the children sand the wood.

Ask: "How are the two kinds of dust the same?"

Walk around the class. Cut a small piece of wood off of each child's piece of wood.

Ask: "Can you tell which piece of wood the small pieces came from?"

3. Get out the third kind of wood.

Give each child a piece of the third kind of wood.

Ask: "Can this kind of wood be changed into wood dust?"

Let the children sand the wood. Walk around the class. Cut a small piece of wood off of each child's piece of wood.

Tell the children:

"Mix the three kinds of dust together."

"Mix the small pieces of wood together."

Ask: "Can you find the dust that came from each kind of wood?"

"How do you know?"

"Can you find the small pieces that came from each kind of wood?"

"How do you know?"

"Which is wood?"

4. Keep the large pieces of wood. Throw the dust and small pieces away.

OPTIONAL ACTIVITY-HOW MANY MATERIALS ARE THERE?

Give each group of four children a bag containing pieces of wood, small pieces of wood and wood dust. These should be all mixed together. These kinds of woods should be different from the three kinds they used in this activity.

Let each group try and find out <u>how many kinds</u> of materials (wood) are in their bag.

ACTIVITY 10 OBSERVING AND MIXING LIQUIDS

SYNOPSIS (WHAT WILL YOU BE DOING?)

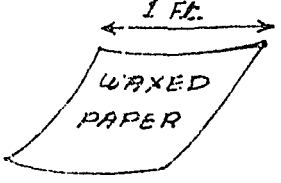
The children are given four kinds of liquids in bottles. They describe the liquid's attributes before they open the bottles. They open the bottles and pour out a little of the liquid. The children describe the attributes as they mix the liquids together. At the end of the activity they set some liquids where they can observe them after a week.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This activity allows the children to experience working with material (matter) in its liquid form. This is new. They can use the senses of touch, smell and sight in describing the attributes of these materials.

MATERIALS

For each child:
- piece of waxed paper or cellophane or plastic or plastic bag
- paper towel
- magnifier



For each group of four children:
- jar of liquid starch or soapy water
- jar of motor oil or cooking oil or kerosene or coconut oil
- jar of water
- jar of vinegar

PREPARATION

Fill the jars half full of liquid. Use small jars. Be sure the jars are clean.

TEACHING SUGGESTIONS

First Day-Working With Liquids

1. Divide the class into groups of four children each. Give each child a piece of waxed paper, a paper towel and a magnifier.

Tell the class:

"Each group will get four bottles of liquid to observe. Do not open these bottles."

Give each group a set of four liquids.

Ask: "How are the liquids the same?"

"How are the liquids different?"

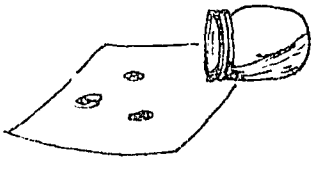
"What other attributes do the liquids have?"

"Can you group the liquids?"

2. Tell the class:

"Carefully open the bottles. Pour a little bit of each liquid on your waxed paper."

"You can touch the liquid, but do not get it on your clothes or other people."



Let the children work with the liquids. They might: mix them, feel them, smell them, look at their neighbor's, or add more.

3. At the end of the period, throw the waxed paper away. Have the children clean their hands and the desks. Keep the liquid left in the jars for tomorrow.

Second Day-More About Liquids

1. Give each group its four jars. Let them pour the liquids together into one jar. Let them discuss what they observe.

"Which liquid is on the top?"

"Do the liquids look the same?"

2. Let the children observe their neighbor's jar.

3. Put the jars on the table at the end of the lesson. Let the class look at them tomorrow to see if there has been any change.

OPTIONAL ACTIVITY - LOOKING AT A GEL

Mix up a package of jello at home and let it set. Put fruit cocktail in it if you want. Take it to school the next day.

Give each child a piece of jello on waxed paper. Let them observe it, touch it, taste it.

Ideas for class discussion:

"How is it like a liquid?"

"What are its attributes?"

"What is it used for?"

"What will happen to it if we put it in the sun?"

"What will happen to it if we put it in the refrigerator?"

OPTIONAL ACTIVITY - MIXING LIQUIDS TOGETHER

Let the children experiment with liquids they suggest. Let them bring the liquids to school and mix them together.

Ideas for class discussion:

"What liquids will not mix together?"

"Do the colors change?"

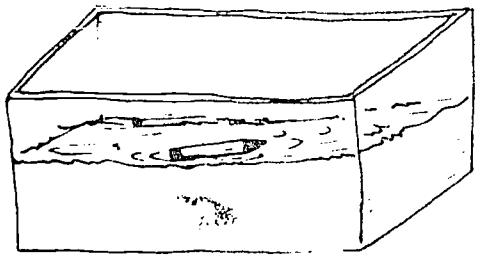
CAUTION: Be careful with liquids that burn.
Do not mix together a liquid that has ammonia in it with a liquid that has chlorine in it.

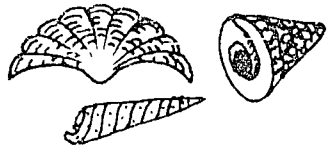
PART 3
EXPERIMENTING WITH MATERIAL OBJECTS

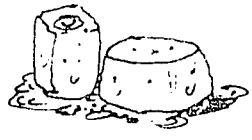
OBJECTIVES

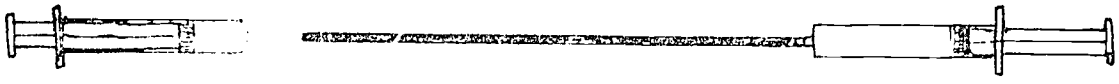
At the end of Part Three the children should be able to:

- Experiment with various objects and observe changes in them.
- Arrange pictures in the order that shows a "picture story" of what happened to the object in the picture.
- Tell others what happened in their experiments.









ACTIVITY 11 ROCK CANDY AND SUGAR CUBES

SYNOPSIS (WHAT WILL YOU BE DOING?)

Each child is given a piece of rock candy and a sugar cube. They experiment with the material.

The children change the shape of the material by grinding it. They can see that the material's appearance changes, but it is the same material. They can see that two objects can look different, but are made of the same material. The children put cards in order to show a picture story about the sugar cube and rock candy.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

This gives the children more experience in working with materials. They see that the same material can look different (Both rock candy and sugar cubes are made of sugar). Making a picture story of the sugar cube and rock candy gives practice in ordering events by the sequence in which they occur.

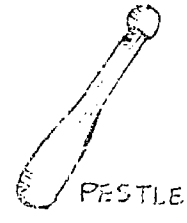
MATERIALS

For each group of two children:
- two cubes of sugar
- two pieces of rock candy
- plastic spoon
- paper towel
- two magnifiers
- mortar or clam shell or jar lid
- pestle or smooth rock
- small jar with lid
- set of picture story cards


MORTAR


CLAM SHELL


JAR LID


PESTLE


SMOOTH ROCK

PREPARATION

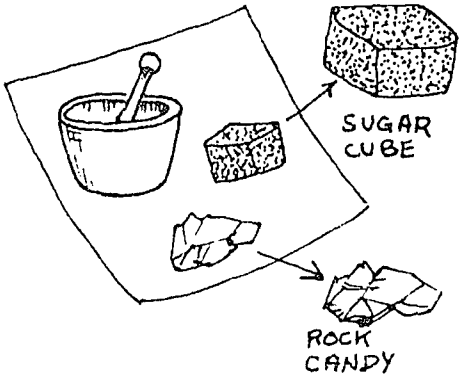
If you use [illegible], jar lids, or smooth rocks; be sure they are clean.

TEACHING SUGGESTIONS

First Day-Observing Rock Candy And Sugar Cubes

1. [illegible] into groups of two children each.

Give each group two paper towels, two magnifiers, two pieces of rock candy and two sugar cubes.

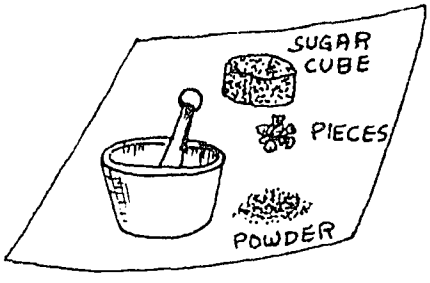


Say: "How are these objects the same?"

"How are these objects different?"

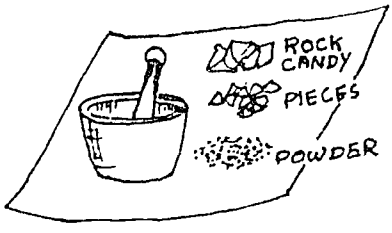
"What other attributes do the objects have?"

2. Give each group a mortar and pestle.



Say: "Put a sugar cube in the mortar and break it into little pieces."

"How are the pieces the same as the cubes of sugar?"



"How are the pieces different from the cube of sugar?"

"Put some of the little pieces into the mortar and grind it into a powder."

"Is the powder the same as the cube?"

"Put a piece of rock candy into the mortar and break it into little pieces."

"Put some of the little pieces into the mortar and grind it into a powder."

"How are the two powders different?"

"How are the powders the same?"

"You can taste it, but do not eat it."

3. At the end of the lesson let each group put its sugar powder and pieces into a small jar. They will use this tomorrow. Put the lid on to keep the ants out of the sugar. Put the jars in a safe place.

Second Day-Objects Made Of The Same Material/A Picture Story

1. Give each group its jar of sugar pieces and powder. Give each child a magnifier.

   Say: "What is the material in your jar?"

   "Can you tell the material the sugar cube is made of?"

   "Can you tell the material the rock candy is made of?"

2. Give each group a set of picture story cards.

Say: "Which pictures show rock candy or pieces of rock candy?"

"Which pictures show sugar cubes or pieces of sugar cubes?"

"Make a picture story about the sugar cube. Put the pictures in the correct order to show what happened to the sugar cube."

"Make a picture story about the rock candy. Put the pictures in the correct order to show what happened to the rock candy."

3. Let volunteers tell the class their picture story for the sugar cube and the rock candy.

   It may be easy for the children to start their story with the whole sugar cube and piece of rock candy. The last pictures of the pieces and powder are difficult to tell apart. This shows that the objects are made of the same material.

4. Collect the picture story cards at the end of the lesson.

OPTIONAL ACTIVITY - WHAT ABOUT SUGAR?

The class can discuss: "Where does sugar come from?"

"What is sugar used for?"

"What can you do with sugar?"

Some of the projects that could be done are:

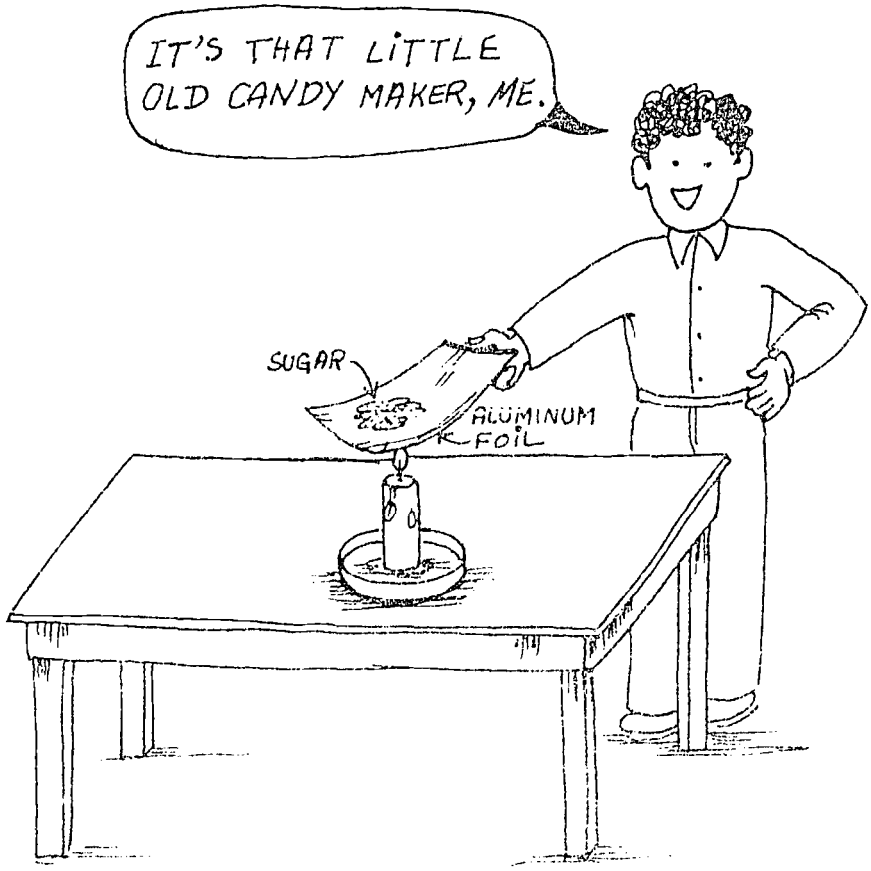
Taking sugar cane and getting sugar from it.

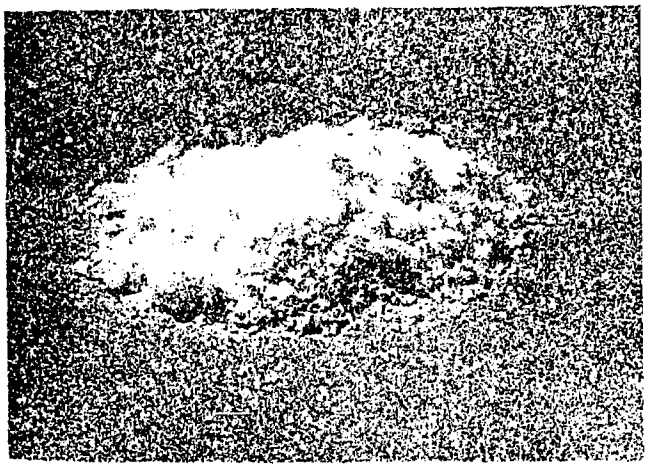
Heating sugar to make candy.

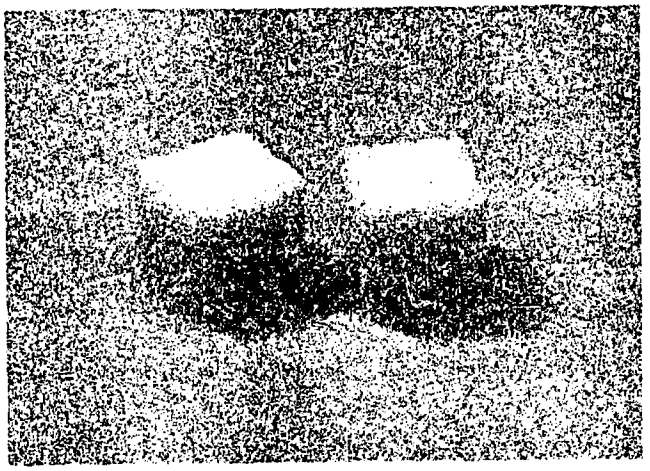
OPTIONAL ACTIVITY - DIFFERENT OBJECTS/SAME MATERIAL

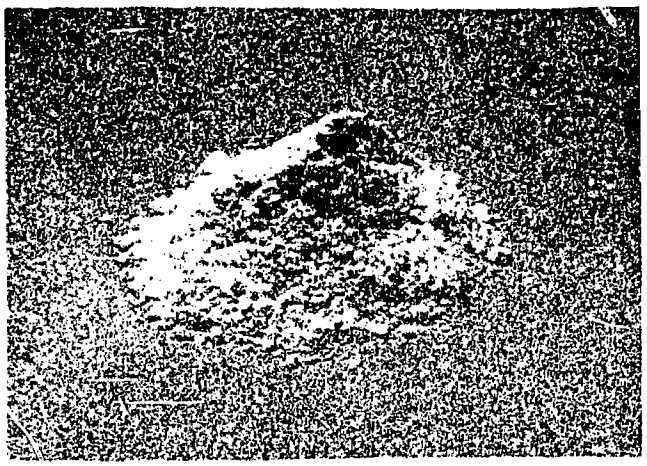
The class can look for objects that are made of the same material.

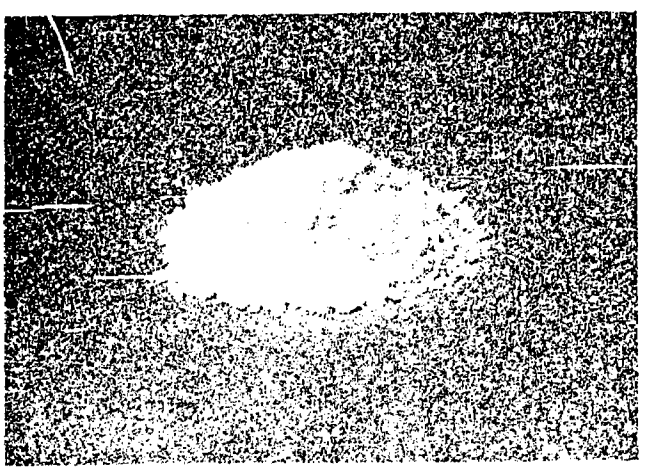
For example: Lime and chalk
Sandstone and beach sand
Rocks and soil
Coral and sea shells

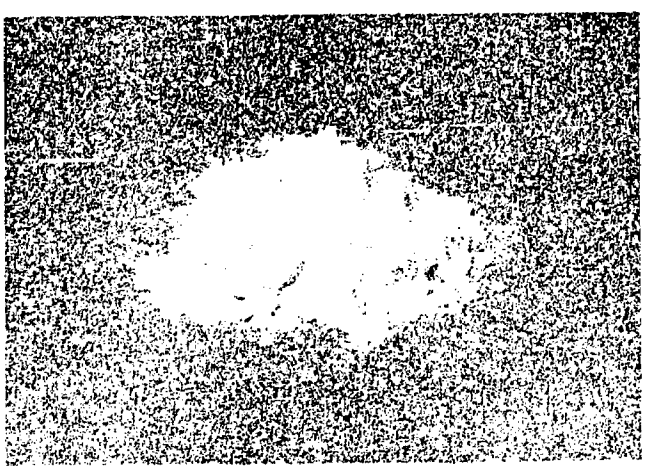


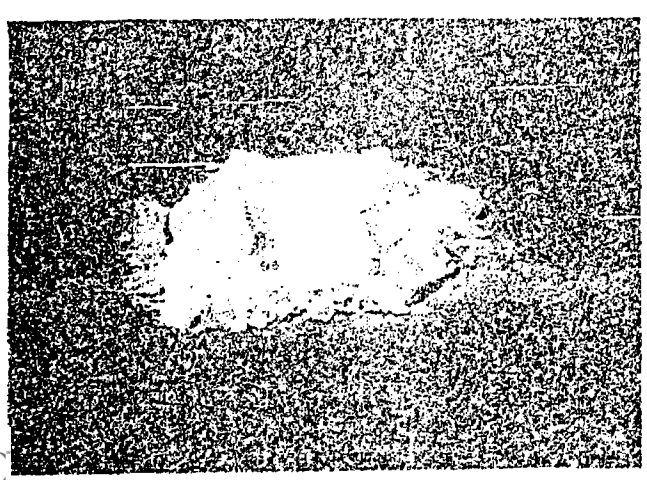












ACTIVITY 12 SOLID AND LIQUID WATER

SYNOPSIS (WHAT WILL YOU BE DOING?)

The children observe water change from a solid (ice) to a liquid. They put cards in order to show a picture story about the ice cube.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

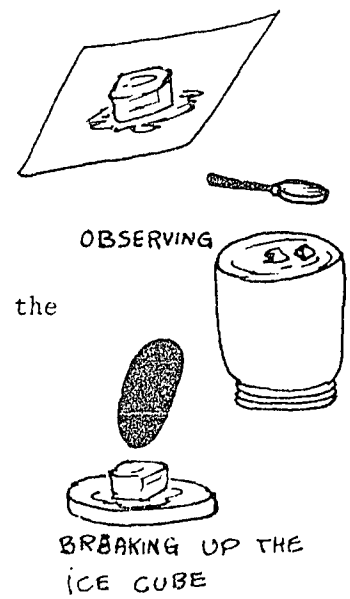
This is a very unstructured activity. The children experience a material change from solid to liquid. The teacher does little directing. The children are given the freedom to observe and discuss their observations with their neighbors. The picture story gives practice in ordering events by the sequence in which they occur.

MATERIALS

For each group of two children:
- two small jars
- plastic spoon
- two paper towels
- mortar or clam shell or jar lid
- pestle or smooth rock
- two ice cubes
- two magnifiers
- set of picture story cards

TEACHING SUGGESTIONS

First Day-Observing Melting Ice



1. Divide the class into groups of two children each.

   Say: "I will give each group two ice cubes to observe."

   "Leave one cube on the paper towel. You can break the second cube into pieces."

   "You can observe the pieces by putting them on the upside down jar."

2. Give each group its materials.

   Let them experiment, observe and discuss for the rest of the lesson.

Second Day-A Picture Story

1. Give each group a set of picture story cards.

   Say: "Make a picture story about the ice cube. Put the pictures in the correct order to show what happened to the ice cube."

2. Let volunteers show the class their picture stories.

3. Collect the picture story cards at the end of the lesson.

OPTIONAL ACTIVITY - WHICH ONE HAS THE MOST WATER?

This activity gives children experience in observing a material (water) placed in different shaped containers. Some children may begin to see that the amount of material does not change if it is put into a different shaped container.

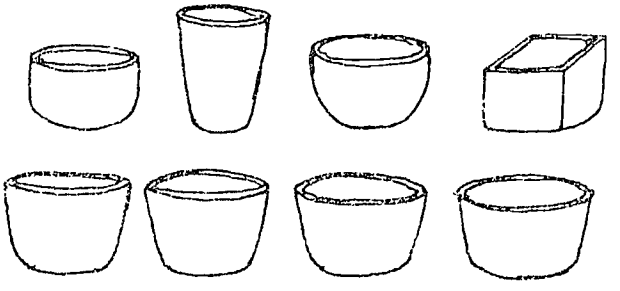
You could use many other kinds of activities where children experience putting sand or water into different cans or jars.

For this activity you will need:

four plastic or paper containers of different shapes,

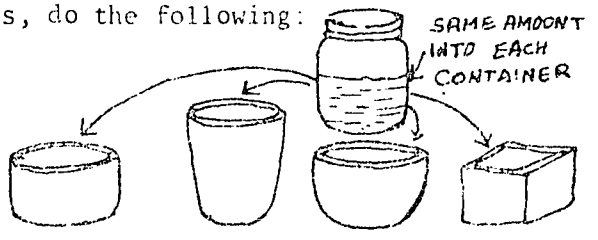
four clear plastic or glass dishes (all the same size and shape), and

food coloring if you have it.



The day before using this activity in class, do the following:

Put the same amount of water into each container. (Be sure the containers are shaped so you can get the ice out after it freezes.)



Put a drop of food coloring in each container if you have it.

Freeze all four containers overnight.

Take the containers of ice to class.

Put the four dishes out. Number the dishes and the containers: 1, 2, 3, and 4.

Put the ice from the containers into the four dishes.

Say: "Which piece of ice will form the most water when it melts?"

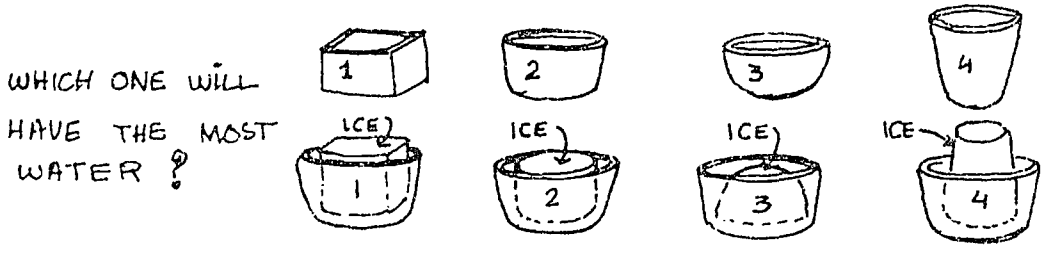
Check the dishes later in the school day. Have a class discussion after all the ice is melted.

Say: "Which dish has the most water?"

"Was this the dish you said would have the most water in it?"

Let the children pour the water back into the containers.

Let them discuss their observations.



ACTIVITY 13 FLOATING AND NONFLOATING OBJECTS

SYNOPSIS (WHAT WILL YOU BE DOING?)

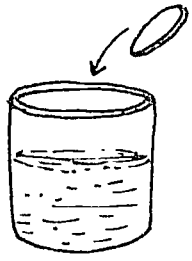
Children experiment with objects to find out if they float or sink. They record their observations.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

In this activity the children keep records of their experiments. The record can be referred to during the class discussion. This introduces the idea of recording observations for later use.

This activity aiso allows the child to answer a question by doing an experiment.

MATERIALS



For each group of two children:
- two cans or dishes or jars or small aquariums
- two paper towels
- two sets of record sheets
- string
- nail
- shell
- button
- piece of wood
- bean seed
- bottle cap
- aluminum foil
- sugar cube
- paper clip
- rubber band
- two or more other objects of the teacher's choice (some examples: plastic spaghetti, seed, boiled peanut, screen, plastic spoon)
- crayon

For the class:
- large can or bucket for water
- paper towels

PREPARATION

Put the objects for each group into a can. This will make it easy to pass the materials out.

TEACHING SUGGESTIONS

First Day-What Sinks Or Floats In Freshwater?

1. Show the children some of the objects.

Say: "Do you think this would float in water?"

"How could we find out?"

2. Divide the class into groups of two children each.

   Give each group a can of objects to test, two sets of record sheets, two paper towels and a second can.

   Say: "You can test these objects to see if they sink or float."

   "Test them one at a time."

   "Record each test on the record sheet. If the object sinks, circle sinks. If the object floats, circle floats."

3. Pour each child's can half full of water.

   Walk around the class observing the children. Listen to them.

   Explain that they can record objects not pictured on the record sheets. They can draw a picture of the object in the blank on the record sheet.

   Let the children test objects found around the room if they wish to.

4. At the end of the period: Collect the record sheets for tomorrow. Let the children empty the water and dry the objects.

Second Day-Looking At The Records

1. Give each child his record sheet.

Say: "Which objects float?"

"Which objects sink?"

"What other objects did you test?"

2. Let the children test other objects if they are still interested or do an OPTIONAL ACTIVITY.

OPTIONAL ACTIVITY - CLAY BOATS

Give each child a piece of clay. Let them make boats to float in their can of water. Give them small stones, washers or nails to put in the boats.

"Which shape boat holds the most?"

"Do some boats float better than others?"

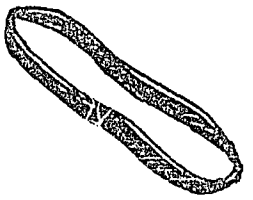
"Which shape is the best?"

"What is the smallest boat that will float? The biggest?"

Test each object in the water.

Circle the word floats if your object floats in water.

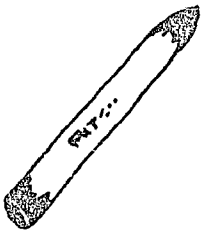
Circle the word sinks if your object sinks in water.



FLOATS

SINKS

rubber band



FLOATS

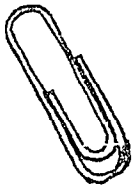
SINKS

crayon

FLOATS

SINKS

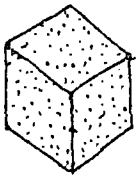
string



FLOATS

SINKS

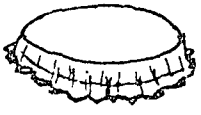
paper clip



FLOATS

SINKS

sugar cube



FLOATS

SINKS

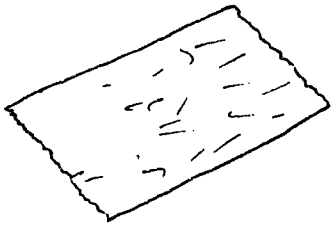
bottle cap

ACTIVITY 13 STUDENT RECORD SHEET

Test each object in the water.

Circle the word floats if your object floats in water.

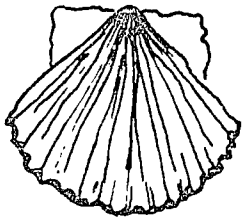
Circle the word sinks if your object sinks in water.



FLOATS

SINKS

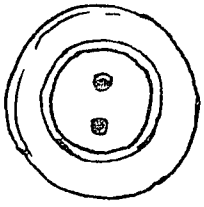
aluminum foil



FLOATS

SINKS

shell



FLOATS

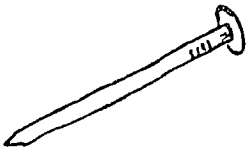
SINKS

button

FLOATS

SINKS

bean



FLOATS

SINKS

nail

FLOATS

SINKS

piece of wood

ACTIVITY 13 STUDENT RECORD SHEET

Test each object in the water.

Circle the word floats if your object floats in water.

Circle the word sinks if your object sinks in water.

FLOATS SINKS _____	FLOATS SINKS _____
FLOATS SINKS _____	FLOATS SINKS _____
FLOATS SINKS _____	FLOATS SINKS _____

ACTIVITY 13 STUDENT RECORD SHEET

ACTIVITY 14 EXPERIMENTING WITH AIR AND WATER

SYNOPSIS (WHAT WILL YOU BE DOING?)

Children experiment with air using bags, balloons, and syringes. While experimenting it can be seen that air (a gas) takes up space and is an object. They also experiment with water. Both air and water are observed for the attributes of: shape, compressibility, and weight.

OVERVIEW OF THIS ACTIVITY (WHY ARE YOU DOING THIS?)

In this activity the children are introduced to thinking of a gas (like air) as an object. This is new to them. They have observed solids and liquids. Now they observe gases. By using water they can compare gases and liquids easily.

MATERIALS

For each child:
- syringe
- clear plastic bag
- ballon
- jar small
- paper towel

For each group of two children:
- plastic tube - 12"

For the class:
- can of Freon - 12
- can for water

CAUTION: Freon - 12 should not be breathed in. Do not let the children handle the can. Keep it out of the reach of the children. Freon - 12 is heavier than air and would cause suffocation if breathed in.

TEACHING SUGGESTIONS

First Day-Observing Some Gases

1. Show the class an empty plastic bag. Say

"What are the attributes of this object?"

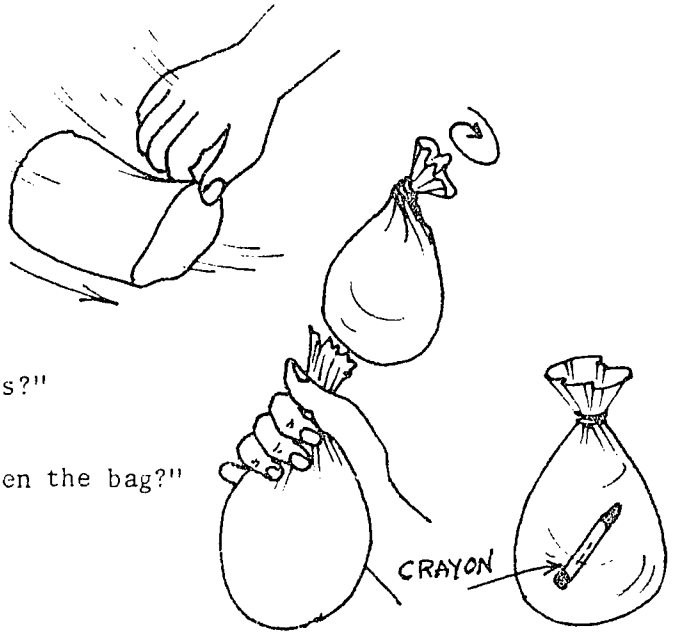
2. Give each child a plastic bag. Say:

"Put an object in the bag. Do not use objects from the desk."

It is hoped that some children will put air in the bag. Let the children show the objects they have in their bags. For example: fingers, pencil, air. Say:

"What are the attributes of the object in your bag?"

3. Move your bag through the air. Trap some air in the bag. Twist it shut so that air will stay in the bag.



Ask the children to trap some air in their bag like you did.

Say: "What is in the bag?"

"What are its attributes?"

"What happens if you open the bag?"

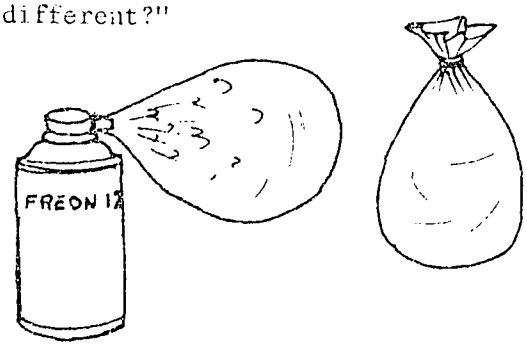
"What shape is it?"

"Can it be squeezed without breaking the bag?"

4. Put a piece of crayon in a plastic bag. Show this to the class. Hold up the bag with the crayon in it and the bag with the air in it.

Say: "How are the objects in these bags different?"

5. Put a plastic bag around the spout of the Freon - 12 can. Put some Freon into the bag. Twist it shut so the Freon will stay in the bag.



Show the class the bag of Freon.

Say: "How is the object in this bag different from your bag of air?"

"How is the Freon like the air?"

6 Hold the bag of Freon and the bag of air up. Drop them at the same time.

Fill up several more bags with Freon. Let the children drop them with their bags of air.

Say: "How are these two gases different?"

"Can you tell which bags are filled with Freon?"

"What other kinds of gas have you seen or heard of?"

Collect the bags at the end of the lesson. Let the Freon out of the bags. Do not let the children breath it.

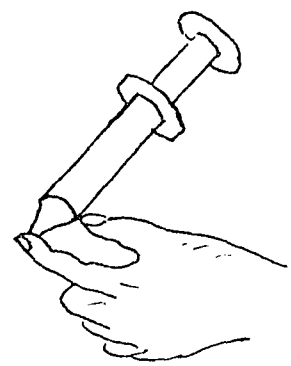
Second Day-Syringes and Air

1. Give each child a syringe. Give each group of two children a piece of tubing.

Let the children experiment with the syringes and tubes.

2. Have the class watch you:

Put your finger over the end of the syringe. Try and push the plunger in.

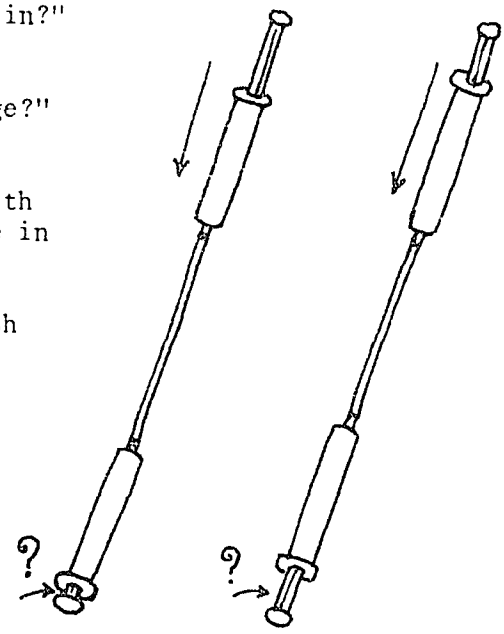


Say: "Why won't the plunger go in?"

"What is inside the syringe?"

Connect two syringes together with the tube. One plunger should be in and one should be out.

Say: "What will happen if I push this plunger in?"

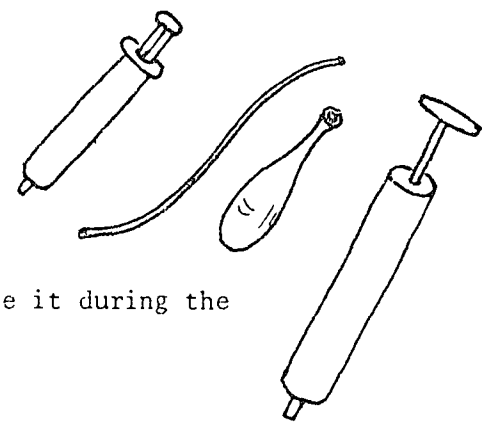


Connect two syringes together with the tube. Both plungers should be out.

Say: "What will happen if I push this plunger in?"

3. Let the children experiment with their syringes and tubes for the rest of the lesson.

Third Day-Syringes, Air and A Ballon



1. Give each child a syringe and a ballon. Give each group of two children a tube.

2. Let the children experiment all period.

3. If you have an air pump, let the class use it during the lesson.

Fourth Day-Syringes and Water

1. Have a class discussion:

"What shape is air?"

"What shape is water?"

"How can you change the shape of air or water?"

2. Tell the class they can experiment with water today if they follow the rules.

   Do not squirt other children with water.

3. Give each child a syringe, a jar of water, and a paper towel Put out the tubes and tell them they can use them if they want to.

4. Let the children experiment for the rest of the period.

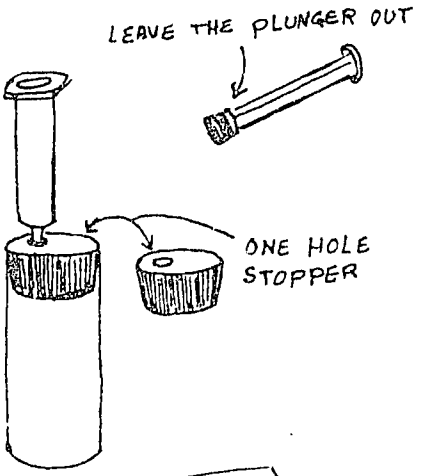
OPTIONAL ACTIVITY - HOW DO YOU GET THE WATER IN? HOW DO YOU GET THE WATER OUT?

Here are two problems you can show your students. Let them try and solve them.

Problem #1 Show the class the syringe, vial and one hole stopper.

Pour some water into the syringe.

"Why doesn't the water go into the vial?"

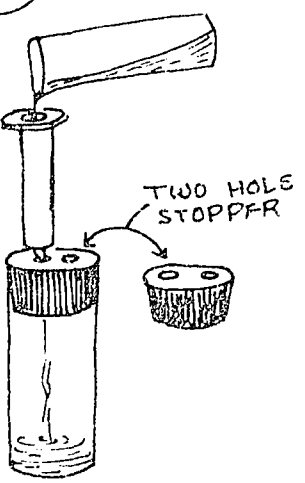


Take out the one hole stopper and put in the two hole stopper.

"What will happen when I pour the water into the syringe?"

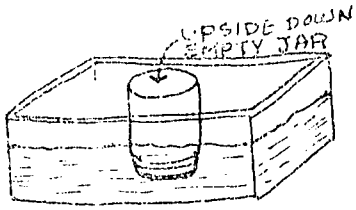
Pour the water into the syringe.

"Why did the water go into the vial this time?"

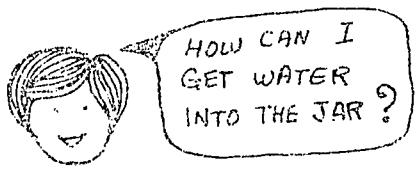


Problem #2 Show the class an aquarium full of water and a syringe with a tube on it.

Hold a jar upside down over the water. The jar should be an inch under the water.



"How can you use the syringe and tube to fill the jar with water?"



Let volunteers try filling the jar. The jar's position should not be changed.

This can be done by taking the air out of the jar or putting water into the jar.

"MATERIAL OBJECTS" MATERIALS

		1	2	3	4	5	6	7	8	9	10	11	12	13	14	total
kit-returnable	Magnifiers (FP)		32				32	32	32	32	32	32	32			32
	buttons			960										16		960
	plastic spoon											16	16			16
	nail													16		16
	syringe														32	32
	can of Freon-12														1	1
	plastic tube														16	16
	picture story card set											16	16			2 sets
kit-consumable	bean seed													16		16
	balloon														32	32
	plastic bag-clear														32	32
	piece of aluminum foil													16		16
	bag-plastic or paper		32			1										32
	bag-paper or cloth				6											6
	sand paper									32						32
	waxed paper										32					32
	starch										*					*
	oil										*					*
	vinegar										*					*
	sugar cubes											32		16		48
	rock candy											32				32
	record sheet set													32		32
teacher	labeled set of woods						6									6
	chart paper	1														1
	blocks-from math (FP)				216											216
	sheet of paper									32						32
	knife									1						1
	paper towel										32	16	32	30	32	162
	small jars with lids										32	16	32		32	32
	ice cubes												32			32
	paper clip													16		16
	rubber band													16		16
students	pieces of plastic (FP)					10										10
	pieces of wood (FP)					10	160			96				16		160
	pieces of metal (FP)					10	160									160
	rocks (FP)							160								160
	shells (FP)								256					16		256
	can (FP)			32			32	32	32					32		32
	can, large (FP)													1	1	1
	bottle cap (FP)													16		16
	clam shell/jar lid (FP)											16	16			16
	smooth rock											16	16			16

(FP) = may be taken from Free Play Objects in the room.

Look at your Free Play List.

HOW TO TAKE A FIELD TRIP

Some of the most important learning experiences are outside the classroom. A field trip experience is just as important as classroom experience. It is usually more important than classroom experience.

A field trip should be an enjoyable learning experience for the students and the teacher. The three most important things in making it a good field trip are:

THE TRIP MUST BE WELL ORGANIZED.

THE PURPOSE OF THE FIELD TRIP MUST BE UNDERSTOOD BY EVERYONE.

ALL CHILDREN MUST UNDERSTAND THEIR RESPONSIBILITIES WHILE ON THE TRIP.

Here are suggestions to help you have a good field trip:

What should you (the teacher) do BEFORE you take the field trip?

Discuss the field trip with the principal and get his permission.

Be sure you know the place you are going to. If you have never been there, go check it out before the day of the trip.

Get permission from the owners before going on private land.

Contact people who will be guiding you or helping you. It is best to have one adult (teacher or parent) to go with you on the trip.

Get parental permission forms for each child. Do this if it is the policy of your school or for your own use.

If you will be using transportation, get the transportation arranged one week before taking the trip.

If you need transportation, arrange it one week before the day of the trip. On the day before the trip check the following: is the transportation confirmed, does the driver know the time and place to come to your school.

What should the class do BEFORE the day of the field trip?

They should know the purpose of the field trip. Discuss this in class. Discuss with the class their responsibilities. This means they know what they will be doing and what the rules are.

Tell them the kinds of clothing to wear on the trip.

If you need some special materials for the trip, the class should get it ready. For example: jars for catching things, nets, record books.

What are some good field trip rules?

The children should know the boundaries they must stay in on the field trip. They should not go outside of these boundaries. For example: You should show them the part of the beach they can work on. They should not go to another place.

The class should leave and enter the school grounds in a quiet orderly manner.

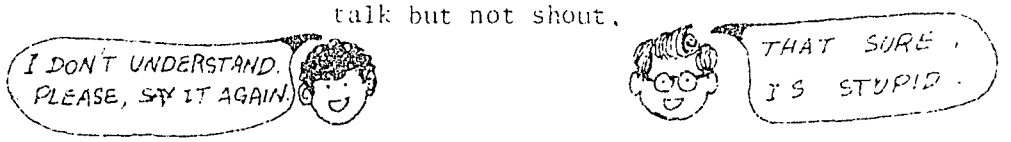
Explain things they should not do or places they should not go because it is dangerous. Examples of such SAFETY RULES are:

> "Stand in the place the teacher says inside the generator plant. No pushing or running inside the building."
>
> "Do not go into water over your head. Only go in the place the teacher says."

Nobody wants children to come to their place if the children are shouting, pushing, running or playing games. The children should be orderly and talk, but not shout, when they are at the place for the field trip.

The children should:

talk but not shout,



ask questions but be polite,

look at things but do not destroy things,

How long should a field trip be?

Only go to the place you planned to go to. If you are going to the beach to catch organisms, do that. Do not stop at other places. If the children are interested in other places, go to these other places on another field trip.

The children will get too tired if you try to do too much. A well planned field trip of one hour is long enough. Special trips using a long bus trip may take longer.

What does the class do after the field trip?

You might discuss the field trip in class the same day. Maybe you will have to wait until the next day to discuss the field trip.

Let the class write a "thank you" letter to the people at the place you visited and the bus driver.