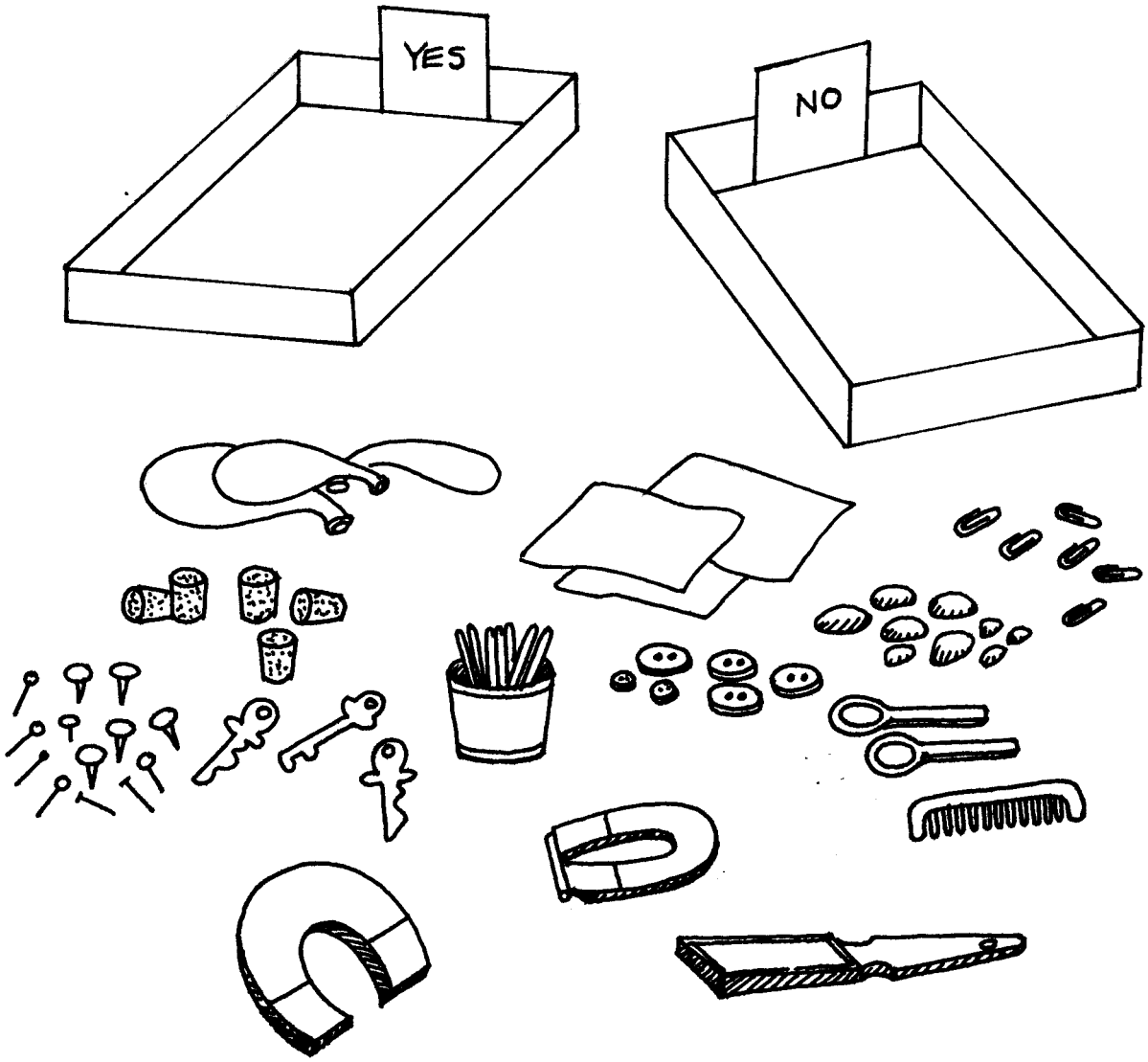
SCIENCE

Magnets: Yes or No

3 to 4



Purpose: This sorting and classifying activity expands a child's understanding of the concept of magnetism. Through active exploration with a magnet and objects, children will discover that magnets attract some objects while repelling others. As children make predictions, test predictions, observe the results, and draw conclusions, they begin to practice scientific inquiry and discovery.

Materials: Collect a variety of items for experimentation—some that the magnet will pick up and others that it will repel. Some examples of familiar objects are:

corks	rocks	buttons
coins	keys	bottle caps
a metal spoon	sticks	metal clips and fasteners
rubber bands		

Also needed:
- magnets
- 2 cards
- 2 trays or sturdy paper plates

Preparation:

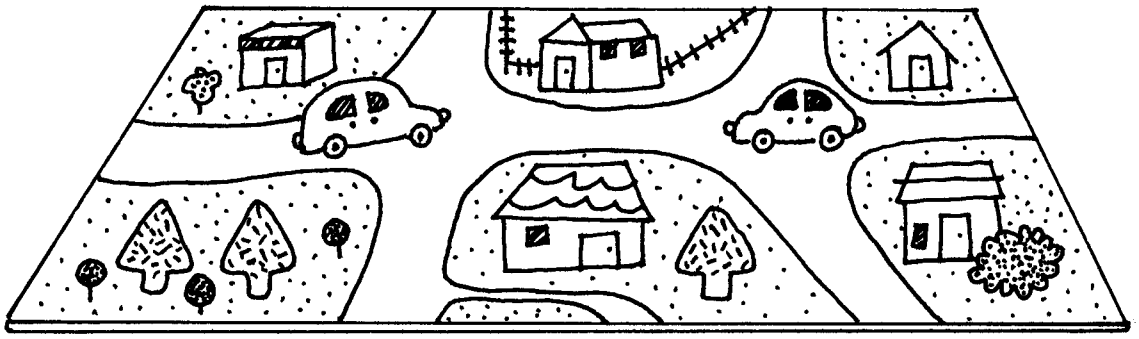
1. Tape a card that is marked "yes" onto one tray or sturdy paper plate and a card that is marked "no" onto another tray or sturdy paper plate.

Activity: Children (especially the young) need time on their own for exploration and discovery. They will soon discover that the magnet picks up some items and will not pick up others. As the child begins to verbalize the concept, the teacher may support the play by providing "yes" or "no" trays for sorting the objects.

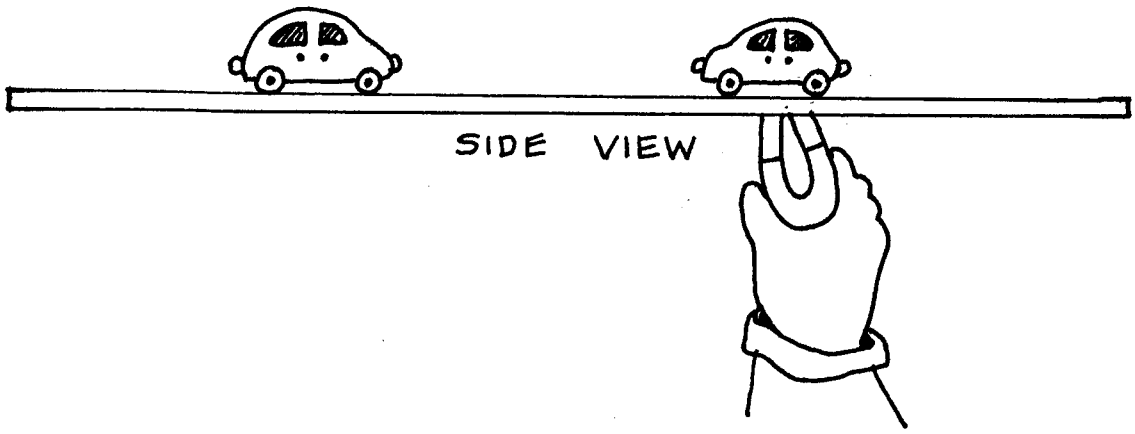
Later, with a new selection of objects, the children may be able to make predictions about whether the item will attract the magnet (yes) or repel the magnet (no). After the child has made a prediction, test the object by sliding a magnet toward it.

Extensions and variations:

- Use drama to enhance this experience. Assign a child the role of a magnet and another child the role of a nail. If the magnet sticks to the object, ask the children to hold hands. Children will not easily tire of being magnets or magnetic and non-magnetic objects. This is a good game to assess the children's understanding of things attracted or not attracted by a magnet.



TOP VIEW



SIDE VIEW

HOME CONNECTION

Suggest that parents make a magnet available to their child at home, if possible. Using the magnet, the child can go on a "magnet hunt" around the home to determine what materials are attracted to magnets. Remind parents that this should be approached as a game and children should be free to explore and experiment.

Purpose: As children investigate magnets and the concept of magnetism, they begin to realize that a magnet can affect an object. While magnetic attraction cannot be seen or felt, it effects can be seen and felt. Through participation in this activity, children experiment with familiar objects to see what things magnets attract (stick to) and repel (push away).

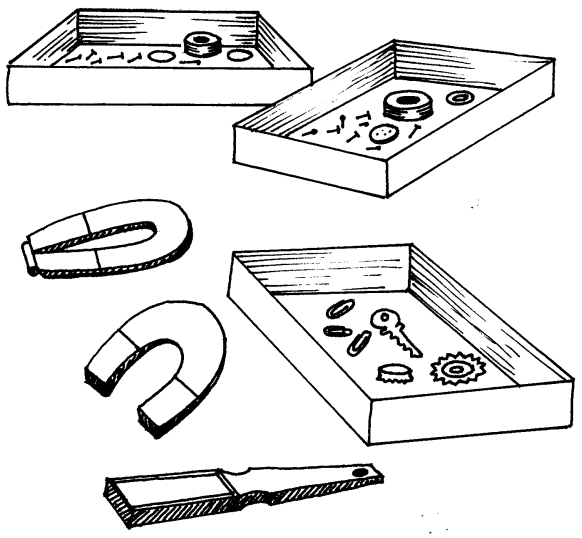
Materials: small cardboard or plastic boxes
metal objects: paper clips, nails, screws, bolts, etc.
3-4 magnets

Preparation:

1. Collect small boxes made of cardboard or plastic.

2. Place familiar metal objects in the boxes, including paper clips, nails, washers, screws, bolts, etc.

3. Have at least 3 or 4 magnets available for each small group.



Activity: Begin magnet exploration by offering each child in the small group one magnet and a box containing metal objects. Permit the children to play with the magnets and objects. Listen carefully to their comments and watch the children's reactions as they share their ideas and discoveries.

The teacher can guide the exploration by sliding a magnet toward a paper clip. Ask the children to watch. What happens?

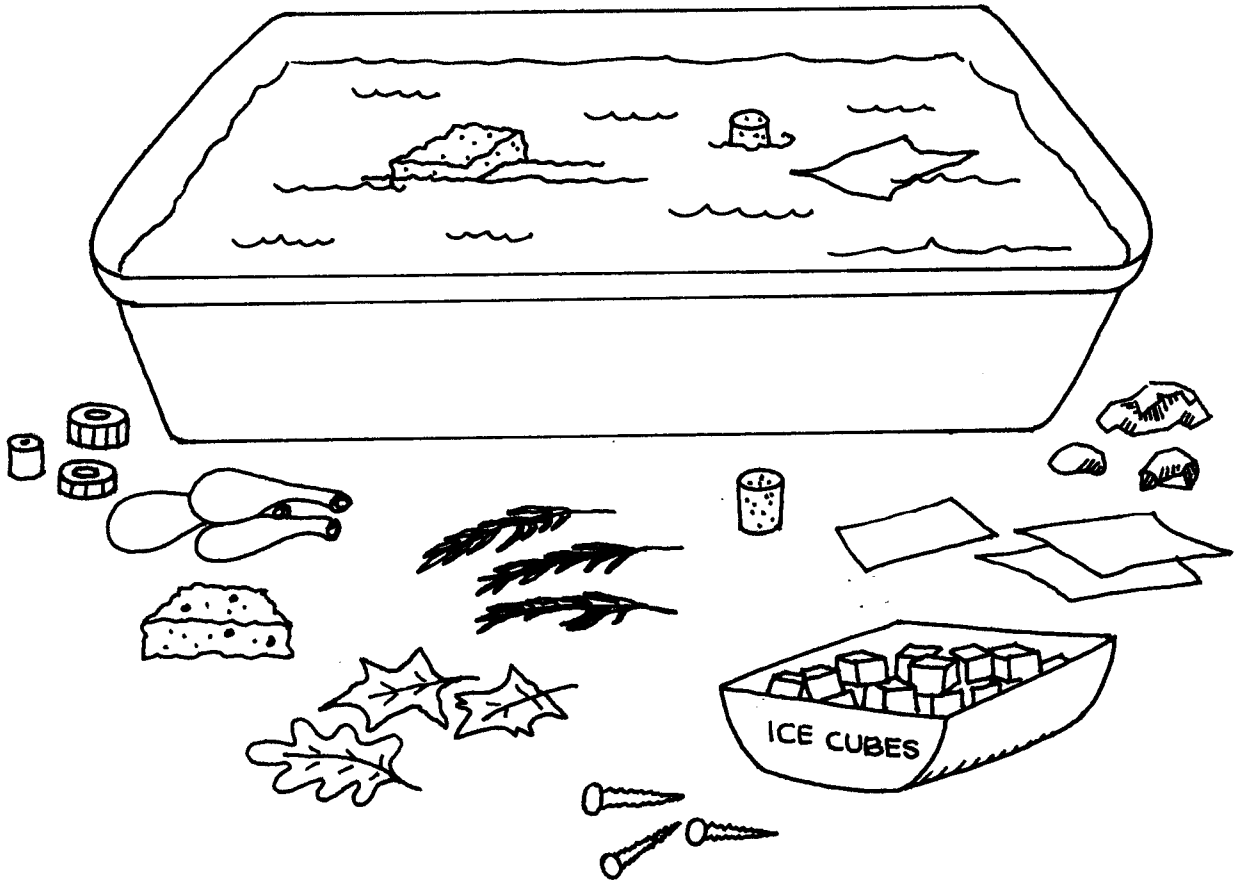
Extensions and variations:

- For 4-year-old children, draw a city, including a network of streets. Small model cars, made of metal or with metal glued to the bottom, can be directed along the road network by moving a magnet underneath the paper.

- Magnetic attractions are part of this art activity. (Use small boxes to confine the activity.) Cut paper to fit inside the bottom of the box. Drip several drops of paint on the paper. Put a small metal object, such as a paper clip, on the paint drops. Slide the magnet underneath the bottom of the box and create a design. For variety, change objects or add another color of paint.

Sink/Float

3 to 6



Purpose: Experimenting with sinking and floating objects in water introduces scientific concepts of buoyancy, displacement, surface tension, density, and compression. Though these are sophisticated concepts, exposure to them at an early age facilitates understanding in later development. Through their experiments, children discover that some objects float and others sink. They compare and experiment with objects varying in size, shape, and dimension. Later, they make predictions based on their experiences and begin to draw some conclusions from their results.

Materials:

	2 trays	water table, tub, or large container
	cards	pencil or marker
	water pitcher	
	Sink/Float objects:	corks, paper, leaves, plastic, metal, coins, rubber balloons, rocks, ice cubes, feathers, sponge, etc.

Preparation:

1. Place a water table, water tub, or large container in the room and put in it a variety of items that float and that do not float—for example, corks, paper, leaves, plastic, metal, rubber balloons, coins, rocks, ice cubes, feathers, empty and full containers, and a sponge. Other materials may be substituted.

2. Fill the water tub to about 10 cm.

3. You will need 2 trays for sorting the objects. Tape a card that is marked "float" on one tray and a card that is marked "sink" on the other.

Activity: Children 3-4 should be given many sensory-motor opportunities to explore water, something they enjoy doing very much. They discover, on their own, that some objects float and some sink.

A 5 or 6 year old (or a small group of children taking turns) can predict whether an object will float or sink and then place it in the water to test the prediction. After the object has been identified as one that floats or sinks, ask the children to place the object on the "float" or "sink" tray.

Extensions and variations:

- Teachers can encourage older children to select other objects from the room and predict whether these objects will sink or float.

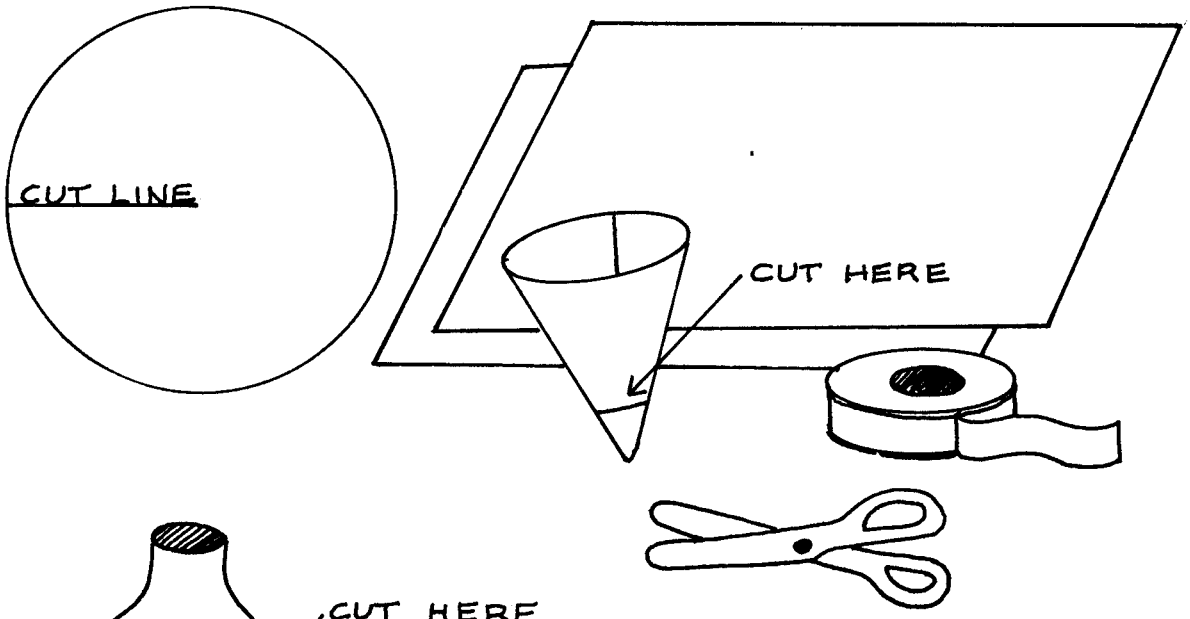
- Have children experiment with a sinking object to make it float. How can it be changed?

- Have a scale available to weigh objects before placing them in the water. What conclusions can be drawn? Do similar objects that weigh the same both float?

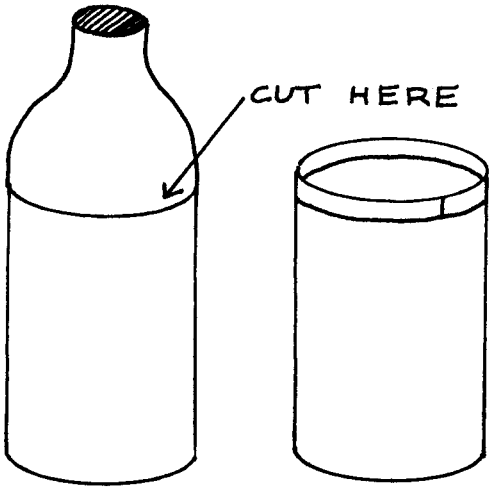
- Add salt to the water and test the objects you tried in plain water. What floats in salt water? What sinks in salt water? Do any objects that float in salt water sink in plain water?

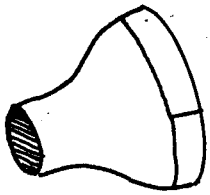
Measuring Liquids

PAPER FUNNEL



SODA BOTTLE FUNNEL





HOME CONNECTION

Parents can set up a supervised water play area at the kitchen sink or in the bath. Provide children with some containers for play.

Purpose: This activity helps children learn about measuring. Teachers facilitate water play by the selection of objects placed in or near the water table. Children begin to understand the concept of volume (that smaller parts or units fill up a larger container) as they pour cup after cup into the container. Children will also refine their fine motor skills and eye-hand coordination during the pouring process. Through the use of funnels, children learn the advantage of tools.

Materials:

- water table
- scissors
- transparent plastic soda bottles: small, medium, large (some to be cut in half to make funnels and containers; some to be used to pour water into)

Preparation:

1. Make funnels and containers by cutting plastic soda bottles in half. Tape the sharp edges.

2. Place the empty containers by the water table for the children to play with.

Activity: Teachers will want to give children, especially 3 year olds, many opportunities for water play before embarking on this measurement activity. Ask a child to select one of the smaller containers. Then offer the child a funnel to place over the opening of a plastic soda bottle. To guide the pouring experience, the teacher asks questions such as, "How many of these little containers of water fill up the soda bottle?" "What will happen if we use a smaller container to pour the water into the bottle?"

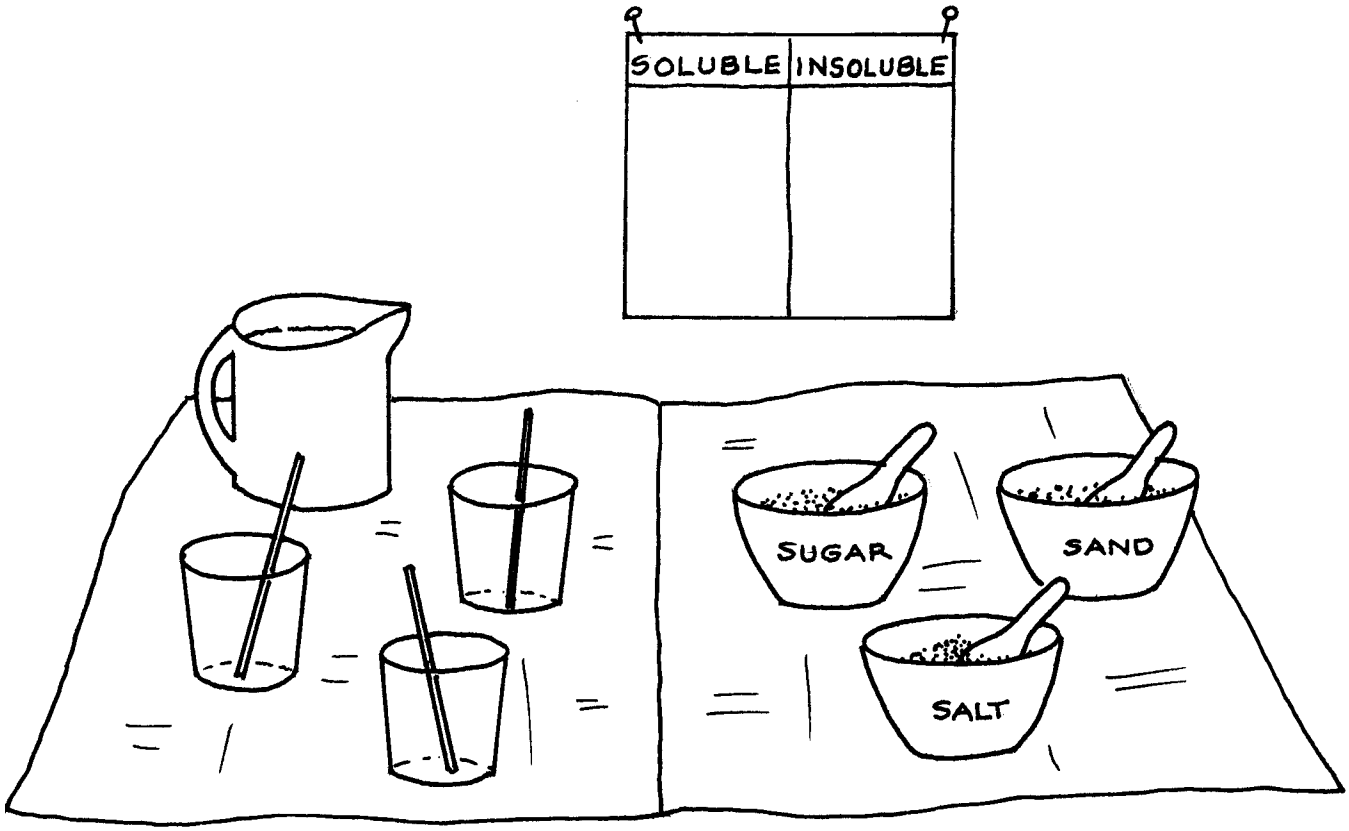
Extensions and variations:

- Children can compare their water measurement experiences with similar activities in the sandbox.

- Teachers can make funnels out of a cone-shaped paper cup or from a cut circle of paper. Cut a slit from the edge of the circle to the center. Take one edge of the slit and roll it up to form a cone. Staple, tape, or glue it in place. Snip off a small piece of the tip to make a hole.

- Select 2 containers of identical volume but different shapes (a short, fat one and a tall, thin one). Ask the children which container holds more. Then test the hypothesis and see the surprising result.

Soluable Substances



HOME CONNECTION

Parents from an apartment house or neighborhood can contribute old pots, cups, containers, and other utensils to provide shared resources for children's play with sand and water. They can also contribute extra potting soil or other substances that the children can experiment with.

Purpose: Water dissolves some substances, but others are insoluble. In this experiment, children will find out which substances dissolve and which do not. Much of cooking involves the concept of mixing substances together. Children will get a close look at several substances and, through discovery, begin to draw conclusions about their properties.

Materials:

- newspaper
- water pitcher
- salt, sugar, sand, etc.
- spoons
- pencil or marker
- cups of water
- stirrers
- bowls
- chart paper

Preparation:

1. Spread newspaper over a table top. Work with small groups of children.

2. Place 3 cups of water (or more if using more substances than salt, sugar, and sand) and stirrers before each child. Older children can pour their own cups of water.

3. Select a number of substances: salt, sugar, sand, etc. Place these substances in separate bowls with spoons readily available for scooping.

4. To help children organize their information, make a simple chart. List substances on one side and categories of soluble and insoluble as headings.

Activity: "Let's see what happens when we add a little salt in one of the cups. Stir it. Can you see it? Where is it? You can dip your finger in the cup and taste it. What do you taste? It is so small you can not see it has *dissolved*."

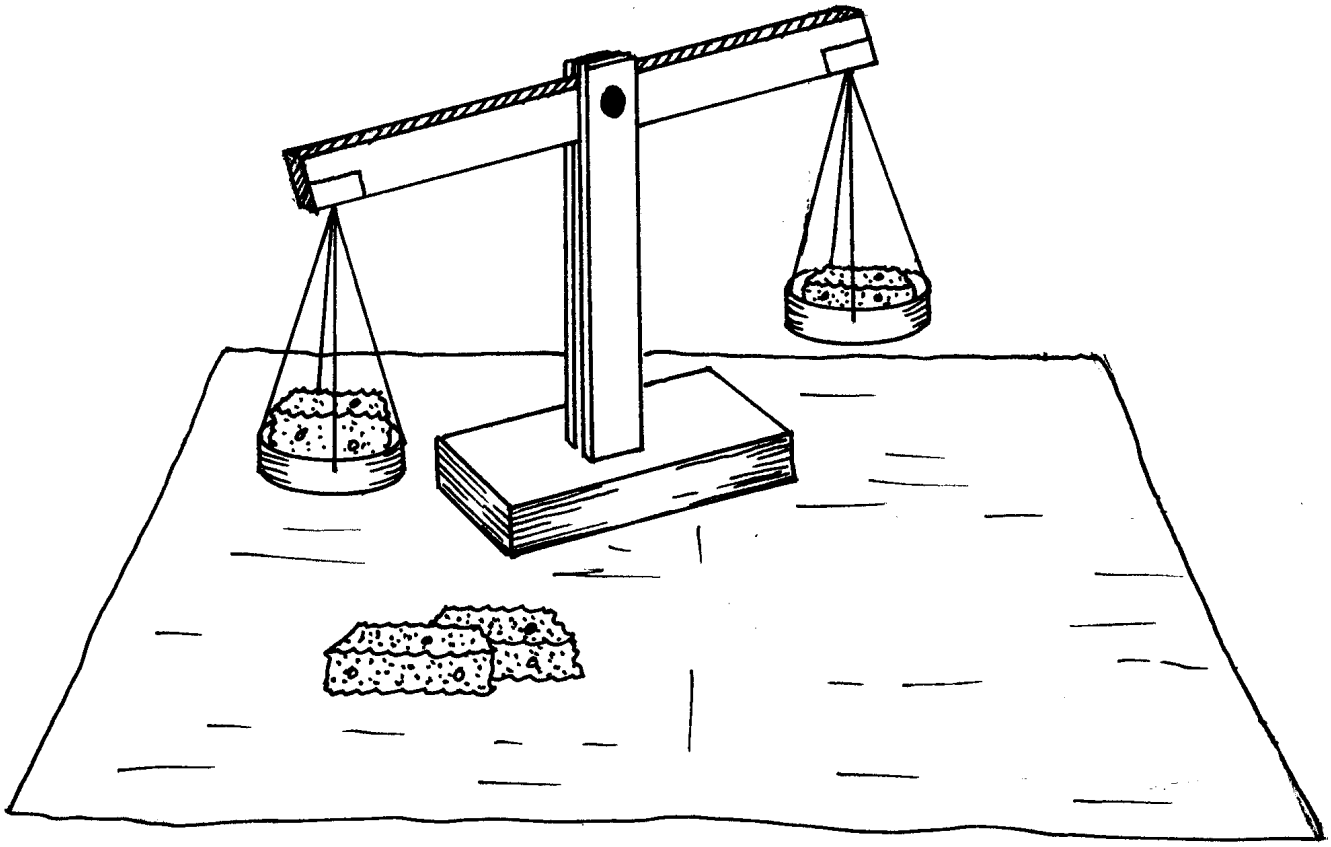
Repeat this process using sugar, sand, etc. Use the chart to record the observations. After all children have had a turn, lead a discussion in a large group to draw conclusions.

Extensions and variations:

- A great extension to this activity is mixing oil and water. Children will learn more about soluble and insoluble materials in water.

Experiment with Sponges

4 to 6



HOME CONNECTION

Parents, encourage children to help with the laundry! By handing their wet clothes to you as you hang them on the line, children will become aware of the difference in weight between clothes when they are wet and dry. By asking thoughtful questions to prompt the child to wonder why this difference exists, or what makes the difference, you turn a daily routine into an opportunity for discovery.

Purpose: In this water play activity, children make the discovery that water has weight. A water-saturated sponge will weigh more than a dry sponge. When expanding this experience, children will learn that the weight of any material increases when water is added to it. Furthermore, measurement is a mathematical skill, and this activity will further develop a child's understanding of weight.

Materials:

newspaper	kitchen scale or balance
sponges (same sizes)	water pitcher

Preparation:

1. Spread newspaper over a table top.

2. Place a scale near the water table.

Activity: Gather a small group of children around a water table or tub of water with a scale or balance nearby. "What does a scale do? Let's see what happens when we put a dry sponge on the scale. Now wet the sponge well with water and weigh it. Which is heavier, a dry sponge or a wet sponge? Why?"

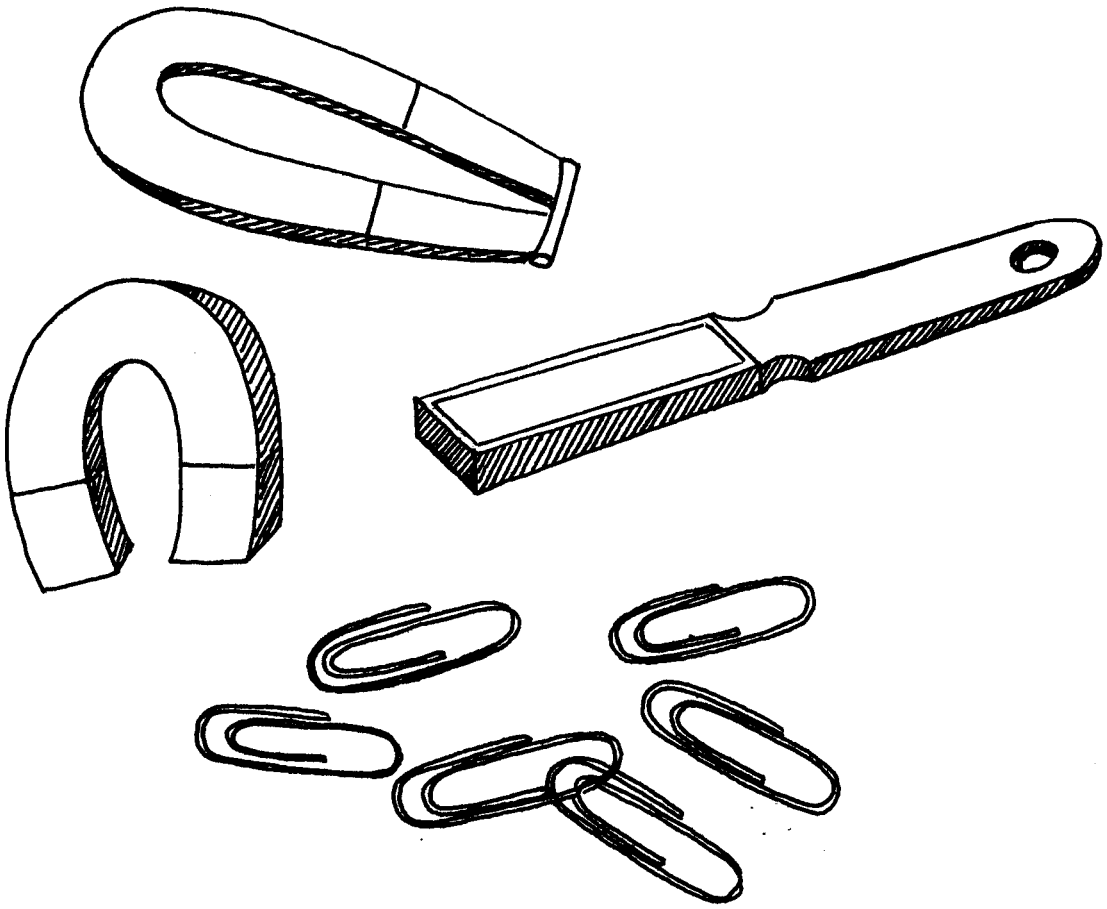
Extensions and variations:

- Leave a wet sponge out overnight. Examine the sponge with the children during morning meeting. How has it changed? This extension naturally lends itself to the water painting activity (see page 170).

- With small groups of children, distribute a piece of wax paper, paper towel, and newspaper. Have children place a drop of water in the middle of each kind of paper. They will see that water spreads in different ways on different kinds of paper. Some kinds of paper absorb water faster and better than others. They will also see that the wax paper does not soak up water. Try this activity with scraps of different fabrics.

Exploring with Different Size and Shape Magnets

5 to 6



HOME CONNECTION

Arrange to have magnets available for a child to borrow from the classroom for a day or two at home. Each parent can sign out a magnet set for a specific time so that all children will have a chance to use the magnets at home. Explain that this process depends on families returning the magnets on time, so the next child who has signed up will get a turn.

Purpose: In this activity children investigate the properties of magnets. When they explore where magnets are most powerful, they begin to learn the principles of polarity and how magnets work. Children see that magnets come in many different shapes, sizes, and strengths.

Materials: paper clips
3 magnets of different sizes and shapes

Preparation:
1. Put out paper clips and magnets on the table.

Activity: This is a small group activity, designed for 2 or 3 children who will take turns sharing the different magnets. Ask the children to hold the curved end of the horseshoe magnet over a small pile of paper clips. Now ask the children to hold the ends of the magnet over the paper clips. Try this with the rectangular magnet. Ask children to discuss their findings (the ends of the magnet will attract the paper clips). Next work with a round magnet. Are the results the same or different?

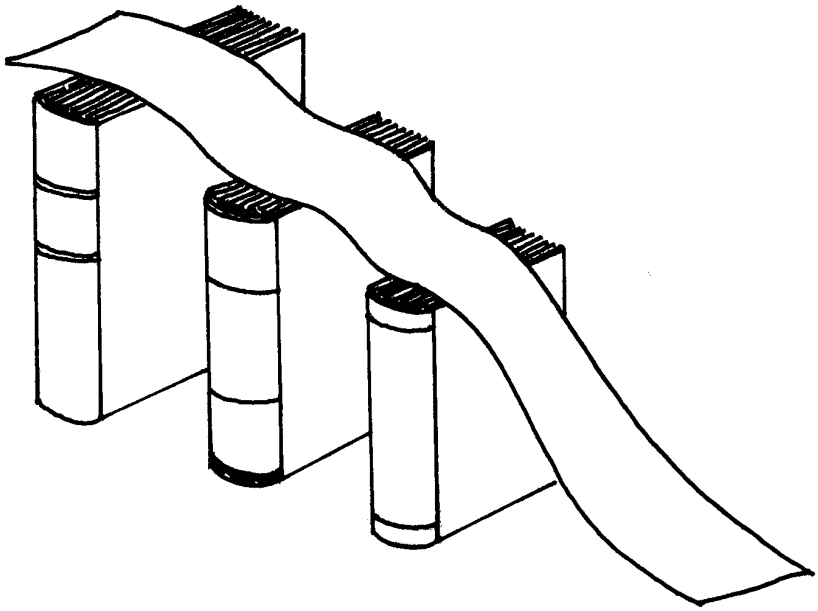
Extensions and variations:
- Use a chain of paper clips to demonstrate the strength of the magnets' ends or poles. How many paper clips will the magnet attract? Are bigger magnets stronger than smaller magnets?

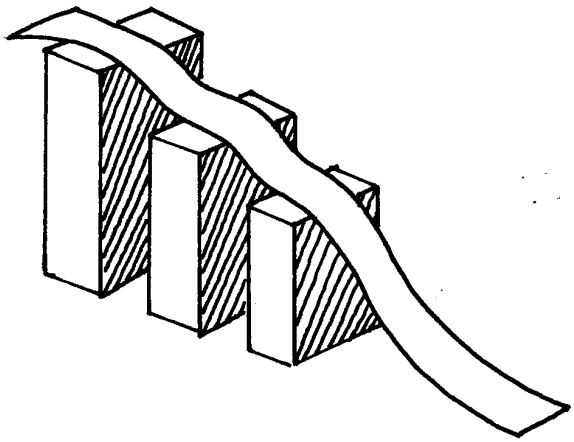
- Go on a magnet hunt in search of items that stick to a magnet. Notice where the items stick to the magnets.

Water Drop Slide

3 to 6

Submitted by Bulgaria





HOME CONNECTION

Suggest to the children that they set up a similar ramp at home and use a ball to show their families the game. First, have their parents predict how far the ball will roll from each point on the ramp, then test the hypothesis to see the results!

Purpose: This activity demonstrates that any object with weight, when dropped onto a hill or inclined ramp, will roll a distance that is in proportion to the height of the hill (or ramp). This activity also helps children generalize the concepts of gravity, weight, speed, and distance from the inclined plane activity on page 191.

Materials:

- books
- water
- smooth plastic band
- tape
- dropper

Preparation:

1. The teacher should gather 3 books of varying height. Place the books at a distance from each other from tallest to shortest.

2. Cover the books with a smooth plastic band, and tape one end to the tallest book and the other end to the floor beyond the shortest book.

Activity: If possible, take the class outside to climb a hill and run down. If this is not possible, have the children remember a time when they ran up and down a big hill. Ask the class questions such as, "How did you feel when you climbed up the hill? How did you feel when you went down the hill? Which is easier, going up or going down?"

After thinking about their experiences playing on hills, children will work in groups of 3 to experiment with the water drop slide. Tell the children the water drop slide will be a make-believe hill. One child can start a drop from the highest book and mark the spot where the drop hits the floor. The next child starts the drop from the middle book, once again marking the spot where the drop hits the floor. Finally the third child can start the drop from the shortest book and mark the place where the drop hits the floor. Which drop went farther? Why? Did some drops travel faster than others? Which ones? Use these questions to promote ideas from the children. Have them suggest ways to test their ideas, or try the variations suggested below.

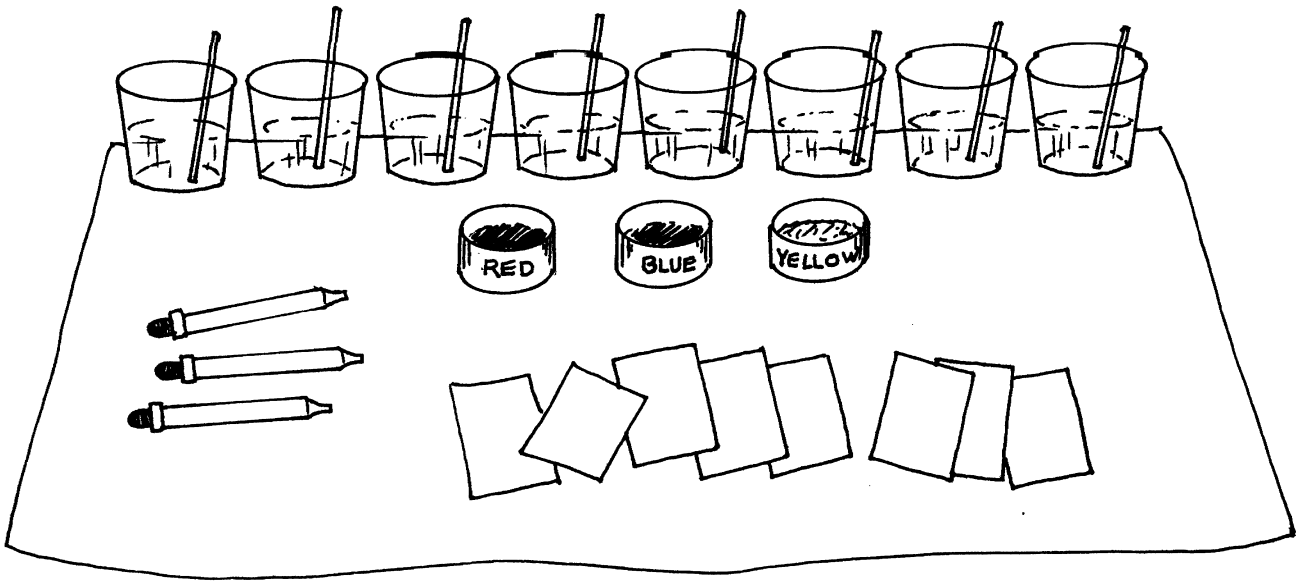
The drop rolls farther when it is started at the top of the make-believe hill than when it starts at a lower level.

Extensions and variations:

- Make a slide using stacked books and a wooden plank or thick paper. Release a small toy car from varying places on the slide. The steeper the slide, the farther a toy car will roll after it reaches the bottom.

- Go sledding with the children and apply the lesson of distance traveled on an inclined plane.

Creating Variations of Colors



HOME CONNECTION

Parents can do this activity with their children at home using glasses of water and food coloring. In doing so, they should use the time to become learners and explorers along with their children!

Purpose: This activity introduces the idea of changing color using a water medium. Children will see new colors form by mixing colors (red and blue become purple). They can increase the intensity of color by adding more of the same color, or decrease the intensity by adding more water. Children identify and name colors such as red, orange, yellow, green, blue, and purple. This activity facilitates creative expression and exploration. The use of eye-droppers to mix colors also helps develop eye-hand coordination.

Materials:

newspaper	red, blue, and yellow food coloring
small plastic cups	3 eyedroppers
water pitcher	straws or wooden stirrers

Preparation:

1. Spread newspaper over the table or on the floor.

2. Work in groups of 3 children. Provide each child in the group with red, blue, and yellow food coloring; an eyedropper; small cups half-filled with water; and straws or wooden stirrers.

3. At first, allow children to mix colors as they wish.

Activity: Tell the children that they will be investigators in this activity. Ask if anyone would like to guess what an investigator does. Discuss how an investigator solves problems and finds out how things change. Ask the children to discover new colors.

Extensions and variations:

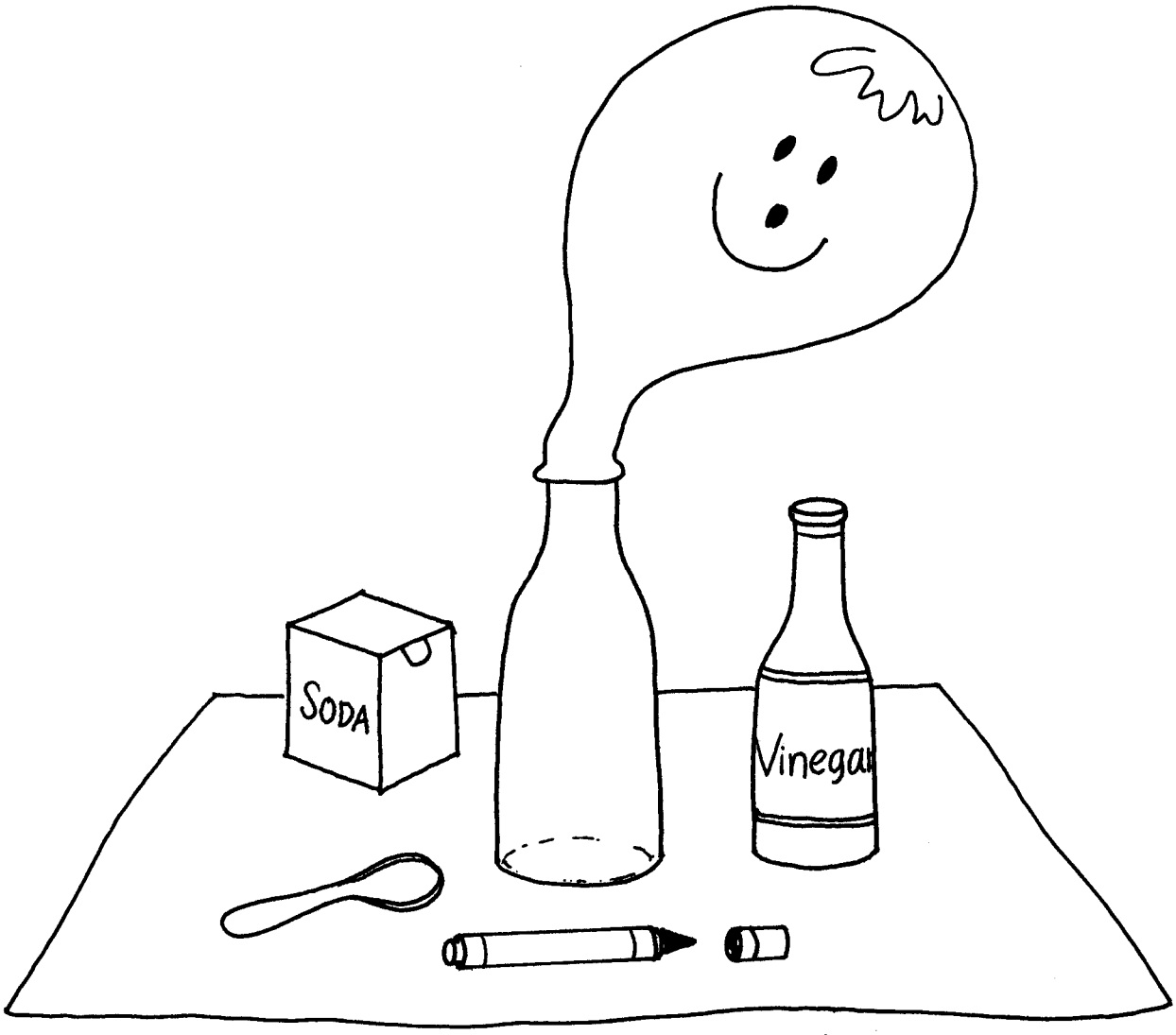
- Instead of food coloring, children can use tempera paint in primary colors (red, yellow, blue) and secondary colors (purple, green, orange).

- Use larger containers for mixing. Many different colors can be created this way.

- Drop secondary colors on paper towels or coffee filters, demonstrating color separation. Ask children to observe what happens to the colors (they will separate into primary colors!).

Fizz Surprise

5 to 6



HOME CONNECTION

When parents and children cook together at home, it is a perfect time to discover how materials mix and change. Young children can learn from their parents about the effect of liquids on dry materials if they have an opportunity to see what happens when these materials are combined. They also begin to realize that they can contribute to family routines.

Purpose: Fizz surprise is a science activity that introduces children to the idea that chemical changes occur when 2 materials are combined. Using the senses to explore the characteristics of vinegar and baking soda enhances a child's discovery of physical properties. (A gas is formed when the baking soda combines with the vinegar and expands.) As children make predictions and observations, they use scientific inquiry to answer questions.

Materials:

- vinegar
- baking soda
- black marker
- chart paper
- balloons
- small spoons
- transparent plastic soda bottle

Preparation:

1. Pour about 5 cm. of vinegar into a transparent plastic soda bottle.

2. Place 2 small spoonfuls of baking soda inside a balloon. A face can be added to the balloon with a permanent marker.

3. Put the neck of the balloon onto the open end of the bottle. Watch what happens!

Activity: Guide a small group of children through the task of adding vinegar to the soda bottle and baking soda to the balloon. Have the children smell each substance and ask if they want to taste either one. Ask children to predict what they think will happen if the balloon is connected to the bottle. Write their predictions on chart paper. Complete the experiment and record their discoveries on the chart. Can they guess why the balloon changed?

Over several days, give other groups the opportunity to experience the chemical changes by adding baking soda to the vinegar. If balloons are unavailable, add the baking soda to the vinegar in a glass jar or small dish. Record the observations.

Extensions and variations:

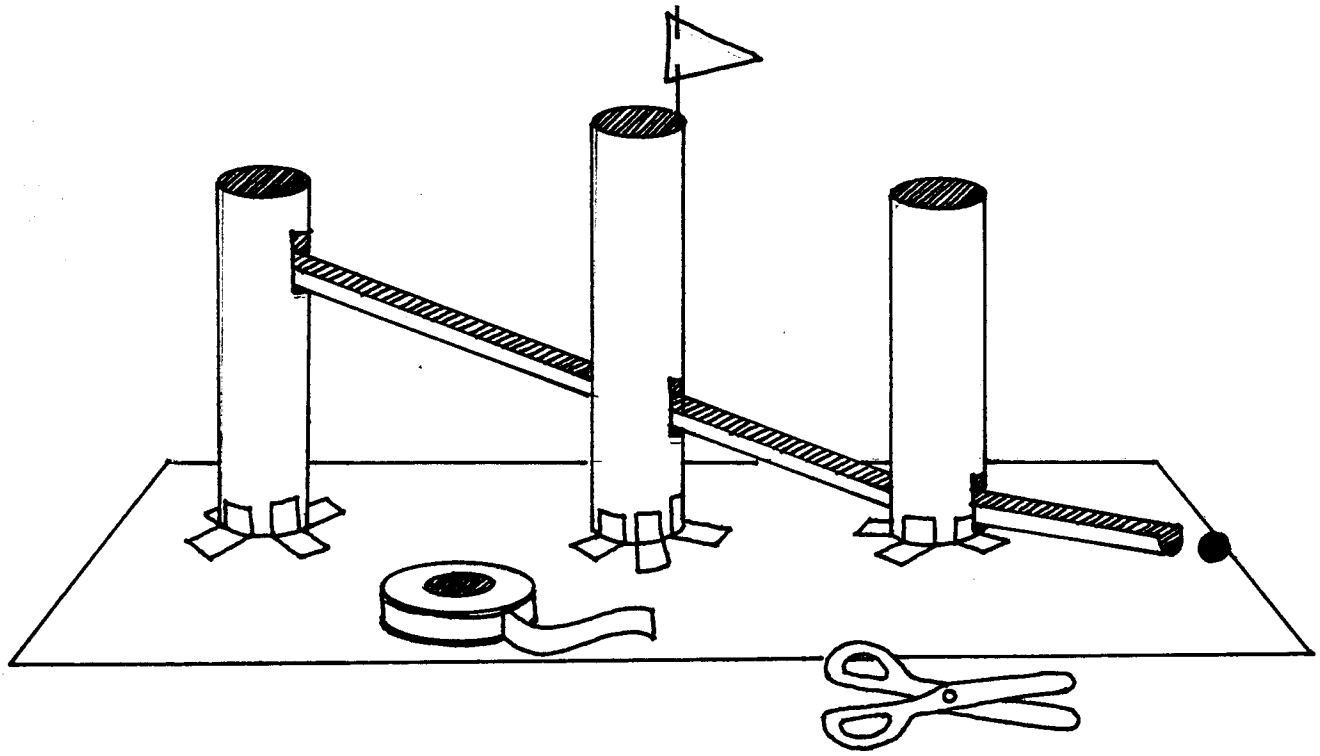
- Make a volcano by piling sand to form a mountain. Place the vinegar in a cup and insert it on the top of the sand mountain. Add baking soda.

- In a small group, review the sequence of the fizz surprise activity: "What happened first? What did we do next?" Then make a class book by writing one step on a page and asking the children to illustrate the pages.

- Have the children try to blow up a balloon. Demonstrate that when air is blown in a balloon it takes up space and the balloon expands. When the air comes out, the balloon deflates.

Marble Shoot

5 to 6



HOME CONNECTION

Collect paper tubes and paper food cartons from the recycling bins at school. Allow parents to take them home for children to build with at home. Ask parents to display the children's creations where they can be viewed by the family.

Purpose: In this activity, children drop a marble and let it roll through several bridging devices, traveling from the highest point to the lowest point of a "shoot" that they build from recycled materials. In the process they learn about the property of weight and the force of gravity upon an object. They also can experiment with variations in speed and distance traveled on inclined planes. The building exercise gives them experience with balance and weight in construction.

Materials: paper towel rolls marble
tape

Preparation:

1. Set out the materials.
2. Cut some of the rolls in half the long way forming the "shoot" sections.
3. One finished marble shoot should be available for the children to see.

Activity: Gather 3 or 4 children at a time at a table and explain that each will be constructing a marble shoot. Begin by allowing the children to play with the marbles for a while. Roll a marble down a slide or inclined plane. "Which way does it travel?" "Can it go up the slide? Why? Can you feel its weight?" Explain that gravity causes objects to fall in a downward direction.

The teacher demonstrates that the marble is placed at the top-most part of the structure, shoots through it, and exits at the bottom, traveling a distance before it comes to a stop. The force of gravity pulls the marble toward the lowest point.

Then the children make their own marble shoots. Encourage each child to be creative, but be sure that the marble is always traveling in a downward direction. The teacher provides assistance as needed, especially cutting the openings in the tubes and attaching them with tape. The children will be delighted to see their inventions work. After several children have completed their marble shoots, compare the time it takes for the marbles to travel from start to finish. "Do the marbles travel faster down some structures than others? Why? Are some longer than others? Are some higher than others? How far does the marble travel when it exits different structures?" Place the marble shoots around the room for the children to see their creations.

Extensions and variations:

- Collect many kinds and varieties of recycled materials and let children make their own inventions: mouse traps, mazes, robots, space ships, etc. By using many materials, they begin to understand that both balance and stability are necessary for structures to stand.

- As a cooperative project, the children could make a class marble shoot.