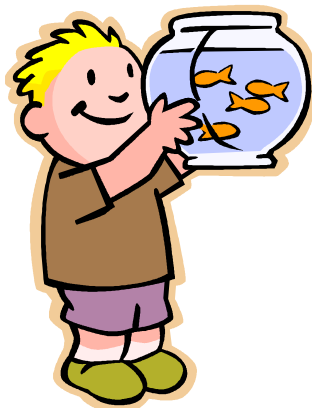
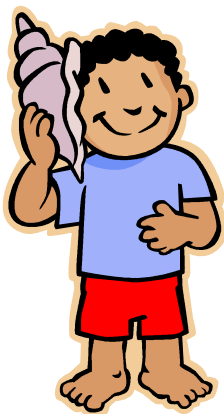


BEST
PRACTICES
TRAINING

GeorgiaStateUniversity 

SUPER SCIENCE

Pre-K Science Activities



LIFE SCIENCE

plants, animals, environment



LEAF PRINTS

Study the shape and structure of leaves by making leaf prints or rubbings.

- For very clear rubbings, attach the flattened leaves to a clipboard or heavy piece of cardboard with clear contact paper. Clip the paper to the board and rub away!
- Glue pressed leaves onto Styrofoam blocks; use as-is for printing or cut around the shape of the leaf with a craft knife. Use large stamp pads or color the backs of leaves with magic markers.
- Press leaves into play dough, clay, or Model Magic to make prints.

THE GREEN GRASS GREW ALL AROUND

Plant grass seed in a variety of places:

- Place grass seed in the toe of a knee-high hose. Add soil to make a ball and tie hose shut. Sprinkle liberally with water. Seed will grow through hose.
- Hollow out the top of a potato. Put grass seed inside. Water and watch it grow.
- Sprinkle grass seed on soil, on several thicknesses of newspaper, and on a sponge that DOES NOT have added soap in it. Ask children to predict where the grass seed will grow by writing their names in one of 3 columns on poster board. (Draw a bag with soil in it at the top of one column, a piece of newspaper at the top of the second column, and a sponge at the top of the third column.) Although the grass seed in the soil will usually sprout first, the seed will eventually grow on all three surfaces. After seeds sprout, children can draw pictures of the results of their experiment.

KEEP IT REAL

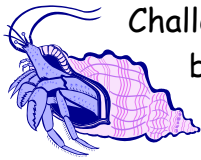
Make sure you always have live animals for the children to observe. Every classroom should have a fish - they're easy to care for and relaxing to watch. Hermit crabs are good, too.

Many small critters don't object to a day spent in the classroom, so bring in worms or crickets or "daddy long legs" for the children to watch. Talk about being gentle and always let the critters go at the end of the day.

PILL BUG PLAYGROUND

Create a temporary habitat for pill bugs (roly pollies) in a fish bowl. Dig up these tiny crustaceans (correctly called Isopods) from under rocks or next to the foundation of your house. Place them in the bowl along with some sticks, soil and fallen leaves. Watch as the pill bugs crawl about, turning over the soil and eating the leaves.

HERMIT CRAB MAZE



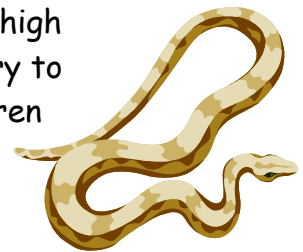
Challenge children to create a maze for your hermit crabs using small blocks or cardboard tubes arranged on a tabletop. Add one or more hermit crabs. Predict the path they will take. Will they go through tunnels? Around obstacles? Observe how the hermit crabs use their limbs to move about and allow children to touch and feel each hermit crab, making sure they wash hands afterwards.

QUILL PENS

Obtain large duck or goose feathers from a farm or craft store. Trim ends on slant. Dip into liquid watercolor and draw or write just as people did long ago. Examine end of quill; it's hollow so ink can flow. What other things do children know about that are similar? Would a plastic straw work? Experiment to see.

SHED YOUR SKIN

- Discover how a snake sheds its skin. Place a clean new knee-high (hosiery) or a leg cut from a pair of tights on child's arm. Try to remove it without using hands or any other body part. Children will discover that rubbing against something rough will scrape the "skin" off. They will make comments like *"This is hard,"* or *"This takes a long time."* Yes, it *is* hard for the snake. It takes 18-24 hours for a real snake to shed its skin!
- Examine a snakeskin. Pet shops will often save them for you. Look at the patterns on its surface. Have children spread white glue on the palms of their hands and allow it to dry. Carefully peel off the glue "skin" and observe the pattern of lines from your palm in the dried glue. A shed snakeskin retains the pattern of scales in the same way.



TRASH SORT

Display a variety of nature items (leaves, pine cones, sticks, etc.) and an assortment of trash (crumpled paper, gum wrappers, pop tops from aluminum cans, etc.). Provide a grass mat and a small trash can for sorting.

Glue items on poster board labeled YES (for items that belong on the ground) and NO (for things that don't.)

Make litter bags to put in cars by cutting holes in top of lunch sacks and having children decorate them.

SPIDER, SPIDER, WEAVE A WEB

Add this activity as part of a topic study on spiders, making sure to include informational books, props, pictures, etc. Provide children with dark-colored paper plates and white string or yarn. Pre-cut slits around the outside of the plate.

Children weave string through slits, back and forth and across and around plate to form web.

FINGER PRINT FUN

With a No. 2 pencil, color a dark rectangle as big as an index finger's top joint on a piece of paper. Rub your index finger on the place you colored to pick up the lead on your fingerprint. Take a piece of Scotch tape and place it on your dirty index finger. This should transfer the lead to the tape, and give you a good finger print. Stick the tape on a clean sheet of paper to study your print. Does it look similar to your friend's print? Try using a different finger. Do your two prints look the same? How might toe prints be similar or different?

NATURE RELAY RACE

Line up several children on one side of the play space. Give each child a leaf, a stick, a rock, etc. On the other side, lay out the matching items. To play the game, each child picks up the item nearest them, runs across to the other side of the space, finds the match to the item they are holding and races back. Then the next person goes until all have had a turn.

IT'S ALIVE!

Record a class pet/animal. Give children a "science data sheet" cut out in the shape of the pet's container (fishbowl, aquarium, etc.). Since science recordings are meant to replicate reality as closely as possible, you can limit the colors of recording materials (crayons, colored pencils) to only those reflected in the actual object. Ask questions about the recordings and take dictation on the back for assessment. Be sure names and dates are on each recording.



COTTON TO CLOTH

Observe a cotton plant (www.cottonman.com or check with your county extension office). Talk about how cotton lint (the white part) is pulled from seeds and twisted into thread. Provide coarsely woven burlap. Encourage children to examine it with magnifying glass. Use burlap, multi-colored yarn, and blunt craft needles to experiment with needlepoint. String buttons on yarn. Sew buttons and beads on to burlap. Pull fabric apart into separate strings. What is made from cotton? Do we grow cotton in Georgia? In your county?

HUMAN BEANS

Wet a cotton ball and put in a small zip-seal bag. Slide the bean into the bag so that it rests between the bag and the cotton ball. Carefully zip the bag closed, and punch a small hole above the zip. Cut a piece of yarn to make a necklace and thread it through the hole.

Wear the bag under your shirt next to your skin all day - you can transplant after it sprouts!

CHICKEN CUP

You will need:

A plastic drinking cup

Yarn or cotton string (nylon string will not work well)

1 paper clip

Paper towel

A nail

Scissors

Water.

Cut a piece of yarn about 20 inches (40 cm) long. Ask an adult to use the nail to carefully punch a hole in the center of the bottom of the cup. Tie one end of the yarn to the middle of the paper clip. Push the other end of the yarn through the hole in the cup and pull it through as shown in the picture. Get a piece of paper towel about the size of a dollar bill, then fold it once and get it damp in the water. Now it's time to make some noise! Hold the cup firmly in one hand, and wrap the damp paper towel around the string near the cup. While you squeeze the string, pull down in short jerks so that the paper towel tightly slides along the string. If all goes well - you hear a chicken!



This is an example of how a sounding board works. The vibrations from the string would be almost silent without the cup, but when you add the cup, it spreads the vibrations and amplifies them (makes them louder.) Pianos and music boxes use wood to act as a sounding board to make the instrument louder.

PHYSICAL SCIENCE

matter, magnets, color and light, machines, electricity, chemistry



OBSERVE CHANGES IN MATTER

Cooking is a perfect way for children to observe basic changes in matter - from solid to liquid, from wet to dry, from light to dark. Food is an instant attention-getter and children eagerly come to the science center to join in the fun! Here are some tried and true favorites.

- **CINNAMON APPLESAUCE:** Heat applesauce in slow cooker until warm. Taste and describe. Add a few cinnamon candies and stir. Observe changes in color. Taste and describe.
- **CHOCOLATE SHAPES:** Provide each child with a Hershey's kiss. Observe/describe/draw shape. Place several kisses into heatproof cup and place cup in pan of boiling water or in microwave. What happens? Pour melted chocolate on waxed paper. Observe/describe/draw new shape. Break into pieces and eat.
- **HOT CHOCOLATE:** Heat milk in slow cooker or on stove. Pour into Styrofoam cups. Add chocolate syrup or powdered cocoa mix. Stir and observe. Provide vocabulary: "dissolving." Add 2-3 mini marshmallows. Observe. Did they dissolve?
- **POPCORN:** Give each child several kernels of popcorn. Observe/describe/draw. Talk about how much space is taken up by the kernels. Pop corn in hot air popper. Give each child a handful of popcorn. Observe/describe/draw. How much space does the popcorn take up now?
- **SCRAMBLED EGGS:** Allow each child to crack egg into bowl and observe. Use words to describe texture - slimy, runny, gooey. Have each child scramble egg, then pour together and cook in electric skillet or wok. Watch as eggs change from liquid to solid. Eat and enjoy. LATER provide children with picture cards to sequence that describe process: "CRACK, BEAT, COOK, EAT."

DANCING RAISINS

Place raisins in a plastic water bottle filled with carbonated water. Watch as they first sink to the bottom and then float to the top. As the bubbles of carbon dioxide gas stick to each raisin, it becomes light enough to float. When the bubbles burst at the surface of the liquid, the raisins sink again. Try this with small pieces of Styrofoam packing material, too.

LIQUID LAYERS

Obtain a large plastic juice jug. Fill 1/3 full with water colored with blue food color. Slowly pour in light corn syrup (an equal amount to the water). The corn syrup sinks to the bottom. Then add an equal amount of vegetable oil. It will float on top. Then drop in a variety of items - a penny, LEGOS, wooden pegs, paper clips, confetti, etc. Where do they float? (They will float on the layer that is comparable in density - some on the corn syrup, some on the water, and some on the oil!)



MINI LAVA LAMP

You'll need

- A glass jar, drinking glass or large plastic bottle
- Vegetable oil
- Salt or Alka Seltzer
- Water
- Food coloring

Pour about 3 inches of water into the jar. Pour about 1/3 cup of vegetable oil into the jar. When everything settles, look to see if the oil is on top of the water, or underneath it. Now you can add one drop of food coloring to the jar. What happens? Is the drop in the oil or in the water? Does the color spread? Now shake salt on top of the oil while you count slowly to 5. Observe what happens to the food coloring and what happens to the salt. Add more salt to keep the action going for as long as you want. (The Alka Seltzer can be substituted for the salt...just pay close attention to the reaction, and add goggles!!!)

COLORFUL COFFEE FILTERS

Provide coffee filters, droppers and small containers of diluted food color or liquid watercolor. Children drop colors on filters and watch as they mix together to form new colors. Try this with paper towels, too. Make a display of *COLOR CIRCLES* and *SQUARES*.





RUBBER BALLS

- 1 tbsp. white glue
- Borax Water (see directions)
- Craft sticks for stirring
- 2 paper cups
- Small sheet of plastic wrap or zippered bag for storage

1. Pour 1 tbsp. of white glue into the first cup. Add one tbsp. of water and stir with craft stick until mixed and then set aside.
2. In second cup, mix 1 1/2 tsp of borax and 4 tbsp. of water to make Borax Water. Stir well. Before borax settles to bottom, scoop out **ONLY** 1 tbsp of the Borax Water and pour into cup that has the glue mixture.
3. Stir with a stick. If mixture does not quickly form a gel, add one more tablespoon of borax mixture and stir again.
4. Remove gel from cup and roll in your hands until substance firms up.

EXPLODING DOTS

Watch the reaction between vinegar and baking soda!

- Spread baking soda over the entire area of a large aluminum baking pan. (Make sure that there is a layer of baking soda covering the entire pan.)
- Pour vinegar into a small cup.
- Add two drops of food coloring to the vinegar.
- Fill the dropper with colored vinegar.
- Drop dots of the vinegar into one spot in the pan. **Watch the reaction!!** This can be repeated in different spots to watch the reaction over and over again.

TOOL TIME

Give children opportunities to practice using tools. Remember: a tool is *any device that helps you perform a task*.

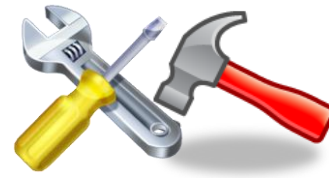
- Provide tubs of soapy water. Use egg beaters or wire whisks to make mountains of suds.
- Provide an assortment of containers and things that fit inside: ice trays and plastic fruit, small bottles and beans, etc. Use tongs, tweezers or chopsticks to pick them up.
- Give children a screwdriver, Phillips head screws, and wooden blocks with pre-drilled holes.
- Try hammering wooden pegs into Styrofoam blocks as a prelude to real hammers and nails.
- Hammer large head nails into a stump from a soft-wood tree like pine.

FIX-IT SHOP

Give children opportunities to investigate how machines are put together by creating a repair shop in your classroom. Provide a space that is isolated from the main flow of traffic.

Make sure that children wear goggles at all times.

Obtain some old toasters, VCR's, computers, telephones, etc. (CAUTION: DON'T USE OLD TV's.) Provide screwdrivers, socket wrenches, hammers, tweezers, tongs. Stand back and watch the fun!



CLEAN MUD

Grate Ivory soap into a large tub. Tear tissue and add to the soap. Add water and squish together with your hands. Describe how it feels. How does the substance change if you add more water? More tissue or soap?

"GOOP"

Mix cornstarch and water together in a tub. Encourage children to describe the texture - smooth, slippery, "drippy," etc. Notice the properties - liquid, then solid. Experiment with adding different amounts of water or cornstarch.

MARKER BOTTLES

- This activity works well with small groups.
- Uncap a dark-colored marker and place in water point side down.
- Observe closely.
- What do you see happening?
- Draw your observation (see scientific recording sheet example).

DIAPER SCIENCE

Let's find out how much water a diaper can hold! Fill a small plastic cup with water and pour it into the clean, unused diaper. Each time you pour a cup of water, place a smiley face on the chart. Tally how many cups of water the diaper was able to hold at the end of the experiment. Explore the contents of the diaper by cutting the diaper open to see what it is made of.

GLITTER PLATES

Brush white glue on a paper plate and add large shiny confetti glitter. Once dry, shine a flashlight on the glitter plate and it will reflect the lights on the wall.

FLOATING M&M'S

Fill a bowl with an inch or two of water. Place a few m&m's with the "m" side up into the bowl, making sure they are completely below the surface of the water. Don't stir, just observe. Predict what will happen. Keep your eye on the "m"! Notice that the colors won't mix unless you move the bowl (each color has a different density.) The "m," which is made from the mineral titanium dioxide, detaches and slides off the candy. Try this with Skittles as well - the "s" is made of paraffin and will float. Children can record once as soon as candy is placed in the water, and again after reaction has occurred.

PEPPER CHASE

Place water in a shallow foam plate and sprinkle pepper on the top of the water. What happens? (It floats.) Touch your finger or a toothpick to some liquid soap and then touch the water with your finger or the toothpick. What happens? (Pepper "runs away.") Pour a small packet of sugar in the water in a slightly different spot. The pepper "comes back!" Try with small pieces of broken toothpicks or cinnamon in place of the pepper (you will have to empty the pepper and water and start over). The soap film weakens surface tension and repels water; the sugar absorbs water and creates tiny currents that cause the pepper to be drawn in.

SEPARATING COLORS (Paper Chromatography)

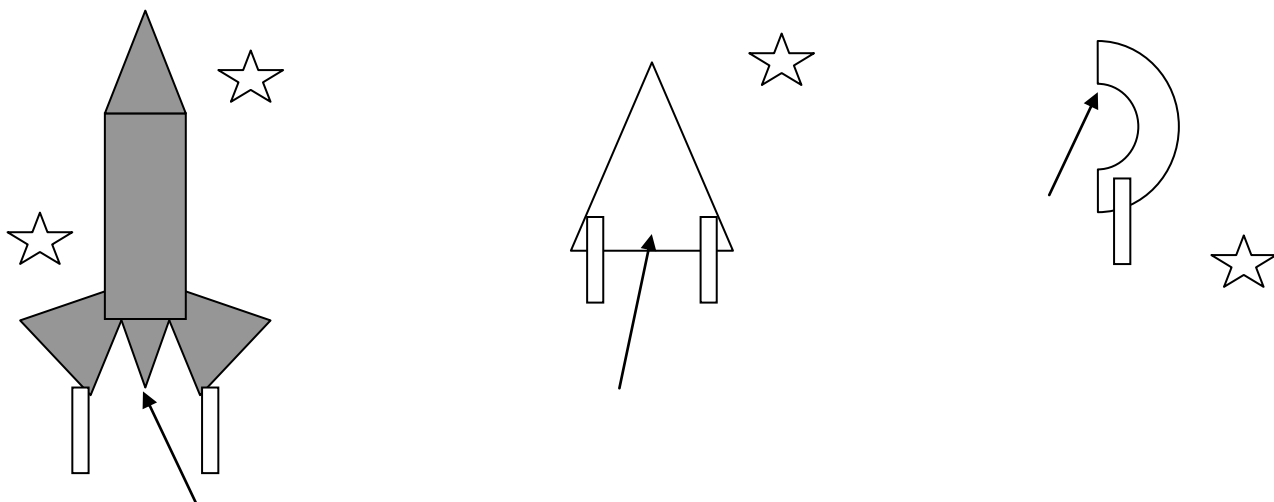
Fill a clear cup with about half an inch of water. Add two drops each of all three primary colors of food coloring - red, blue and yellow. Swirl the cup gently to mix. The color should be dark brown. Tape a strip of paper towel around a pencil or coffee stirrer and suspend the pencil over the glass so that the end of the strip barely touches the colored water. Watch the colors separate as they move up the strip of towel.

HOMEMADE THERMOMETER

Pour equal parts of tap water and rubbing alcohol into the bottle, filling about 1/8 to a 1/4 of the bottle. Add a couple of drops of food coloring and mix. Put the straw in the bottle, but don't let the straw touch the bottom (DO NOT DRINK THE MIXTURE). Use the modeling clay to seal the neck of the bottle, so the straw stays in place. Now hold your hands on the bottle and watch what happens to the mixture in the bottle. You just made a thermometer! Just like any thermometer, the mixture expanded when it was warmed. This made the liquid no longer fit in the bottom of the bottle. As the alcohol expanded the colored mixture moved up through the straw. You can watch your thermometer and see how the liquid changes throughout the day. What happens if your thermometer is in shadow or in sunlight?

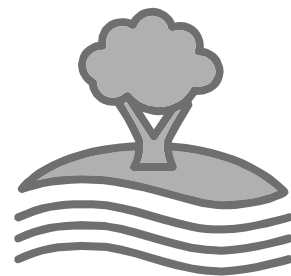
CLOTHESPIN MAGIC

Help children explore center of gravity with this "magical" experiment. Show children the cardboard cut-out of a rocket ship. Explain that before the rocket can take off it must be able to stand up on its own. Attempt to balance the rocket on the tip of your finger. Invite them to try. What happens? "It falls over!" "It's not working." Then explain that "we need some rocket engines." Attach two clothespins to the ends of the rocket and try again. IT WORKS! (You have placed additional weight at the bottom of the shape and thus changed the center of gravity.) Now give the children "spaceships" that they can try to balance on their own. Experiment with points of balance and with how to attach clothespins. Help them record their results. Provide paper and pencils and encourage them to trace the shapes and show where the clothespins were attached.



EARTH SCIENCE

soil, rocks, weather, water, air, sun, moon and stars, seasons



MYSTERY MUD

Mix mud in a plastic tub. Add small plastic animals or other objects. Retrieve with tongs and rinse in another tub of clean water. Place on tray or towels to dry. Sort what you found.

TORNADO IN A BOTTLE

Pour water into a 2 liter plastic bottle. Add 1 teaspoon of clear liquid soap. Add 3 or 4 small tightly crumpled balls of aluminum foil. Make sure they are compressed enough to sink to the bottom of the bottle. Add 2 or 3 drops of blue food coloring. Replace lid and close tightly. Swirl bottle and observe tornado. The crumpled foil helps the funnel last longer.

WATER, WATER EVERYWHERE

Children love to play in water! Take advantage of their natural enthusiasm with these water activities:

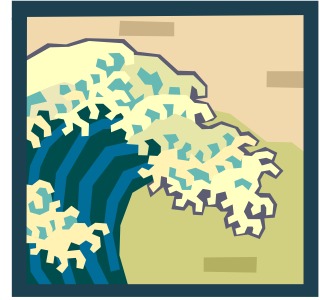
- Provide an assortment of doll or baby clothes, tubs, clotheslines and pins. Children wash clothes and hang on line to dry. Talk about what happens to water in the clothes. Which clothes dry faster? How does the sun help?
- Use sponges and squeegees to clean windows.
- Give children an assortment of sponges - natural and synthetic - and let them experiment with soaking up water and squeezing it out. Provide some cups to catch the water and measure it.
- Freeze water in large blocks of different shapes and sizes. Provide children with salt to sprinkle on surfaces. Can they "glue" blocks together?
- Poke several pinholes in the sides around the bottom of plastic water bottles. Fill bottles and screw cap on tightly; water should stop coming through holes. To release water, unscrew cap slightly.
- "Paint" with water on the chalkboard; on a wooden fence; on playground pavement.

BUBBLES AND BURPS

Give children basters, plastic water bottles and water tubs. Show them how to squeeze basters to make bubbles in water. Lower the water bottles straight down into water and then turn them sideways to make them "burp." What made the bubbles? (air)

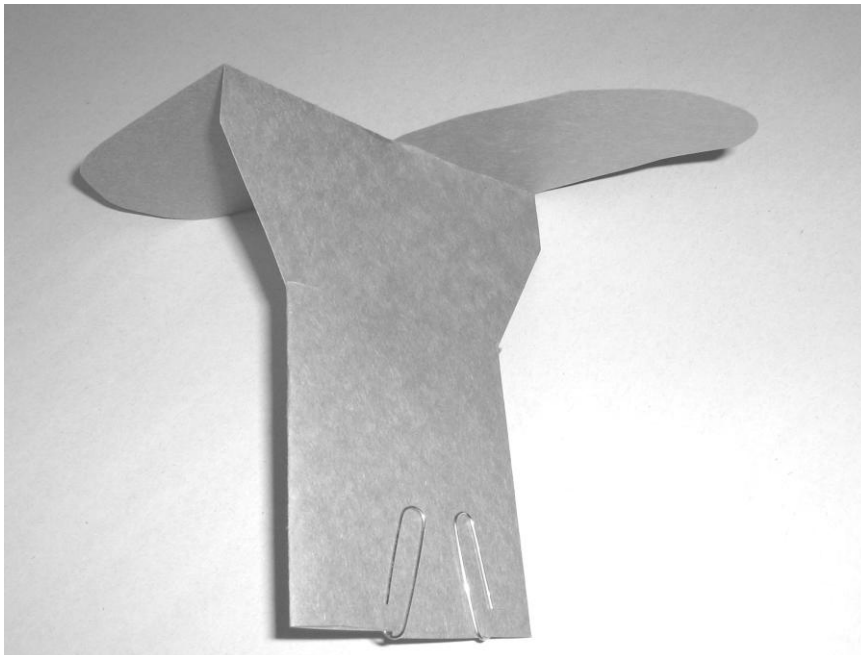
OCEAN IN A BOTTLE

In an empty plastic bottle, mix equal parts of water and mineral oil, each colored a different color. You may color the water with regular food coloring or liquid watercolor. The oil requires an oil-based color. (In the spring you can find oil-based colors for dyeing eggs on sale.) As children move and shake the bottle, the oil and water form interesting waves and patterns. When the bottle is still, the oil and water separate again.



MAKE A PAPER HELICOPTER

Trace the pattern on construction paper. Cut it out, making sure to cut the rotors apart down the center. DO NOT cut off the curved tops. Fold on the dotted lines and attach two paper clips to the bottom. Fold the rotors in opposite directions, parallel to the floor. Hold high in the air and drop straight down. Watch it spin! Experiment with holding and releasing it in different ways. Which works best? Try pointing rotors straight up. What happens?



Fold this rotor in one direction, and the other in the opposite direction.



Fold this tab in towards the center.

Fold this tab in towards the center.

After folding in tabs, attach paper clips here. One tab will slightly overlap the other.

HOW SOIL HOLDS WATER

Place different types of soil (sand, potting soil, clay) in the same size funnels. Place funnels in clear bottles or jars all the same size and shape. Pour same amount of water ($\frac{1}{4}$ to $\frac{1}{2}$ cup) into each funnel. Measure and compare how much water collects in each jar. Which soil let water through? Which soil "held on" to the water?

ROCK 'N ' ROLL

Bring rocks from home or collect on playground.

- Talk about shapes of rocks, colors, textures (rough or smooth.) Sort by size, shape, color.
- Use simple field guide to identify some common rocks
- •Use magnifying glasses to see many colors in one rock.
- •Provide small carpet squares in "rock colors." Try to match rocks to squares.
- •Create a display for rocks. Staple together $\frac{1}{2}$ pint milk cartons with tops cut off. Place the grid in a shallow box to make it sturdier, or use boxes from class supplies of crayons.
- •Weigh and compare rocks on balance scale.

CREATING CRATERS

Lay newspaper down on the working surface. Fill a small tray with fine sand and sprinkle a very thin layer of flour on the surface of the sand. Drop the marble onto the sand from a height of about 3 inches. Remove the marble and observe/record the mark it left, called a "crater." Predict what you expect to happen if you drop the ping-pong ball from the same height. Will the hole be deeper or shallower? Smooth the surface of the sand. Repeat the process with a ping-pong ball and a gumball, or any other spherical object. What happens if you change the height from which the balls are dropped? Compare these results to photographs of impact craters on Earth, the moon, and Mars. What are the similarities? Differences?

WATER CYCLE

Give each child a cotton ball, and tell them to pretend that they are holding a cloud. Ask how the cloud feels: heavy or light, soft or hard? Children place the "cloud" gently on top of cold water while still holding it. Explain that in real life,

water *evaporates* - invisibly travels up to the cloud. It is a lot colder up in the sky, so the vapor turns into water, and fills up the cloud. Ask: Can you see the "cloud" (cotton ball) filling up with the water? Ask the children to gently pick up the "cloud" from the pan. Ask: How does the "cloud" feel now? Light or heavy? Warm or cold? What is happening now with the water? The water is dripping from the "cloud." Why? The cloud can't hold all that water, it's too heavy. When water falls from the clouds because they are too heavy with water, it's called rain. The water or rain comes right back into the pan, and the pan could be a stream, river, ocean or the ground.

MINI PLANETARIUM

To make the planetarium or star viewer, collect empty toilet tissue or paper towel tubes. Cover the end of the toilet tubes with black construction paper and use a rubber band or tape to secure. Using a push pin with a handle, children punch small holes in the construction paper (be sure to model and supervise this step). Hold the tubes up to the light and look through the open end to "see the stars."

