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ABSTRACT

This booklet accompanies a videotape covering the same material. It is intended as a guide to performing 16 science demonstrations with young children. Section titles are: "Surface Tension", "Budding Botanist", "Mystery Matter", "Young Rock Stars", "What a Gas!", "Zounds...What Sounds!", and "Brrrrr...Cool Science." Included is a section describing ways to use these experiments. (MKR)

Science, Discovery & Laughter Video Guide Book

The Washington Superintendent of Public Instruction and The Science Club *present*

SCIENCE, DISCOVERY & LAUGHTER

VIDEO GUIDE BOOK

A Science Club Parent-Professor Video and Guide Book

El Superintendente de Instrucción Publica del Estado de Washington y El Club Científico *presenta*

CIENCIA, DESCUBRIMIENTO Y RISAS

VIDEO GUIDE BOOK

Un Programa Para Los Profesores-Padres

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ATTENTION: SURFACE TENSION

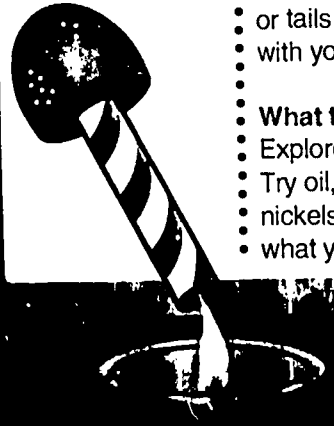
Make a gumdropper:
It's easy! You will need a small gumdrop and a plastic straw. Press the gumdrop into the end of the straw. It works like an eyedropper! Just put the straw in the liquid, pinch it, and the liquid will rise up the straw. Lift the straw, stop pinching it, and the liquid flows out!

PENNY PLOP

How many drops of water will fit on a penny? Find out!

What you need:

A penny
Water
Eyedropper
or cur
gumdropper



What to do:

Make a prediction about how many drops of water will fit on your penny before it overflows. Use the eyedropper or gumdropper to carefully put drops of water on the penny. Count the drops. Turn the coin over and try again. Does heads or tails make a difference? Compare the results with your original guess. Are you surprised?

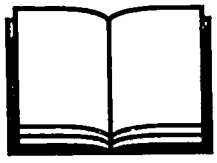
What to discover:

Explore the surface tension in other liquids. Try oil, milk, soapy water. Try different coins — nickels, dimes, quarters. Base your prediction on what you've learned from the penny experiment.

AHA!
The water molecules at the surface of the water form a tension because they are so attracted to one another and to the water molecules under them. This is called surface tension! The dome of the water finally becomes so high that the water molecules can't hold together, and over they go!

Have you ever wondered...
...why small drops of water are round?

PENNY PLOP / Much more for kids to explore...



Read:
The Magic Schoolbus at the Waterworks
by Joanne Cole

Learn more about...
- MENISCUS
- MOLECULES
- SOAP

Try to discover...
More about the people in the "You can quote me" boxes.

Bright idea...
This is a simple and fun game to do with your family or friends. Gather together a bunch of pennies. Then fill a glass to the brim with water. Have everyone take turns slipping a penny into the glass by its edge. Whose penny will cause the water to overflow? Can you guess beforehand how many pennies it will take to make the water overflow?

Fun to find out...
How is soap made? Why do soap and water make things clean?

Challenge...
Water is amazing!
Tie a string to a faucet and pull the string towards the corner of the sink. Turn on the water. What does the water do?

Learn more about water...
Using an eyedropper or gumdropper, put drops of water onto a piece of waxed paper. Move the droplets around with a toothpick. What happens? Try this with droplets of water colored with different food colorings.

ATTENTION: SURFACE TENSION

PSYCHIC PEPPER

Concentrate!
You can make that pepper move
(...with our secret ingredient).

What you need:

Container
like a wide bowl
or pie plate
Water
Pepper
Liquid dish detergent

What to do:

Fill a bowl or pie plate with water. Sprinkle pepper to cover the surface of the water. Place a drop of the detergent in the middle of the pepper.

What to discover:

Observe! Does any pepper sink? Try talcum powder instead of pepper. Use different brands of dishwashing soap, or even shampoo. Test the surface tension in different liquids — use milk or soda pop instead of water.

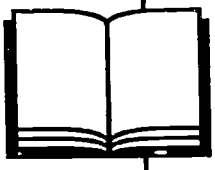
Hints:
You can challenge your child to use his or her mind to control the pepper. Hold your child's finger and touch the water with it. Nothing happens! Now hold it again, but this time secretly have a little detergent on your palm and rub it on your child's finger. Now try again. WOW!

Warning:
Be sure to shake the pepper away from your face. It can irritate your eyes and nose.

AHA!
The soap has reduced the water's surface tension in the center of the plate by lessening the attraction of the water molecules on the surface. Some soaps contain wetting agents to weaken the surface tension. This helps clean those greasy dishes

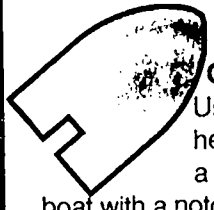
PSYCHIC PEPPER / Much more for kids to explore...

"Everybody books"...
Many of the books suggested are called "Picture Books". We like to call them "Everybody Books", because people of all ages will enjoy them.



You can quote me!
"The true worth of an experimenter consists in his pursuing not only what he seeks in his experiment, but also what he did not seek."

Claude Bernard



Challenge...
Use an index card or heavy paper to make a boat. Cut out a flat boat with a notch in its stern. Set the boat gently on the water. Can you think of a way to make it move by using soap, now that you've learned about soap's effect on surface tension? Then try using oil. Does oil work?

Fun to find out...
Learn about a fascinating insect that uses the principles of surface tension. It's called a **water strider** or **pond skater**.

Observe...
Combine water and oil. Shake. Will it mix? Now add soap. What happens? Try this experiment with different brands of soap.

Can you do this?
Can you make a paper clip float on the surface of water? Give it a try!

ATTENTION: SURFACE TENSION

Lots of questions?
Design an investigation to think of a way to challenge your hypothesis. Be sure to vary one thing at a time. Remember that your results might need to be tested by someone else. Keep a written record of your testing steps and the results of your experiments.

COLOR CLOUDS

What shape do you see in the swirling clouds of milk and food coloring?

Hint:
Ask your child to tell you what the swirling milk and food coloring looks like.

What you need:

2% milk
Food coloring
Liquid dishwashing soap
Eyedropper or gumdropper
Plate or pie plate

What to do:

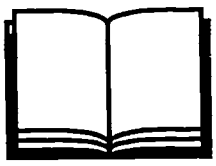
Pour milk into the plate so it covers the bottom. Put 4 drops of food coloring into the center of the milk. What do you think will happen when you put a drop of dishwashing liquid in the center of the coloring? Use your eyedropper or gumdropper to add the soap and test your prediction. Observe! Then add more drops of coloring and soap.

What to discover:

Use different brands of dishwashing soap.
Compare whole milk or nonfat milk with 2% milk.
Try it with water or juice. Combine different colors.

Bright idea:
Secretly put the liquid dishwashing soap in an empty film container. This adds to the drama of the experiment. Can your child guess what this secret ingredient is? 10

COLOR CLOUDS / Much more for kids to explore...



Read...

It Looked Like Spilt Milk *by Charles Shaw*
The Cloud Book *by Tomie De Paola*
Color Dance *by Ann Jonas*
Mouse Paint *by Ellen Stoll Walsh*

You can quote me!

"Science and art belong to the same world, and the barriers of nationality vanish between them."

Johann Wolfgang von Goethe

Imagine...

Take an imaginary voyage on a cloud. Observe the earth below. What do you see? What countries are you travelling above? What are the people down below doing? Write a story or poem about your adventures.

Challenge...

Make primary colored ice cubes with food coloring and water — red, blue and yellow. What do you think will happen if you place a red ice cube and a blue ice cube together in a bowl to melt? Try it and see. Then try other color combinations. Record your results.

Draw...

Observe real clouds. Draw pictures of what they look like to you. What would they look like in different colors?

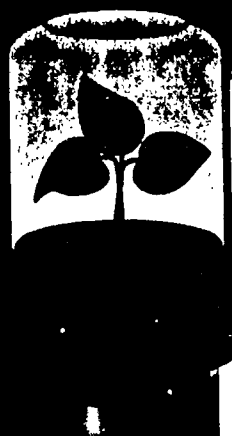
Classify...

Collect items or list things that are your favorite color. Classify them by putting them into groups.

Take a survey...

Ask your family and friends what their favorite color is. Which color is picked most often? Make a chart or graph to show your results.

BUDDING BOTANIST



TERRIFIC TERRARIUMS

Don't recycle that pop bottle yet.
You may be able to grow a garden in it. No Kidding!

What you need:

One liter plastic pop bottle (the kind with the extra plastic piece as the base)
Soil
Scissors or a knife
Handful of little rocks
Seeds like popcorn, beans and dandelion seeds ...
or seeds from fruits and vegetables

What to do:

Remove the base from the bottle by running warm water into it. Line the bottom of the base with little rocks for drainage. Fill the base with soil. Plant seeds. Water. Cut the top off the bottle — cut right before the curve of the bottle begins. Turn bottle over and fit into base. Put in a sunny place, and watch your garden grow!

What to discover:

How many types of seeds can you find around your kitchen or yard? How fast do your plants grow? Measure them daily. Count their leaves.

"HYPOTHESIS"
A fancy sounding word for an "educated guess". Think about what you want to test (like the difference in plant growth in terrariums with holes or no holes) and guess what you think is going to happen. Don't worry if things turn out differently than you thought. Maybe it will lead to a new discovery.

Hint:
The base of the bottle may be difficult to remove at first. Just run warm water into it to loosen the glue. Then give the base a twist.

A Respect For Life:
Growing plants is a great way for children to learn the responsibility of caring for nature.

What happens if...
...you cut holes in one terrarium and not another?
...you use rocks for drainage in one terrarium and not another?
...you put two terrariums in different locations?

TERRIFIC TERRARIUMS / Much more for kids to explore...

Read...
Try the following books:
Vegetable Soup *by Lois Ehlert*
This Year's Garden *by Cynthia Rylant*
From Seed to Pear *by Ali Mitgutsch*
The Lorax *by Dr. Seuss*
Three Stalks of Corn *by Leo Politi*

Act...
Add a little drama to your life. Act out the growth of a seed. Will you grow into a flower, a vegetable, a fruit — or something else entirely? How do you feel when it rains or when the wind blows? Choose some funny music to go with it. Ask your audience to make appropriate sounds — like wind, rain, or a visit from an ant, grassshopper or bumble bee.

Draw...
Put your imagination to work. Invent a plant. How does it look? Where would it grow? What are its needs?

You can quote me!
"I wanted to know every strange stone, flower, insect, bird, or beast."
George Washington Carver

Read biographies about famous folks...
A Weed is a Flower: The Life of George Washington Carver *by Aliki* or author *Steven Kellogg's* retelling of Johnny Appleseed's life. Also read about environmentalist Rachel Carson in one of the many biographies available.

Challenge...
Do you need soil to grow a seed? Try using cotton, rocks or just water.

Learn more about...
- BOTANY

BUDDING BOTANIST

AHA!
Exploding seed pods and parachutes? Did you know that seeds travel in many ways? Seeds can travel by air, by water, by people, by animals (and even by sock!) What other ways do you think seeds can travel?

Bright idea...
Leave bird seed out for winter birds. Read the ingredients on the package. What kinds of seeds are in bird seed?

SOCK WALK

Taking a walk can be a growing experience. Here's the perfect solution for those socks without mates.

What you need:

- *A light colored sock — a large size if possible*
- *Soil*
- *Water*
- *Magnifying lens — if you have one*
- *A place to walk that has weeds — like a garden, empty lot, field or park*

What to do:

Put on the sock OVER your shoe and pant leg. Take a walk in a place with weeds (and seeds). Gently remove the sock. Look at the cool things you picked up! Fill the sock with soil. Hang it up, or place it in a pan in a sunny location. Keep it moist and watch it sprout!

What to discover:

Observe your sock garden. Do all the seeds start to grow at once? Look through a plant identification book. Can you identify any of the plants that are growing?

What happens...
...if you put the socks in different locations as they grow?
... if you use different amounts of water?
...if you take several sock walks in different locations, or during different seasons?

Another bright idea...
Take a field trip in your socks. Take along a pencil and paper for sketching. Draw pictures of what you see, hear, smell, feel, what you enjoy. Collect fallen leaves and sort them. Make a handprint in the mud.

SOCK WALK / Much more for kids to explore...

Read...

The Eyewitness Book Series: Plant
Tiny Seed *by Eric Carle*
Miss Rumphius *by Barbara Cooney*
The Lotus Seed *by Sherry Garland*
The Big Seed *by Ellen Howard*
The Plant That Ate Dirty Socks *by Nancy McArthur*

Tell a story...

Take an imaginary sock walk in a special location. What kinds of seeds would stick to your sock in a tropical rain forest? Walking through a field in the Midwest? On a hike in the mountains?

Draw...

Draw your sock from different views. Try drawing it again in a couple of weeks. Or draw just one seed, observing it in detail.

Fun to find out...

Do you think plants can grow on other planets? Think about what you've learned about the needs of a plant. Then choose a planet to read about — perhaps Uranus or Venus. Could a seed grow on that planet?

More challenging questions...

How are seedless grapes grown? Do aquatic plants have roots?

People Seed Treat

1/2 cup sunflower seeds
1/2 cup peanut butter
1/4 cup honey
1/2 cup cocoa powder or instant dry milk
1/2 cup sesame seeds

Mix the first four ingredients and shape into small balls. Spread the 1/2 cup of sesame seeds on a sheet of waxed paper. Roll each ball in the sesame seeds. Store in the refrigerator.

Hint!
If the GLOP is still sticky, dip it back into the Borax water.

GLOP

You'll be amazed at how much fun it is to play with this stuff. (But try to give the kids a chance, too!)

What you need:

1/4 cup white glue
1/2 cup warm water
1/2 teaspoon Borax
2 clear plastic glasses or jars
2 spoons
Food coloring
Plastic baggie or storage container

What to do:

Pour glue into one of the glasses or jars. Stir in food coloring. Set aside. In the other glass, stir the Borax into the warm water. Slowly pour the colored glue into the glass of Borax and water. Take the GLOP out of the glass and knead. Play! Store it in a baggie or container.

What to discover:

What happens when you stretch it...
or roll it into a ball... or let it dry out?
How does it sound when you bounce it?

"OBSERVATION"
A word that means looking at something very closely and getting as much information as possible. Encourage your children to make observations about GLOP!

Observe...
...what happens when you first pour the glue into the Borax and water. Ask your kids what it reminds them of. This will help them make sense out of something that may be unfamiliar to them.

GLOP / Much more for kids to explore...

Read...

Mudworks: Creative Clay, Dough and Modeling Experiences *by Mary Ann Kohl*

Giant Jam Sandwich *by John V. Lord*

The Secret Life of School Supplies *by Vicki Cobb*

Write...

Look on the back of the Borax container. Write to that address to find out what Borax is made of and what's so special about it.

You can quote me!

"I feel a recipe is only a theme, which an intelligent cook can play each time with a variation."

Madame Benoit

Learn more about...

- MATTER

Try to discover...

...what makes glue so sticky!

Imagine...

If you were a famous cook and you were asked to create the stickiest recipe in the whole world, what ingredients would you use? How much of each ingredient would you need? A teaspoon, a tablespoon, a cup? Would you stir your recipe, cook it, bake it, freeze it, dry it in the sun?

Brainstorm...

Did you know that there are a lot of sticky things in nature? How about sap from a pine tree, or a spider's web? How many other sticky things can you name? It's a fun game to play with your family.

Challenge...

The next time you make GLOP, try adding different amounts of Borax, or mix a few drops of food coloring together to create different colors. Explore and see what happens.

MYSTERY MATTER

MARTIAN MUD

What is this mysterious substance?
Is it really from a Martian volcano?
Try making some before showing it to your children, and let them guess the ingredients!

What you need:

1 box cornstarch
2 cups water
Large bowl
Mixing spoon
Food coloring

What to do:

Empty box of cornstarch in bowl. Add water slowly while stirring. Stir in food coloring. Experiment — stir it quickly, then slowly. PLAY!!!

What to discover:

What happens when you punch it... roll it into a ball... sink your finger into it... let it run through your fingers? When does it act like a solid? When does it act like a liquid? Why is this stuff so weird? Make a list with your kids.

Why is this stuff so weird?

One reason Martian Mud acts like a solid **and** a liquid is because the cornstarch does not completely dissolve in water — for instance, like sugar dissolves in water. The sugar does not separate out. But it's also not like muddy water, where the dirt will eventually settle to the bottom. It's somewhere in between.

"EXPERIMENT"

A word that means to perform tests in order to discover something unknown, or to show something that is already known. Ask your children if they can think of any experments they can do to learn more about Martian Mud.

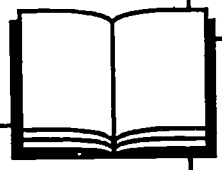
Warning!

Don't dump Martian Mud down your sink. It may clog things up! You can put it in the garbage or in the compost pile.

MARTIAN MUD / Much more for kids to explore...

Read...
Try ***Bartholomew and the Oobleck*** *by Dr. Seuss* or two books *by Vicki Cobb*, ***Why Can't You Unscramble An Egg? and other not such dumb questions about matter*** or ***Gobs of Goo.***

Or books that show the real soil of Mars and the real spaceship that explored Mars, like books by authors Duncan Brewer, Seymour Simon and Michael George.



Design...
Invent a space ship that can land on Martian Mud. Build it out of clay, plastic building blocks, sticks — whatever you can find around your house.

Draw...
What kind of creature would eat Martian Mud? How does it eat Martian Mud? Does it have a trunk like an elephant or a mouth like your own?

Fun to find out...
Where is the solar system's biggest volcano?
Where is the solar system's largest canyon?

Learn more about...
- COLLOIDS
- SOLIDS
- MOLECULES
- LIQUIDS

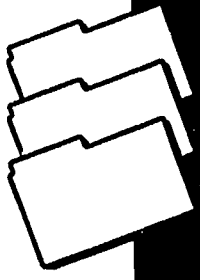
Experimentation is fun!
Feel free to change our "recipes" to see what will happen

...if you add a little more or less of something

...or if you used two different brands of ingredients

...or — well, you decide!

Just have fun, but make sure what you substitute is safe.



YOUNG ROCK STARS

BACKYARD SOUVENIRS

What treasures lie in your yard?
Or in your children's pockets?

What you need:

Rocks from your walk
Old toothbrushes
Pan of water
Rags

What to do:

Go on a family walk around the block with a bag — or just your pockets! Collect rocks that you think look interesting. Clean your rocks using old toothbrushes, pans of water and rags.

What to discover:

Encourage your child to classify or organize the rocks. Choose different properties according to size, shape, color, location where they were found. Help your child see that there are many ways to group even a few rocks.

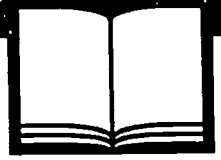
Bright ideas: Let children glue their rocks on heavy paper or cardboard, or organize their collections in egg cartons. Encourage them to label their collections according to where they found the rocks, or how they grouped them.

Did you know: Rocks give us answers to questions about the universe? In 1969, Apollo 12 brought back about 75 pounds of rock from the moon. Try to find out more about what scientists discovered from investigating these moon rocks.

CLASSIFICATION...

...helps to organize the world around us. We observe similarities and differences among objects, and classify them in a useful way. Let your children design their collections according to their own ideas of grouping.

BACKYARD SOUVENIRS / Much more for kids to explore...



Read...

...***Coyote Steals the Blanket: A Ute Tale*** *by Janet Stevens,* ***The Sun, the Wind and the Rain*** *by Lisa Westberg Peters,* ***Magic School Bus Inside the Earth*** *by Joanna Cole,* ***Eyewitness Book Series: Rocks and Minerals,*** ***Everybody Needs a Rock*** *by Byrd Baylor.*

You can quote me!

"Science is more than just sitting at your desk grinding away at problems. It's thinking and talking with other scientists."
Shirley A. Jackson

Learn more about...

- IGNEOUS ROCKS
- SEDIMENTARY ROCKS
- METAMORPHIC ROCKS

Field Trip...

Go through an average day. Where do you see classification being used? What about your kitchen cupboards and drawers, closets, the grocery store, the newspaper, your classroom? Go for a walk and find things that have spiral patterns, are round, are certain colors.

Mini Museum...

Set up a special place in the house to show off your works of art or special collections. These interest centers can show sorted rocks, leaves, seeds, rocks, nuts, and even pictures from catalogs.

Artwork...

Can you think of art projects to make with rocks? How about making paperweights by coloring pebbles with special designs or funny faces?

YOUNG ROCK STARS

CREATING CRATERS

Green cheese? The man in the Moon?
Are those craters we see?

What you need:

Different sizes of rocks
Flour
Hot cocoa mix
Shallow tub or pan, at least 13" X 19"

What to do:

Put three or four inches of flour in the pan. Smooth the surface. Sprinkle a thin layer of hot cocoa mix on the surface of the flour. Drop the rocks at different heights and angles into the pan. Look at the pattern the rocks make.

What to discover:

Test out variables, like holding the same rock at different heights and angles. Use different size rocks. Shoot a rock into the pan with a rubber band. Do these changes make a difference to the size and shape of the crater?

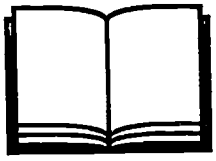
Change our recipe:
Can you think of anything edible that you can substitute for the rocks? What about substitutions for the flour and cocoa mix?

Experiment with a friend:
Ask your friend to close his or her eyes while you toss a rock into the pan. Can your friend figure out from what angle you threw the rock? Now change places, and let your friend toss the rock!

VARIABLES...
...are conditions that affect an experiment. Be sure to change just one variable at a time, and hold the others constant. For instance, if you want to test how the size of a crater is affected by the height from which a rock is dropped, use the same rock, but drop it from different heights.

AHA!
As meteors fall through the Earth's atmosphere, they get extremely hot. The few that hit the earth are called meteorites. They move so fast that when they hit the surface they explode and create craters.

CREATING CRATERS / Much more for kids to explore...



You can quote me!

"We especially need imagination in science. It is not all mathematics, nor all logic, but it is beauty and poetry."

Maria Mitchell

Read...

Moon *by Seymour Simon*
Moon *by Michael George*
Moon Mother *by Ed Young*
Grandfather Twilight *by Barbara Berger*

Learn more about famous folks...

Read about astronomers like Galilei Galileo, William Herschel, Tycho Brahe and Maria Mitchell. Learn more about astronauts like John Glenn, Ellen Ochoa and Mae Jemison.

Learn more about...

- METEORS
- METEORITES
- CRATERS

What language is this anyway?

What are maria, paludes, sinii and riles? Need a hint? They have something to do with the moon.

Fun to find out...

Why does the moon have so many craters? Which astronauts walked on the moon? When did this happen?

Observe...

Watch the moon for a month. Draw a picture of what you see.

WHAT A GAS!

AHA!
Vinegar is an acid, and the baking soda is a base. A chemical reaction is produced when they are mixed together. A product of this reaction is carbon dioxide gas. The carbon dioxide gas inflates the balloon!

BOTTLE BELCH

Mix a solid and a liquid, and you get gas? Huh?

What you need:

A bottle with a narrow neck
Balloon
Vinegar
Baking soda
Funnel or small paper cup

What to do:

Pour a small amount of vinegar into the bottle. Use a funnel or a small paper cup to put baking soda in the balloon. Pull the balloon tightly over the mouth of the bottle. Careful, don't let any baking soda fall into the bottle yet. Now let the baking soda fall into the bottle. Shake gently.

What to discover:

What must have been formed in order for the balloon to expand? Explore different amounts of baking soda and vinegar. What about other liquids like lemon juice, water, oil, milk? What happens if you substitute baking powder for the baking soda?

"PREDICTION"
A word that means to use previous observations and other information to forecast an outcome or event. Give your child a chance to predict the potential outcome of an experiment. Don't worry if the experiment turns out differently than your prediction. That's science!

Did you know:
...that yeast makes dough rise by releasing carbon dioxide?

Speaking of gas:
...why can't anything burn on the moon?

WHAT A GAS!

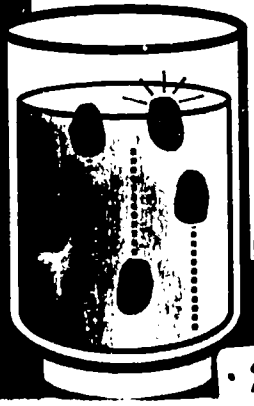
What is this amazing stuff?
When an animal breathes, it is released into the air. Plants use it. It puts out fire. It forms the bubbles in fizzy drinks. Its bubbles make a cake rise. It is made of carbon and oxygen.
What is it?

CARBON DIOXIDE

RAISING RAISINS

These raisins are really moving! What's happening?

What you need:
Raisins
Baking soda
Vinegar
Water
Glass container



What to do:
Put some baking soda into a container of water.
Drop two raisins into the mixture.
Anything happening? Now add some vinegar.
Observe the behavior of the raisins.

What to discover:
What causes the raisins to move up and down? What about comparing regular raisins with chocolate covered raisins? Why do some raisins work, and others don't? Try lifesavers, gum, or even spaghetti.

Bright idea:
Have raisin races with a friend. Pick your champion raisins and see how many times they go up and down in a certain amount of time.

Observe:
The next time you put a straw into soda pop, notice that the bubbles tend to cling to the straw.

AHA!
The carbon dioxide gas bubbles tend to cling on surfaces. Since the raisins are light, the bubbles lift them to the surface. The bubbles break when the raisins reach the top, and the raisins sink.

WHAT A GAS! / Much more for kids to explore...

Read...
Strega Nona's Magic Lessons *by Tomie de Paola,* ***Messing Around with Baking Chemistry*** *by Bernie Zubrowski,* ***Bread, Bread, Bread*** *by Ann Morris,* ***The Bread Book*** *by Carolyn Meyer*

Learn more about...
- BUOYANCY
- DENSITY
- GASES

You can quote me!
"When nothing is sure, everything is possible."
Margaret Drabble

Float or sink...
Find five (5) things that you think will float, and five (5) things that you think will sink. Test these items while taking a bath!

Fun to find out...
Raising Raisins shows you basic principles of buoyancy and density. Try reading ***Submarines and Other Underwater Craft*** *by Harvey Weiss* and ***Submarines*** *by Gail Gibbons.*

Explore yeast...
Why do you need to put the dough in a warm place to rise? Compare putting yeast in cold water and warm water. Are the results different? Look for recipes that don't use yeast. Why do those foods still rise?

Challenge...
Do the balloon experiment again. This time, mix half a package of dry yeast and a spoonful of sugar in the balloon with a cup of warm water in the bottle. What happens?

ZOUNDS ... WHAT SOUNDS!

AHA!
When you clap your hands, it's not just your hands that move. The air vibrates, too! Sound is transmitted through the air to your ears by air vibrations called sound waves. The straw makes sound like a wind instrument — a column of air vibrates inside a tube. Changing the length of the air column produces different notes!

STRAW FLUTES & TOOTS

You've never thought of a drinking straw as a musical instrument? This makes family outings to fast food places very interesting.

What you need:

Plastic drinking straws
Scissors
Tape

What to do:

Flatten one end of the straw. Cut off the side edges to form a "V" shape. Then snip off the pointed tip. Put in your mouth and blow!

What to discover:

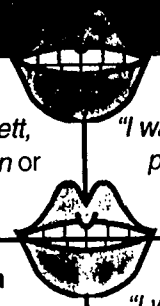
Experiment with various lengths of straws and compare the difference in sounds they make.
Cut one as short as you can.
Tape straws together to make a long one.
What happens if you cut holes in the straw?

Hints:
Making noise with a straw can take some time to master. Encourage your children to keep trying.

Bright idea:
What about making a mini-trombone? How? Put a thin straw inside a wider one!

STRAW FLUTES & TOOTS / Much more for kids to explore...

Read...
...books like ***Berlioz the Bear*** *by Jan Brett,* ***Orchestranimals*** *by Vlasta Van Kampen* or ***Eyewitness Book Series: Music***



You can quote me!
"I was gratified to be able to answer promptly. I said 'I don't know'."
Mark Twain

More to Read and Do...
How about using those extra straws to build structures? Read ***Messing Around with Drinking Straw Construction*** *by Bernie Zubrowski.*

Learn more about...
- PITCH
- TONE

You can quote me, too!
"I wasn't sure until quite late in life that I discovered how easy it is to say 'I don't know'."
Somerset Maughm

Challenge...
How about taping different lengths of straws together to make a panpipe? Line seven (7) straws side by side, about 1/2 inch apart. Tape them together in the middle. Cut each one a little bit shorter than the one before. Blow gently across the top of each straw to make a note! Do the longer straws play a high or low note?

Music...
Look around your home. Can you find anything to use to make an instrument? Try rubber bands, bottle caps, cans, wires, boxes...

Fun to find out...
Is there sound on the moon?

ZOUNDS ... WHAT SOUNDS!

AHA!
Sound can travel through other materials besides air. Sound waves are transmitted to your eardrums through the string and cups. Vibrations carry the sound along the string. If the string is touched while it is vibrating, it will disrupt the sound. What other materials can it travel through? Metal? Wood? Walls?

CONCERT IN A CUP

I'm hearing bells! So can you!

What you need:

2 plastic cups
String
Metal spoons and other assorted items like a wire hanger, pencil, plastic spoons, etc.

What to do:
Carefully poke a small hole in the bottom of each cup. Measure out the string by stretching your arms wide. Then thread each end of the string through one of the holes in the cups. Tie a knot to secure the string and cups together. Put the cups over your ears, bend forward and allow the string to hand freely. Ask someone to hang a spoon on the string and strike it.

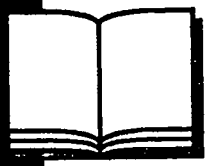
What to discover:
What does it sound like? An old fashioned clock chime or a church bell? Ask your child to describe how it sounds.

CURIOUSITY...
...is a powerful force that leads us to ask questions and explore the world around us. Share a sense of wonder and excitement with your children so that they can see that science is an action word. Expose them to a wide range of experiences and guide them in finding their own solutions.

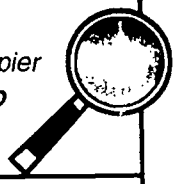
More to discover:
Try different types of string, and various lengths of string. Hang different objects on the string, and strike them with metal, plastic or wood.

Hint:
Be sure to let the string hang freely and not allow it to touch hands or clothes. What happens when a hand is placed on the string?

CONCERT IN A CUP / Much more for kids to explore...

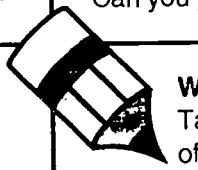


Read...
Crash! Bang! Boom! *by Peter Spier* and ***The Animals That Drank Up Sound*** *by William Stafford.*



Challenge...
Take four (4) identical glasses. Leave one empty and fill three (3) with different amounts of water. Tap a pencil on the top of each rim. Listen carefully to the sound each makes. Arrange the glasses in order from lowest to highest sounds. Can you play a tune?

What would the world be like without sound?
Read ***I Have A Sister, My Sister is Deaf*** *by Jeanne Whitehouse Peterson* or a biography of Helen Keller.



Drama...
Play charades! Ssshh! Don't make a sound. See if your audience can guess who you are or what you are doing.

First words...
What were the first words spoken over a telephone by Alexander Graham Bell?

What were the first words from the phonograph invented by Thomas Edison?

Write...
Take a walk. Make a list of all the sounds you like and don't like. You can use **onomatopoeia** to describe what you hear. Buzz! Rattle! Bang!

You aren't sure what that means? Look it up in a dictionary!

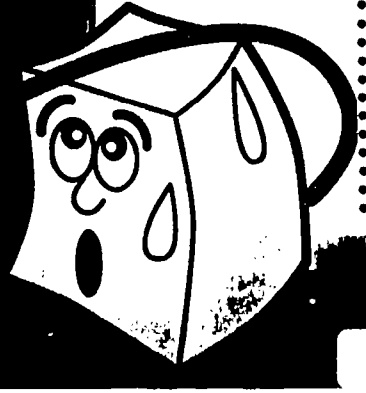
BRRRRR ... COOL SCIENCE

Questions you can answer now...
Why do people put salt on icy sidewalks? Does the sea freeze easily?

ICE CUBE RODEO

Howdy, Partners. Bet you can't "lasso" that cube! We'll show you how...

What you need:
Ice cube
Glass of water, almost full
About 7" of string
Salt



What to do:
Place an ice cube in an almost full glass of water. Challenge someone to lasso the cube with the string and lift it up. Let them try!
Now, wet the string and lay it across the top of the cube. Sprinkle salt on the string. Pause. Lift the cube.

What to discover:
Does the temperature of the water make any difference? Would it work using another liquid? What about the thickness of the string, or the size of the ice cube?

"PERSEVERANCE"
A word that means a willingness to pursue questions or a problem until you've found a satisfying conclusion. Encourage your children and show them that they may need to redo experiments, risk failure, change approaches and allow time as they satisfy their curiousity.

AHA!
The salt lowers the freezing point just enough to melt the ice cube. But after awhile, the water refreezes because the freezing point begins to go up again. It freezes the string to the ice cube and you can lift the cube!

BRRRRR ... COOL SCIENCE

COZY CUBES

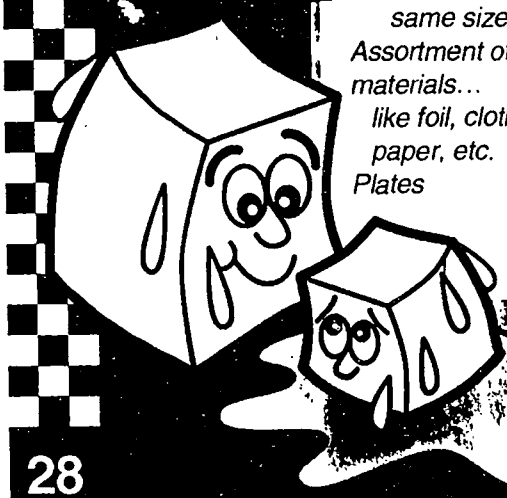
Questions to think about:
Why do drinks stay cold in a thermos? How many ways can water change forms? (Hint: water can freeze, thaw...)

Your challenge:
to keep your ice cubes from thawing.
What would you use?

What you need:
Ice cubes...
all close to the same size
Assortment of materials...
like foil, cloth, paper, etc.
Plates

What to do:
Give each person an ice cube and set it on a plate. Allow time to wrap the cube in whatever materials you choose. Set your cube aside and decide on a time to check your cubes. Decide on a way to measure whose cube won.

What to discover:
Discuss which materials worked best.



Bright idea:
Try an opposite experiment: Make your ice cube thaw quickly!

Conduct an interview:
What did people use to keep food cold before refigeration?

Measurement:
Measurement is an important part of problem solving. You can make simple comparisons using non-standard measuring units such as your hands, or use standard measures of time, temperature, distance or mass. If you have a food scale, you can measure the mass of your cube before and after. You can also measure your cubes with a tape measure, or measure the water left after the cube thaws.

BRRRRR ... COOL SCIENCE

Have you ever wondered:
How do icicles form?
How much water is in an inch of snow?

ICE CREAM IN A BAGGIE

Can you freeze something without a freezer?
Learn the answer while you learn that experiments can be delicious.
Share this one with your whole family.

What you need:

1/3 cup of milk
1 tablespoon sugar
1/8 teaspoon VANILLA
1 large ziplock baggie
1 sandwich baggie
Ice
6 tablespoons salt

What to do:
Place milk, sugar and vanilla in the smaller bag. Seal carefully. Put ice in the larger bag and add salt. Place the smaller bag into the larger bag and seal. Shake for three minutes.

What to discover:
Would this experiment work faster with whole milk, 2% milk or nonfat milk? Try it!
What would happen if you didn't use salt?

IMPORTANT!
Be sure to seal the baggies carefully!

AHA!
The salt makes the ice in the bag melt quickly. This temperature change from ice to water requires heat. The heat is drawn from the mixture in the small bag, and the mixture gets cold and freezes. Amazing!

Recipe Hints:
If you'd like other flavors, add chocolate drink mix or fruit.

Brrrrr...COOL SCIENCE / Much more for kids to explore...

Read...
Try books having to do with cold like ***Mystery of the Missing Red Mitten*** *by Steven Kellogg,* ***Dear Rebecca, Winter is Here*** *by Jean Craighead George,* or ***Sadie and the Snowman*** *by Allen Morgan.*

For more experiments, try ***The Science Book of Hot and Cold*** *by Neil Ardley* or ***Science Experiments You Can Eat*** *by Vicki Cobb.*

Learn more about...
- INSULATION
- REFRIGERATION

Fun to find out...
What type of life exists in an area like Antarctica? What plants and animals live there?

Challenge...
Explore more about freezing. Design an experiment that shows that water expands when it freezes, or find out if the temperature of the water makes a difference to the speed it freezes. Can you think of a way to find out if all liquids have the same freezing point?

You can quote me!
"To be surprised, to wonder is to begin to understand."
José Ortega y Gasset

Write...
Write a poem about ice or snow. What words do you think of when you see, smell, hear, taste, touch snow? Collect winter scenes from magazines, or draw your own to illustrate your poem.

YOU CAN MAKE A DIFFERENCE!

Ways To Use These Experiments...

...At Home:

- Have a special family activity night once a week or once a month. Let your kids take turns being the activity leader.

...At School:

- Start a school science club. It can be held before or after school, or at lunchtime. Some schools combine different grade levels; others have separate clubs for each level.
- Form a science support group. Pass out a survey at your child's school so that you can get together with other parents who are interested in science enrichment.
- Start a science volunteer program at school. Volunteer to go into your children's classroom and do experiments on a regular basis. Start a schoolwide program where each classroom or grade level has its own volunteer.
- Have a family science night at your child's school. This night can be part of a science fair celebration or an open house. Let children explore science experiment stations which parents lead.
- Have parents train older students to become science volunteers for younger children. Teach the older kids an experiment, then allow them to go into the younger kids' classrooms. Let them discover how much fun teaching can be.

...And Elsewhere:

- Try these experiments when you babysit, or visit with children of relatives or friends. Don't forget daycare centers, too.
- Use these experiments with organizations to which you or your children belong — scouts, church groups, etc.
- Open parent or business meetings with an experiment. Share the fun of science with other adults, and let them share it with their kids.

CREDITS RECONOCIMIENTOS

Writer	Beth Daynes	Escritora
Consultants	Jim & Kathy Burrows	Consultores
Graphic Designer	MaryAnn Davis	Ilustradora
Literature Consultant	Robin Kohut	Consultora Sobre la Literatura
Spanish Translator	Susana Stettri Sawrey	Traductora al Español
Spanish Production Artist	Taylor Daynes	Artista de Producción al Español

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The Science Club

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55 First Place NW / Suite 4
Issaquah, WA 98027
800-391-6939