Science Fun for Everyone!

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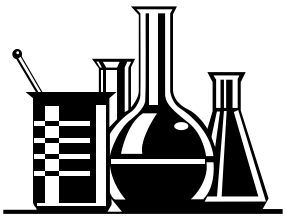


Introduction to say to students: ***Today we are going to talk about what happens when things are mixed together. The word for this is 'chemistry'. What is chemistry? Chemistry is when you mix things together and watch to see if there is a change. Change is fun to watch! A change is called a reaction when you are doing chemistry. We are going to be chemists today. Anyone who works with materials to try to understand them better and who looks at the way they change is called a chemist. Let's look at a reaction right now.***

Gooey Gumdrops

This fun but simple experiment teaches about making a mixture.

What you need: 1 medicine dropper per child, plastic bowls, a tsp. measurer, wax paper, one tsp. Jell-O powder per child (fruit flavor)

Place a bowl of water and medicine droppers on the table. Cut out one small square of wax paper per child. Put 1 tsp. of Jell-O on each of the wax paper squares.

Show the students how to use a medicine dropper by making a drop on their hand. After they have mastered making a drop, instruct them to place 4-5 small drops of water all over the Jell-O. Remember they need to be drops, not blobs!

Shake the wax paper a little and wow! Instant gumdrops that may be eaten for a tasty treat! Add more water drops if there is enough powder left.

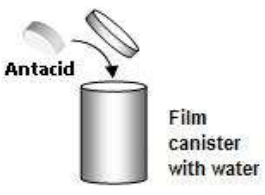
Application questions: Why does the Jell-o powder make gumdrops? (The gelatin in the powder combines with the water. Gelatin is used in a lot of cooking to give substances their form and consistency.) What is a mixture? (when two or more different substances are mixed together but not combined chemically)

Pop Rockets:

This is a good experiment to do outside.

What you need: black film canisters with gray lids, extra lids, 1 Alka Seltzer per child broken in half

To show how a gas can cause something to happen, fill a film



canister halfway with water.
Add ½ of an Alka Seltzer and quickly put the lid on firmly. Place the canister on the ground. Watch.

If nothing happens, check the seal on the lid or change lids. (When they get old they don't stay on very tight.) You may need to add a little extra piece of Alka Seltzer.
Watch the effect of the gas (carbon dioxide) being given off when the Alka Seltzer reacts with water! (The lid will pop off several times if you keep replacing it.) Even though we cannot see the gas, it sure was there!

Application questions: What did you predict would happen when the Alka Seltzer was added? Why did this reaction happen? (The water and the Alka Seltzer made big bubbles of carbon dioxide and the lid popped right off!) Chemicals can release a lot of power when they react with each other.

Let the kids enjoy doing this fun experiment. Please make sure they do not get too close to the film canisters after they put the Alka Seltzer inside.

Shaving Cream Marbling

You will enjoy this as much as your students!

What you need: *1 piece of card stock per child (about 3" X 3" each), shaving cream, large metal cooking sheet with lip, spatula, 2-3 food colors, 1 toothpick per child*

Apply shaving cream to the pan. Use the back of a squeegee or spatula to spread the shaving cream out to a nice even layer. Drop about 8 – 10 drops of food colors on the shaving cream. Use a toothpick to swirl through the shaving cream spread the color out in streaks.

Lay the cardstock on the shaving cream and gently press. Peel the cardstock off and lay it on a clean area of the pan. Scrape the squeegee across the cardstock to remove the shaving cream, leaving the color behind. Set the painted cardstock aside to dry. If the paper starts to curve or curl, you may wish to put a book or pan on top to flatten it out before it dries.

Application questions: What happens to the paper? What do you think makes the paper stain like that? Why is shaving cream an important part of this experiment?

How Clouds Make Rain

With some of the leftover shaving cream, let's try an experiment about clouds and rain.

What you need: *shaving cream, medicine dropper, food coloring, clear plastic cup, water*
All air contains water, but close to the ground it is usually in the form of water vapor. When warm air rises, it expands and cools. The cool air cannot hold as much water vapor as warm air, so some of the water vapor starts to stick (condenses) on to tiny pieces of dust that are floating in the air. This forms a tiny droplet of water around each dust particle. When billions of these droplets come together they become a cloud that you can see.

Fill a jar almost to the top with water. Cover the water with a "cloud" of shaving cream. Make predictions about what will happen when you put

drops of food coloring on the shaving cream cloud. Give the drops a little time and observe the food coloring. It starts "raining" into the water below! This is how rain works. The water collects in a cloud until there is too much, and then it leaks through, forming rain.

Application questions: What did you predict would happen? What did happen when you added the food coloring? How is this similar to rain falling from the clouds?

Monster Glove

This is big fun!

What you need: 1 latex glove per child (check allergies), small box of baking soda, small bottle of vinegar

Pour about 2 tablespoons of baking soda into each glove. Be sure and get some baking soda into each of the fingers. Help the students pour in about ½ - ¾ cup of vinegar into their glove.

Once the vinegar is in the glove, they must move fast! Quickly twist off the open end of the glove and shake it. Watch how big the glove gets as the vinegar and baking soda react together! Get ready for lots of giggles! A repeat performance is always fun. Simply add more baking soda and vinegar to the same glove. (Sometimes if you can see baking soda collected in the bottoms of the fingers, all you need to do is add vinegar and shake.)

Application questions: What two things are reacting together? The glove is blowing up due to the GAS that is being given off as the baking soda and vinegar react to each other. Chemicals can either be in a solid form, a liquid form, and now you see they can be in the form of a gas. Gases are hard to see, but sometimes we can see things they do--like blowing up our monster glove!

Color Swirl

This is a great experiment to see the magic of colors!

What you need: *plastic bowls, <u>small</u> containers for dishwashing soap (We use old film canisters.), food coloring (at least 2 colors), small amount dishwashing liquid, toothpicks, whole milk*

Pour a small amount of warm milk into a plastic bowl. Just cover the bottom surface. Give each child a toothpick. Children can share the small container of dishwashing soap with others at their table.

Explain that you will put several drops of food coloring on top of the milk. Observe what the colors do as they sit on the milk. Show the students how to dip their toothpick into the soap and then into the milk. Make predictions about the reaction!

Hold the toothpick in the milk for a few seconds and observe. Any "ooohs and ahhhs"? There should be! Keep dipping the toothpick into the soap and back into the milk until the reaction stops. That will happen when the solution gets too soapy.

Application questions: What does the food coloring do when you add it to the milk <u>before</u> you touch it with the soap? What does the food coloring do <u>after</u> you touched the milk with the soapy toothpick? Describe the reaction – what did the colors do? What patterns did they make? (The food coloring is pushed out of the way as the soap travels across the surface of the milk. This is similar to what happens during an oil spill.)

Ivory Soap in Microwave

Some chemicals have unusual properties and can change form.

What you need: bar of Ivory soap, 2 other brands of soap, paper plate, a microwave, clear plastic container of water

Put a piece of Ivory soap in the water. What does it do? Add another piece of a different brand of soap. What does it do? Add the third brand of soap. (Only the Ivory floats.)

Brainstorm about why only the Ivory floats.

Place a whole bar of Ivory soap on a paper plate. Put it in the microwave on high for about 2 minutes. If the window of the microwave is small, let the children take turns peeking inside. WOW! Let the soap cool for a minute or so before passing pieces of it around for the children to touch.

Application questions: What happened to the soap? Why did the soap do that? (Ivory soap is the only brand that has air pumped into it as it is being made. That is why it is the soap that floats. So when the soap is heated, trapped water in the air pockets heats up and causes the soap to expand! Chemicals can change shape.

Bubble in a Bubble

Children will enjoy this experiment as they try to perfect their bubble making skills! Xerox a take-home direction sheet so they can do this again at home.

*What you need: 1 tbs. of Imperial granulated sugar or glycerin, 2 tsp. **blue** Dawn dish soap, ¾ cup distilled water, a plastic pipette, scissors, container for bubble solution*

Mix up the bubble solution. The single most important part is the water. Distilled water is highly recommended. Good bubbles can be made without glycerin, but adding glycerin keeps the water from evaporating and makes the bubbles much stronger. The bubbles also last longer. You can substitute Karo syrup for glycerin but glycerin is recommended. It is found in pharmacies.

Tip: Let the bubble solution sit open to the air and undisturbed for 24 hours in advance of using it. The bonds in the bubble solution will strengthen.

Use scissors to cut off the end of the pipette bulb. Use your hand to wipe down a small section of a table with the solution you've made. Dip the bulbed-end of the pipette into the solution and use the pipette to blow a bubble on the table. Dip the pipette back into the bubble solution and place the bulb inside the first bubble. Blow a second bubble! See how many bubbles you can blow inside the others.

Application questions: How do the bubbles blow up? How is another bubble formed inside a bubble? Bubbles form because of a combination of water's hydrogen bonds and the oily film you can see shimmer in the light. The oily film you see is actually layers of soap attached to, and surrounding, hydrogen-bonded water. Sugar or glycerin helps make the bubbles last longer. When you're blowing a bubble inside your first bubble, you probably noticed the larger, original bubble expanding. When you blow your second

bubble, you are increasing the volume of air inside both bubbles! The hydrogen bonds of the water (and the soap and sugar/glycerin) are very elastic and allow for this increase in volume.

Bubble Snakes

This fun experiment helps children create long strands of bubbles which we call bubble snakes!

What you need: empty 16 oz plastic bottle, bowl of bubble solution, scissors, piece of fabric (similar to a washcloth or sock), liquid food coloring (optional)

Hold a clean, empty plastic bottle and carefully cut the bottom off. (The best bottles are strong ones like diet drink bottles.) Cover the freshly-cut hole with a piece of fabric that is similar to a washcloth or cotton sock. Use a strong rubber band to keep the fabric in place. Make the bubble solution 24 hours in advance.

Dip the fabric-covered end of the bottle into a bowl of the bubble solution. Blow into the mouth of the plastic bottle and create a bubble snake! It's also fun to add color.
Add a few drops of 2-3 colors of food coloring to the fabric on the end of the bottle. Dip the fabric in the bubble solution and give the bottle another blow.

Bubbles form because of the surface tension of water. Hydrogen atoms in one water molecule are attracted to oxygen atoms in other water molecules. They like to cling together. When you blow air through the bottle, you are making hundreds of tiny bubbles that attach to each other in a long continuous string of bubbles.

Application questions: What happens when you blow air into the bottle? Did it take a big breath or a small one? Why do you think bubbles are round? (Scientists have shown that bubbles enclose as much air as they can in the minimum amount of bubble solution, so that's why they are always round.)

Fun Fizzy Paint

This is the same chemical reaction that was used to blow up the Monster Glove

What you need: food coloring, baking soda, vinegar, bowls for different colors of Fizzy Paint, small squeeze bottle or medicine dropper, spoon, piece of cardboard or card stock (cut in half), aluminum pie pan, small craft stick

Add food coloring to a bowl of water. Then mix baking soda into the diluted food coloring until it forms a thick paste. The paint tends to settle, so you may need to give it a quick stir every now and then. You now have fizzy paint!

Pour vinegar into a squeeze bottle or other container if you use medicine droppers.

Place a piece of card stock into a pie pan. Show the children how to use a spatula or craft stick to spread the thick paint onto the paper.
The children will love mixing the colors and smearing the paint on the paper.

Once they are satisfied with their painting, help them squeeze small amounts of vinegar over their masterpiece. Medicine droppers may also be used for this step. After the fizzing stops, take the paper out so the paint can dry.

Application questions: What happens? What do you see? Why does it happen? How long does the paint fizz?

Perfect Penny!

Children will experiment with salt and vinegar to clean a penny.

What you need: dirty pennies, 2 plastic bowls, a toothbrush, vinegar, salt, paper towel

Place a few dirty pennies in a bowl of water. Predict what will happen. Will it clean the pennies? Take the pennies out and scrub them with a toothbrush. Observe.

Now place the pennies in a bowl of vinegar. Predict what will happen. Take the pennies out and place them on the paper towel. Scrub them with a toothbrush. Observe.

Finally, put the pennies back in the vinegar. Take them out and sprinkle salt on the vinegar-soaked pennies. Scrub them with a toothbrush. Observe what happens. Ta da! Clean pennies!

Application questions: What do the pennies do after placing them in the 3 different solutions and scrubbing them? Did one solution clean better than the others? Which one? The chemistry that is going on is caused by the acid in the vinegar. In vinegar alone, the pennies do not get clean and shiny. But when salt is added, it reacts with the vinegar and removes the chemical that was making the pennies "dirty." (It is called copper oxide.) Awesome!

Another method is to place dirty pennies in 3 plastic cups: one cup of water, one cup of soap and water, and one cup of salt and vinegar. Let the pennies soak for about 5-10 minutes. Make predictions about which solution will clean the pennies. Take the pennies out of the cups and compare. Amazing!

Diet Coke and Mentos

This chemical reaction is bound to get your students excited! You'll need a 2-liter bottle of diet soda (diet doesn't make a sticky mess) and an outdoor location for your geyser. Select a flat surface on the lawn or driveway to place the bottle.

What you need: A roll or box of Mentos® mints, 2-liter bottle of diet soda

Open the bottle of soda and drop in several MENTOS candies. Hints for "triggers": Punch a hole in each candy, push a twist tie or pipe cleaner through the holes and loop the end over the open mouth of the soda bottle. When ready, simply lift the end of the twist tie up and inside the bottle. Run! Another way is to use a piece of paper, like construction paper, to form a small funnel. Place the candies inside and funnel them into the bottle when ready.

Warn everyone to stand back. Countdown… 3-2-1…. The MENTOS will drop and the soda will go flying into the air! For extra fun, our teacher who does this wears a poncho and stays in the "splash zone"! Pour out the remaining soda and take a look at the MENTOS. You can see where the soda has eaten away at the surface of the candy.

Application questions: Why does mixing Mentos with soda produce this awesome eruption? Soda pop is basically sugar (or has sweetener), flavoring, water, and preservatives. Soda is bubbly due to invisible carbon dioxide gas, which is pumped into bottles at the bottling factory using lots of pressure. Until you open the bottle and pour a glass of soda, the gas mostly stays suspended in the liquid and cannot expand to form more bubbles, which gases naturally do.

Teaching Suggestion about Chemical Safety:

For younger students:

Yummy or Yucky game (Some chemicals are safe and some are not safe.)
What you need: 1 white poster board, permanent markers: red, black, examples of good chemicals like apple juice, examples of bad chemicals like Ajax powder. See list below for other suggestions. Mr. Yuk stickers can be ordered through the poison control center.

Cut a white poster board in half. Draw a smiley face on one with big red lips. Write "Yummy". On the other piece of poster, draw a sad face. Write "Yucky" on it.

With the students, check for understanding of the word "chemical".

"Boys and girls, you are going to be chemists today! A chemist is someone who does experiments with chemicals. Let's learn about chemicals. God made everything in the world out of chemicals. Even YOU are made of chemicals! There are good chemicals and there are bad chemicals. If you ever put a bad chemical in your mouth, it could make you very sick! Some chemicals are wet like this juice (show the juice box) ***and some are dry like this can of powder*** (show an empty or unopened Bleach powder)***. Always ask an adult first before you put anything near or in your mouth!"***

Show the class the different chemicals. They may choose an item and place it in front of the "Yummy" poster or in front of the "Yucky" poster. Ask them to recite whether each one is a good chemical **("Yummy!")** or a bad chemical **("Yucky!")** Then show the Mr. Yuk stickers. Tell them they will get some to take home today to label yucky chemicals in their house (with Mom or Dad's help). Why might they have bad chemicals at home?

For older students:

Eeny Meenie Miney Mo:

What you need: See list below for examples you may want to use.
"Boys and girls, you are going to be chemists today! Does anyone know what a chemist does? A chemist is someone just like you and me who works with materials to try to understand them better and to look at ways they change. Chemists have developed new foods and candies, discovered or created new materials like plastics, and have even made new medicines to help us when we are sick. Chemists work with special things called chemicals.

Let's learn about chemicals. God made everything out of chemicals--even YOU! (water, protein, fat, iron, salt, calcium, etc.)

Chemicals are made out of matter which in turn is made out of atoms. There are safe chemicals and there are harmful chemicals. Chemists wear special safety equipment when working with dangerous chemicals in a lab." (Show the goggles and latex gloves.) ***If you ever put a harmful chemical in your mouth, it could make you very sick! Some chemicals are liquids and some are solids. Those are easy to understand because we can see them. Some chemicals can exist in either form like water--it can be ice or liquid water.***

Right now, we want to look at some chemicals that you probably have in your home. We are going to play a game where you have to decide which is the safe chemical and which is the harmful chemical. You may think it is easy, but it may be harder than you think. A lot of chemicals look alike!"

Show the class the different chemicals in the containers. Every pair of chemicals are "look alike" chemicals. For example, it is very easy to confuse Pine O' Pine cleaner and apple juice. Smelling them would give it away, but many times people are in a hurry and do not take that precaution. So, do not let the children smell the samples. Hold up the pair of containers that go together. (Container A goes with the other Container A, etc.) Use the answer key below.

Allow the children to look at a pair of chemicals with a partner. Call on each team to tell you which one is the **safe** chemical and what it is. Eeny meeny miney mo! What about the dangerous chemical? Be sure and ask for reasons for their answer. Ask them to tell about the danger of their look alike chemicals.

Discuss what this shows about the dangers of chemicals especially with the very young and the very old who cannot read or see well.

Sudafed medicine

Samples in the Containers:

A	Pine O' Pine cleaner	D	Ajax cleaner (white)	G	orange M & Ms
A	apple juice	D	powdered sugar	G	Motrin medicine pills
B	toothpaste	E	mini marshmallows	H	red hots candy
B	Ben Gay ointment	E	moth balls	H	Sudafed cold pills
C	Milk of magnesia	F	water	I	chocolate
C	milk	F	rubbing alcohol	I	Ex Lax