Looking for educational mentoring activity ideas?

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Amachi
PITTSBURGH
Hands of Faith in Action

Activity 1: The World's Easiest Lava Lamp

Age Group: Elementary School

SUPPLIES

- Clean 1 liter clear soda bottle
- ¾ cup of water
- vegetable oil
- Fizzing tablets (i.e., Alka Seltzer)
- Food coloring

DIRECTIONS

1. Pour the water into the bottle.
2. Use a measuring cup or funnel to slowly pour the vegetable oil into the bottle until its almost full. You may have to wait a few minutes for the oil and water to separate.
3. Add 10 drops of food coloring to the bottle (red is a good color if you want it to look like actual lava, but any color works!).
4. Break a seltzer tablet in half and drop half the tablet into the bottle. Watch it sink to the bottom and let the blobby greatness begin!
5. To keep the effect going, just add another tablet piece. For a true lava lamp effect, shine a flashlight through the bottom of the bottle.

HOW DOES IT WORK?

First…

The oil stays above the water because **oil is lighter – or *less dense* – than water**. The oil and water do not mix because of something called "intermolecular polarity." **Molecular polarity** basically means that water molecules are attracted to other water molecules – kind of like how two magnets are attracted to each other. They get along fine, and can loosely bond together into water droplets. Oil molecules are attracted to other oil molecules. However, **the structures of the two molecules (water and oil) do not allow them to bond together**.

But then…

When you add the fizzy tablet, it sinks to the bottom, dissolves, and creates a gas. As the gas bubbles rise, they take some of the colored water with them. When the blob of water reaches the top, the gas escapes and the water goes back down.

By the way, you can store your "Blobs In A Bottle" with the cap on, and then anytime you want to bring it back to life, just add another tablet piece.

THINGS TO TALK ABOUT

Does the temperature of the water affect the reaction?
Does the size of the bottle affect how many blobs are produced?
Does the effect still work if the cap is put on the bottle?
Does the size of the tablet pieces affect the number of blobs created?

Activity 2: Candy Chromatography

Age Group: Middle School

Why are candies different colors?

SUPPLIES

- M&M's/Skittles (each color)
- Coffee filter paper
- A tall glass
- Water
- Table salt
- Pencil
- Scissors
- Ruler
- 6 toothpicks
- Aluminum foil
- Empty 2 liter bottle with cap (rinsed)

DIRECTIONS

1. Cut the coffee filter paper into a 3 by 3 inch square.
2. Draw a line with the pencil about ½ inch from one edge of the paper. Make six dots with the pencil equally spaced along the line, leaving about ¼ inch between the first and last dots and the edge of the paper. Below the line, label each dot for the different colors of candy that you have. For example, Y for yellow, G for green, etc.
3. **Make solutions of the colors in each candy**: take an 8 by 4 inch piece of aluminum foil and lay it flat on a table. Place six drops of water spaced evenly along the foil. Place one color of candy on each drop. Wait about a minute for the color to come off the candy and dissolve in the water. Remove and dispose of the candies.
4. **"Spot" the colors onto the filter paper**: Dampen the tip of one of the toothpicks in one of the colored solutions. Lightly touch it to the corresponding labeled dot on your coffee filter paper. Use a light touch, so that the dot of color is small. Repeat this step for each color, using a different toothpick each time.
5. After all the colored spots on the filter paper have dried, repeat the process with the toothpicks to get more color on each spot. Repeat three times total, waiting for the spots to dry each time.
6. Fold the paper in half so that it stands up on its own, with the fold standing vertically and the dots on the bottom.
7. **Make a developing solution**: Add ⅛ teaspoon of salt and three cups of water to the bottle. Screw the cap on tightly. Shake the contents until the salt is dissolved in the water.
8. Pour the salt solution into the tall glass. The level of the solution should be low enough so that when you put the filter paper in, the dots will initially be above the water level. Hold the filter paper with the dots at the bottom and set it in the glass with the salt solution.

WHAT HAPPENED?

The salt solution seems to defy gravity, by climbing up the paper! In fact, it is moving through the paper by a process called *capillary action*. The color spots climb up the paper along with the salt solution, and some colors start to separate into different bands. The colors of some candies are made from more than one dye, and the colors that are mixtures separate as the bands move up the paper. The dyes separate because some dyes stick more to the paper while other dyes are more soluble in the salt solution. This process is called **chromatography**. The dyes that travel the least have more "affinity" for the paper than the dyes that travel more.

THINGS TO TALK ABOUT

Which candies contained mixtures of dyes?
Which ones seem to have just one dye?
Can you match the colors on the paper with the dyes on the label?
Do similar colors from different candies travel up the paper the same distance?

Activity 3: Fireproof Balloons

Age Group: Elementary School

ADULT SUPERVISION REQUIRED

SUPPLIES

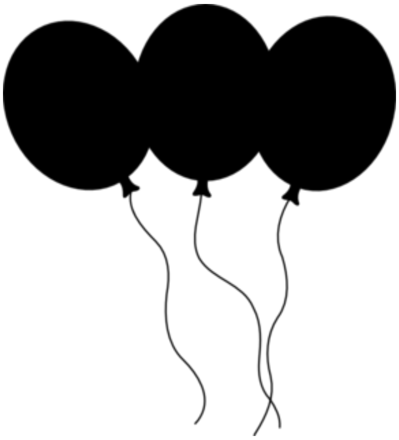
- Two round balloons (not inflated)
- Several matches
- Water

DIRECTIONS

1. Inflate one balloon and tie it closed.
2. Place ¼ cup of water in the other balloon, and then inflate it and tie it shut.
3. Light a match and hold it under the first balloon. Allow the flame to touch the balloon. **What happens?** The balloon breaks, perhaps even before the flame touches it.
4. Light another match. Hold it directly under the water in the second balloon. Allow the flame to touch the balloon. **This balloon doesn't break.** You may even see a black patch of soot form on the outside of the balloon above the flame.

HOW DOES IT WORK?

A flame heats whatever is placed in it; for example, the flame heats the rubber of both balloons. The balloon with no water breaks in the flame because the rubber of that balloon becomes so hot that it becomes too weak to resist the pressure of the air inside the balloon. **When there is water inside the balloon, it absorbs most of the heat from the flame.** Then, the rubber of the balloon does not become very hot, and thus does not weaken, and the balloon does not break.



WHY IS THIS INTERESTING?

Water is a particularly good absorber of heat. It takes a lot of heat to change the temperature of water. It takes ten times as much heat to raise the temperature of 1 gram of water by 1 degree than it does to raise the temperature of 1 gram of iron by the same amount. This is why it takes so long to bring water to boil. When water cools, it releases a great deal of heat.

SOMETHING TO TALK ABOUT

Why do you think that geographic areas near oceans or other large bodies of water do not get as cold in winter as places further inland?

Activity 4: Build a Fizz Inflator

Age Group: Any age!

SUPPLIES

- One small empty plastic soda or water bottle
- ½ cup of vinegar
- Small balloon
- Baking soda
- Funnel (If you don't have a funnel you can make one using the paper and some tape.)

DIRECTIONS

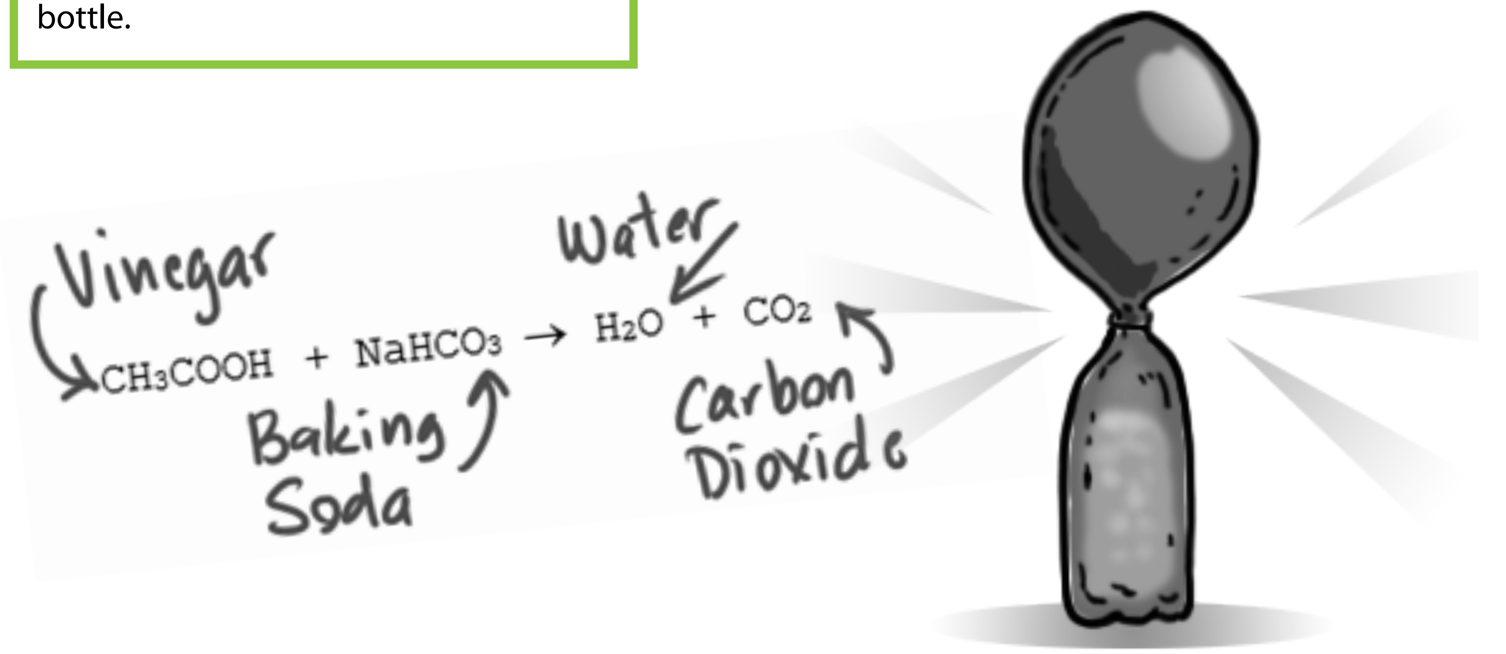
1. Carefully pour the vinegar into the bottle.
2. Loosen up the balloon by stretching it a few times and then use the funnel to fill it a bit more than half way with baking soda.
3. Carefully put the neck of the balloon all the way over the neck of the bottle without letting any baking soda into the bottle.
4. **Now the fun part:** Lift the balloon up so that the baking soda falls from the balloon into the bottle and mixes with the vinegar.

WHAT HAPPENED?

The baking soda (a **base**) and the vinegar (an **acid**) create a reaction and the two chemicals work together to create a gas called **carbon dioxide**. Gasses need a lot of room to spread out, so the carbon dioxide fills the bottle, then moves into the balloon to inflate it once it runs out of space in the bottle.

THINGS TO TALK ABOUT

1. Does water temperature affect how fast the balloon fills up?
2. Does the size of the bottle affect how much the balloon fills?
3. Can the amount the balloon fills-up be controlled by the amount of vinegar or baking soda?



Activity 5: Apple or Potato?

Age Group: Elementary School

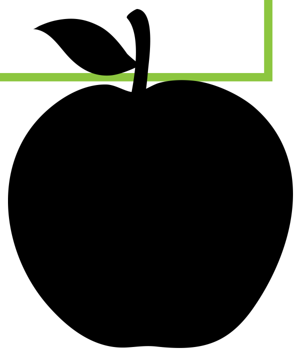
Why do foods taste different?

SUPPLIES

- a small piece of potato
- a small piece of peeled apple

DIRECTIONS

1. Close your eyes and mix up the piece of potato and the piece of apple so you don't know which is which.
2. Hold your nose and eat each piece. Can you tell the difference?



HOW DOES IT WORK?

Holding your nose while tasting the potato and apple makes it hard to tell the difference between the two. Your nose and mouth are connected through the same airway which means that you taste and smell foods at the same time. Your sense of taste can recognize salty, sweet, bitter and sour but when you combine this with your sense of smell you can recognize many other individual 'tastes'. Take away your smell (and sight) and you limit your brains ability to tell the difference between certain foods.

Activity 6: Integer Flash

Age Group: Middle School

SUPPLIES

- Deck of cards with the face cards (jacks, queens, and kings) removed
- Two players

DIRECTIONS and RULES

1. Shuffle and deal the deck of cards face-down.
2. For the purposes of the game, aces = 1.
3. Each red card symbolizes a negative integer. Each black card symbolizes a positive integer.
4. Both players turn over a card at the same time and show it face up on the table. Whoever announces the correct product (the number you get when you multiply both cards together) aloud first wins both cards. If there's a tie, both players can keep their cards.
5. Players continue until one of them has all of the cards. This player wins.

HELPFUL HINTS ABOUT INTEGERS

3 x 3 = 9

-3 x -3 = 9

3 x -3 = -9

-3 x 3 = -9

Activity 7: Righty or Lefty?

Age Group: Elementary School

How do your body and brain work together?

SUPPLIES

- Pen or pencil
- Paper or notepad to record your findings
- An empty tube (like an old paper towel tube)
- A cup of water
- A small ball (or something soft you can throw)

DIRECTIONS

Do each of the following tasks. Write "left" or "right" next to each task depending on what side you used. When you've finished all the challenges review your results and make your own conclusions about which is your dominant eye, hand and foot.

Eye Test:

- Which eye do you use to wink?
- Which eye do you use to look through the empty tube?
- Extend your arms in front of your body. Make a triangle shape using your fore fingers and thumbs. Bring your hands together, making the triangle smaller. Find a small object in the room and focus on it through the hole in your hands (using both eyes). Try closing just your left eye and then just your right. If your view of the object changed when you closed your left eye, mark down 'left', if it changed when you closed your right eye, mark down 'right'.

Hand/Arm Test:

- Which hand do you use to write?
- Pick up the cup of water, which and did you use?
- Throw the ball, which arm did you use?

Foot/Leg Test:

- Run forward and jump: which leg did you use?
- Kick the ball: which foot did you use?

HOW DOES IT WORK?

Around 90% of the world's population is right handed – but the reason for this is not completely understood. Some scientists think that the reason is related to which side of your brain you use for language; **the left side of your brain controls the right side of your body, and in around 90% of people the left side of the brain also controls language.**

Others think the reason might have more to do with **culture**. The word "right" is associated with being correct and doing the right thing while the word "left" original meant weak. Favoring the right hand may have become a social development as more right-handed people taught more children important skills and various tools that were designed to be used with the right hand.

Around 80% of people are right footed and 70% favor their right eye, even though 90% are right-handed. This could be because you are more likely to be **trained** to use your right hand than your right foot or eye. Some people are **ambidextrous**, meaning they can use their left and right sides with equal skill.

THINGS TO TALK ABOUT

- Are you more likely to be left-handed if one of your parents is left-handed?
- How can you practice using your non-dominant hand?
- In 2009, only 7% of the players in the NBA were left-handed while in 2008 around 26% of MLB pitchers were left-handed. Do left-handed people have an advantage or a disadvantage in **sports**? Is it better to left-handed in some sports than others?

For more ideas, click here.