Mad Scientist

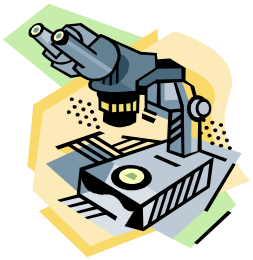
Post-Visit Activities

3rd through 5th Grades

VIRGINIA AIR & SPACE CENTER

Revised: February, 2009

Activities



These activities are intended for use after your visit to the Virginia Air and Space Center. Your students should recall the information and activities from the "Mad Scientist" program in order to do these activities. All of the activities can be tailored to your specific classroom needs, and the procedures listed are suggestions for teaching.

Double Bubbles

This experiment helps students understand density when they blow soap bubbles that float on bubbles of carbon dioxide that have been made with a mixture of baking soda and vinegar. The Experiment page, "Double Bubbles", is attached.

Salty Bubbles

Density is explored when oil and water are layered in a glass. When salt is added, students discover how mixtures can alter densities. The Experiment page, "Salty Bubbles", is attached.

Density and Raisins

Density and buoyancy are explored in this experiment that includes colorless soda and a few fresh raisins. Please refer to the attached Experiment page, " Density and Raisins".

Websites

Here are some interactive websites that may be interesting for your students.

http://www.harcourtschool.com/activity/states_of_matter/index.html

http://www.eduplace.com/kids/hmsc/activities/simulations/gr3/unite.html

http://www.eduplace.com/kids/hmsc/activities/simulations/gr4/unite.html

Double  Bubbles

Materials Needed

* 1/4 cup of baking soda
* 1 cup of vinegar
* bubbles and a bubble wand (you can get this at most toy stores)
* large, clear container, like a clear plastic or glass bowl
* small clear cup
* bowl
* spoon

Hypothesis

Make a prediction about what will happen when bubbles are blown onto the vinegar and baking soda mixture. Will the soap bubbles sink or float? Write your Hypothesis.

Procedure

1. Put 1/4-cup baking soda in a clear container.
2. Then add 1 cup of vinegar.
3. The mixture of vinegar and baking soda will bubble, because it is making carbon dioxide.
4. Blow some bubbles from the purchased bubble mixture with the bubble wand into the container of vinegar and baking soda bubbles.

Conclusion

What happened to the soap bubbles? Write a Conclusion to the Experiment describing what happened.

Explanation

The carbon dioxide stays at the bottom of the bowl because it is denser than the air in the bowl. The bubbles float on top of the carbon dioxide because they are filled with air. The air is less dense than the carbon dioxide. This will help to understand what density means. If you had two balloons and you filled one with air and the other one with the same amount of carbon dioxide, the balloons would be the same size, because the gas in them takes up the same amount of space. However, if you weighed both balloons, the one with the carbon dioxide would be heavier. This is because carbon dioxide is denser than air.

Salty Bubbles

Materials Needed

* clear glass container, shaped like a drinking glass
* vegetable oil
* 4 tablespoons of salt or more

Hypothesis

Make a prediction by answering the following question.

What will happen when salt is added to the water and oil layers in the glass container?

Procedure

1. Fill the glass approximately half full of water.
2. Add about one-half inch of oil. Wait for the water and oil to separate into two layers.
3. Pour in 4 tablespoons of salt. If nothing happens in a few minutes, add more salt and record the results.

Conclusion

What happened to the oil and water layers in the glass container when salt was added? Write the conclusion to your experiment and the reason.

Explanation

Vegetable oil is less dense than water so it floats on top of the water. When salt is added, the salt mixes with the vegetable oil. This mixture of oil and salt is more dense than the water, so it sinks in bubbles. When a bubble goes under water, the oil separates from the salt. The salt mixes with the water and dissolves. Now that the oil and salt have separated, the oil is less dense than the water, so it floats back to the top of the water again!

Density and Raisins

Materials Needed

- a can of colorless soda (e.g., 7-Up or Sprite)
- a tall, clear glass or plastic cup
- several raisins (fresh raisins work the best)

Hypothesis
Make a prediction by answering the following question.
What will happen when raisins are dropped into a glass of colorless soda?

Procedure

1. Pour the can of soda into the tall glass.
2. Drop several raisins into the glass. Watch the raisins for a few seconds.
3. Describe what is happening to the raisins. Do they sink or float?
4. Keep watching, and then describe what happens in the next several minutes.

Conclusion
What happened to the raisins in the colorless soda? Write a conclusion to your experiment.

Explanation
Raisins are denser than the liquid in the soda, so initially they sink to the bottom of the glass. The carbonated soft drink releases carbon dioxide bubbles. When these bubbles stick to the rough surface of a raisin, the raisin is lifted because of the increase in buoyancy. When the raisin reaches the surface, the bubbles pop, and the carbon dioxide gas escapes into the air. This causes the raisin to lose buoyancy and sink. This rising and sinking of the raisins continues until most of the carbon dioxide has escaped, and the soda goes flat. With time, the raisin gets soggy and becomes too heavy to rise to the surface.

Carbonated beverages are prepared by putting the beverage into a can under high pressure of carbon dioxide gas. This high pressure causes the carbon dioxide gas to dissolve in the liquid. When the can of soda is opened, the carbon dioxide gas produces noise as it rushes out of the can. The decreased pressure allows some of the carbon dioxide gas dissolved in the liquid to escape. This is what makes the bubbles in a soft drink.

Alternate Material
Another way to do this experiment is to generate the carbon dioxide gas using the reaction of baking soda and vinegar. Fill the glass about 1/2 full with water. Add one teaspoon of baking soda and stir until it is dissolved in the water. Add several raisins to the glass. SLOWLY pour in vinegar until the glass is about 3/4 full. The vinegar and baking soda react to form carbon dioxide bubbles, and the raisins will react as in the soft drink.