Sparking Discovery in the Classroom

TRAVELING SCIENCE WORKSHOPS

DISCOVERY MUSEUM

Bubbles

Teacher Resource Guide

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Bubbles

Soap bubbles are familiar, fun "toys" that can be used to help students make discoveries about shapes and colors. Some of the assumptions that people have about bubbles can be easily challenged as a way to focus their attention on what they actually see instead of what they expect to see. Some of the common assumptions about soap bubbles are that they are easily popped, that they are short lived, that bubble blowers and bubbles are all round, and that all bubbles are clear and small. These activities challenge those assumptions, giving students a chance to make new ones based on observation and experimentation. Comparison skills are stressed through observations of bubble shape and color.

Basic Bubble Solution Recipe

1 cup dish washing soap (Dawn™, Joy™, or Ajax™ work well)
10 cups water
1 tablespoon glycerin

Put all ingredients in a one gallon jar and mix well.

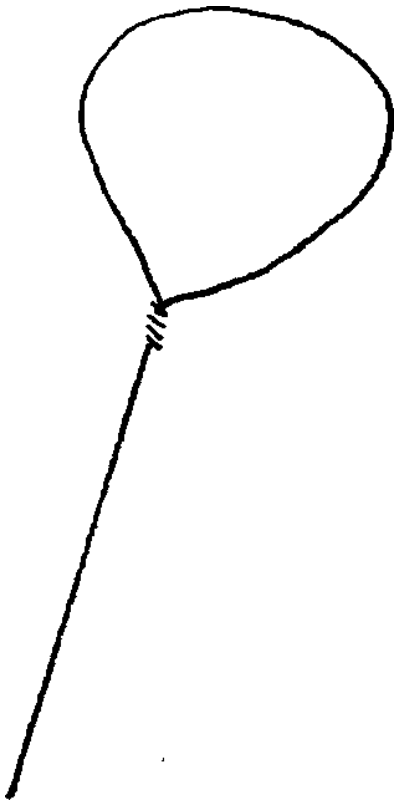
Bendable Bubble Blowers

Most bubble blowers, or bubble wands, are round. The bubbles that they produce are generally round. This activity allows you to make a bubble wand of any shape. Try to predict the shape of bubbles blown through these different shaped wands.

Bubbles will pop on dry objects and surfaces but not on wet ones. Try to catch a bubble on a wet wand or on your hand.

Look at the shape and colors of the bubbles. Do they change?

Materials
insulated electrical wire
scissors
bubble solution
bowl or dishpan



Procedure
1. Fill a bowl several inches deep with bubble solution.
2. Cut lengths of wire 3" or longer.
3. Bend the wire into a loop of any shape.
4. Dip the loop into the solution and blow a bubble.
5. Try to catch the bubble on a wet loop or on your hand.
6. Notice the shape and color of the bubble. Do they change?
7. Change the shape of your loop and blow another bubble to compare.

Multiple Bubbles

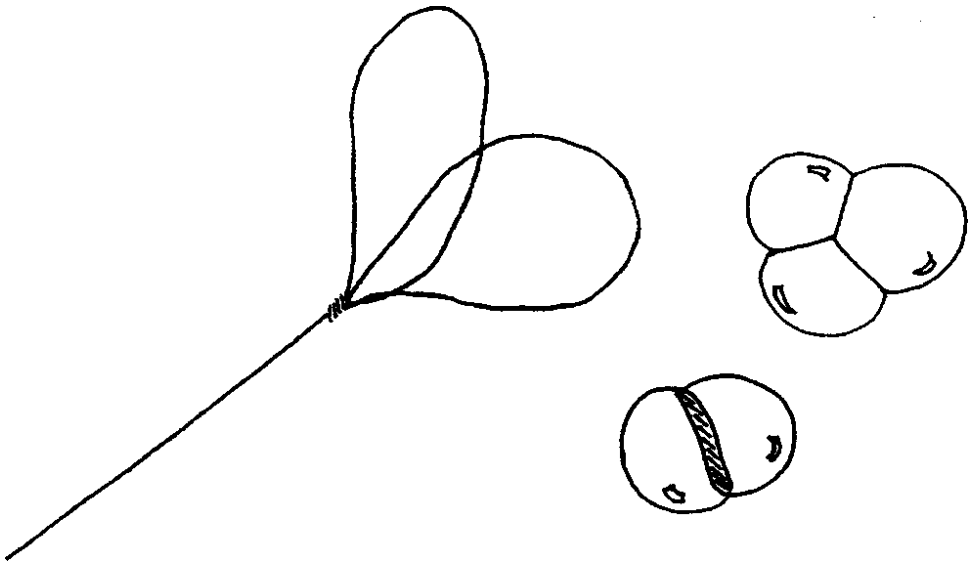
When bubbles stick together, they meet at particular angles. While single bubbles are round, multiple bubbles meet with flat faces. The reason for this is also the reason that bubbles are round - soap bubble films pull away from anything they touch, including themselves. Water has this same property of surface tension, although water needs to be mixed with soap to be able to form a film. The spherical shape of a bubble allows a closed shape to form with the least amount of bubble surface. It pulls evenly on itself in all directions. When two or more bubbles meet, the faces between the bubbles also form with the least amount of bubble surface. This makes any double or triple bubble look roughly the same as any other. Try to blow some multiple bubbles and notice the shapes. Can you think of other objects that are also shaped this way?

Materials

insulated electrical wire
scissors
bubble solution
bowl or dishpan
straw

Procedure

1. Fill a bowl several inches deep with bubble solution.
2. Cut lengths of wire 3" or longer.
3. Bend the wire into a double (or triple) loop.
4. Dip the loop into the solution and blow some bubbles.
5. Try to catch any multiple bubbles and look at them.
6. Draw a picture of several different multiple bubbles.
7. Empty the bowl so only a thin film of bubble solution covers the bottom.
8. Stick a straw into the film and gently blow a bubble.
9. Blow more bubbles next to each other and notice how they meet.
10. Can you blow five bubbles so that the middle one is square?



Bubble Prints

The shapes that bubbles make when they meet are quite regular. These shapes can be used to introduce other shapes in nature. Not only are many natural forms round, many are also made in the same kinds of geometric shapes that bubbles make when they meet. Many of these shapes are pentagons and hexagons, the shapes of starfish and beehive cells respectively. However, multiple bubbles rarely last long enough to be able to count the number of sides on each bubble. By adding paint to the bubble solution, you can make a permanent print of the surfaces of your multiple bubbles and inspect it at your leisure.

Materials

Crayola Washable™ paint
bubble solution
straw
small bowl
paper

Procedure

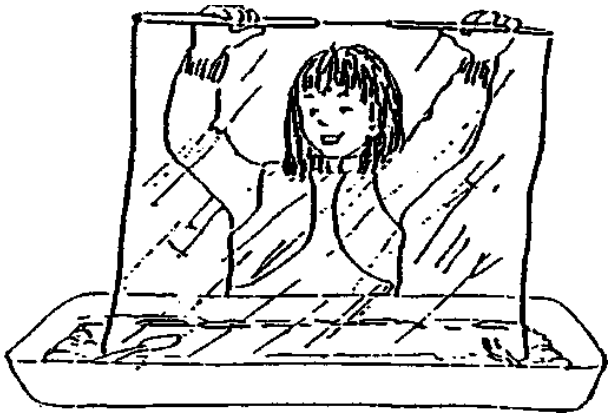
1. Pour enough paint to cover the bottom of a small bowl.
2. Fill the bowl about half full of bubble solution.
3. Stir gently with a straw.
4. Blow enough bubbles so they rise above the bowl.
5. Gently place a piece of paper onto the bubbles.
6. Remove the paper and allow it to dry.
7. If the bubble shapes aren't dark enough, add more paint.
8. Try to count the number of sides on some bubbles.
9. Can you think of other objects or animals with these shapes?

Bubble Wall

A large bubble wall allows you to watch bubble colors on a flat surface, or to blow weird shapes that rarely form complete giant bubbles. Objects that are wet with bubble solution can pass through the wall. Dry objects will pop it. Try to pull different objects through the bubble wall.

Materials

bubble solution
dish pan
straws
string
scissors
spoon and fork
flashlight
piece of paper



Procedure

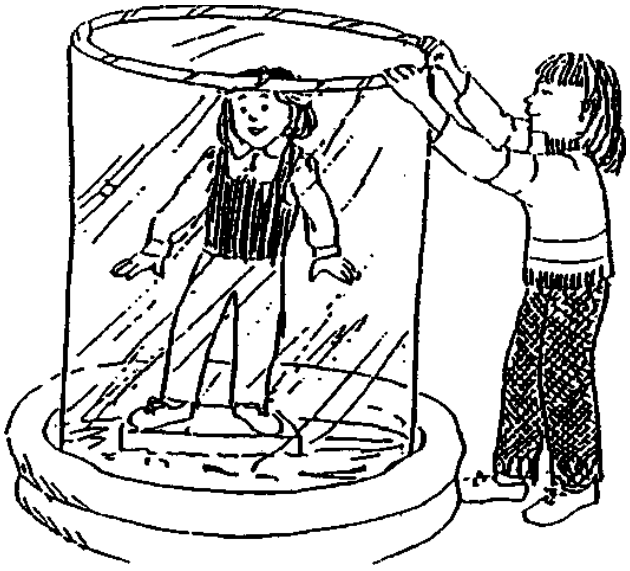
1. Thread a 4-foot piece of string through two straws and tie the ends.
2. Fill your dishpan with a few inches of bubble solution.
3. Place the spoon and fork over the string in the corners of the pan.
4. Dip the string, including the straws, completely into the pan.
5. Pick up the straws until the string is taut.
6. Shine a light through the bubble wall onto the piece of paper.
7. Watch the colors swirl and change. Can you tell when it will pop?
8. Try to pass objects through the wall by wetting them with bubble solution.
9. Can you shake hands with a friend through the bubble wall?

Bubble Hoop

Find out what it's like to be surrounded by a giant bubble tube. This activity is recommended for the classroom that doesn't mind a little good clean (but messy) fun.

Materials

bubble solution (lots)
toy wading pool
milk crate
hula hoop



Procedure

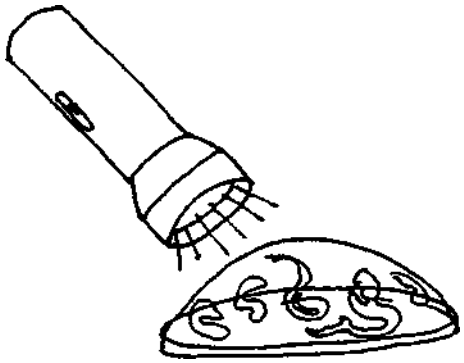
1. Fill the wading pool with a few inches of bubble solution.
2. Put the milk crate in the middle of the pool.
3. Stand on the crate.
4. Put the hula hoop in the wading pool around you.
5. Have a friend pick it up over your head.

Bubble Color

The color of a bubble corresponds to the thickness of the bubble film at any particular spot. When a bubble forms, the bubble film begins to evaporate and get thinner and thinner until it pops. As the bubble film gets thinner, it's color changes. This is due to light waves mixing when they reflect off of the front and back surfaces of a bubble. Try to recognize as many colors as you can in a bubble.

Materials

bubble solution
clear coffee can lid or other flat plastic container
straw
flashlight



Procedure

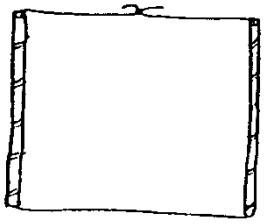
1. Pour a film of bubble solution onto the coffee can lid.
2. Use a straw to blow a large bubble on the lid.
3. Shine a flashlight at the bubble.
4. Watch the different colors.
5. Can you tell how old a bubble is by its colors?
6. Can you predict exactly when a bubble is about to pop?

Giant Bubbles

Giant bubbles are fairly awe-inspiring. They are a testimony to the strength of the film of a bubble. Although they writhe and undulate in the slightest air current, they will seldom pop unless touched with a dry object. You can use giant bubbles as a challenge. First, can you master the technique of making them? Once you do, try to catch a small bubble with a large bubble or blow a small bubble inside a big bubble with a straw.

Materials

bubble solution (lots)
straw
scissors
string
bowl or dishpan



Procedure

1. Cut a straw in half.
2. Thread about two feet of string through both straw halves and tie a knot.
3. Hold onto the straws and dip the entire loop into the solution.
4. Remove from the solution, let the excess liquid drain, then pull the straws apart and upwards.
5. Pull the two straws together to break off a giant bubble.

Sources of Materials

Insulated wire: Amazon
Glycerin: Pharmacy

Resources

Print Resources:

- *Bubbles Float, Bubbles Pop,* Mark Weakland, Capstone Press, 2011
- *Pop! A Book about Bubbles*, Kimberly Bradley, HarperCollins, 2001
- *The Ultimate Bubble Book: Soapy Science Fun*, Shar Levine, Sterling Publishing, 2003

Online Resources:

- Fun with Bubbles! By SciShow Kids on YouTube
    - https://www.youtube.com/watch?v=XxU_QenIO54