

## Bubble Science (For children ages 3-8)

It's hard to resist the magical quality of blowing bubbles and watching them float away. But did you ever wonder, how bubbles form? Here's a fun activity that examines the science of bubbles.

| 20 – 30 minutes |

### Skills Developed:

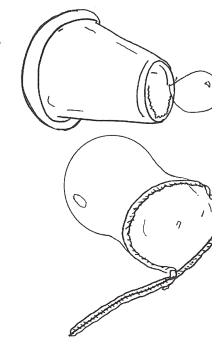
- Decision-making
- Large and small motor coordination
- Observing, inferring, and predicting
- Using tools

### Materials Needed:

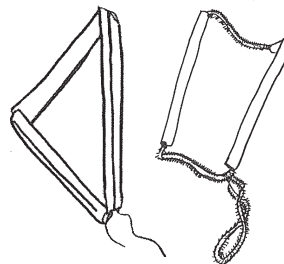
- 1/2 cup of liquid detergent
- 1/2 gallon of water
- 1 oz. of glycerine (available in the hand lotion section of drug stores)
- Basins, bowls, or any large pan
- A measuring cup
- Straws
- Small paper cups
- Pipe cleaners
- String
- Scissors
- Pencils (for making holes)
- Newspaper to cover the table and floor
- Paper towels for cleanup
- Smocks (optional)

### What's the Science?

Water **molecules**, small particles of water, are made to stick together — they have **cohesion** which makes the surface too strong to stretch into a bubble shape. Adding soap weakens the surface. The soap and water molecules **adhere**, or stick together, so when you blow air into it, the surface stretches and bubbles are formed. The bubbles have "skins" made of many layers of soap and water which help water molecules stretch to become **spherical**, or round. Adding glycerine, which bonds with water molecules, slowing down evaporation, makes bubbles last longer.



The colors in bubbles occur because the skin is thick in some places and thin in others. Light bounces off, or is **refracted** through the thick areas, and enters through the thin ones. Where the bubble is thick, the light will appear red, and where it is thin, the light will appear violet. The colors in-between occur because of differences in thickness.



## Getting Ready:

Make the bubble mixture by pouring  $\frac{1}{2}$  gallon of water into a large container and adding  $\frac{1}{2}$  cup of liquid detergent and about 1 oz. of glycerine. Mix contents very gently and do not shake. Avoid making suds. If you can plan ahead, the best bubble solution is one that has been allowed to sit overnight. (Your bubble mixture can be stored and reused.)

Cover a table and the floor with newspaper – or take the bubble mixture outside. This is a great outdoor activity.

## Activity:

1. For bubble-makers, start with the paper cups and, using a pencil, make a hole in the bottom. Let your child experiment with the sizes of the hole, or decide for herself if she wants to remove the bottom completely.
2. Let your child experiment with the other items for creating bubble-makers. Try making some samples together:
  - Use pipe cleaners to make a round bubble-maker. Then try to make square one. Be sure to twist the ends of the pipe cleaners securely.
  - Make a rectangular bubble-maker by threading a piece of string through two straws and knotting the string. Hold the straws as far apart as possible to form a rectangle.

3. While you are making bubbles and experimenting together, you may want to ask a few questions:

- Could your hand be a bubble-maker?
- What do you see when you hold bubbles to the light?
- Can you make different sized bubbles? How?

4. Afterwards, talk about the role of air in bubbles (air takes up space, the more air, the bigger the bubble) and about the color in bubbles. Ask:

- Do you see a rainbow?
- Do the colors disappear right before the bubble breaks?

## Additional activities for different age-levels:

### 3-4 year olds

Put a large sheet of waxed paper on the table and add some bubble solution. Ask your daughter to put a straw directly on the bubble solution and blow, which will make a big mound of bubbles, which she can feel, move around on the waxed paper, and have fun popping.

### 5-6 year olds

Create bubble-makers that will produce very large bubbles, for example, knot a long piece of yarn together to make a big circle; make a large rectangle with straws and string; or twist several pipe cleaners together to make a large, free-form shape. Blow some bubbles inside and some bubbles outside. Compare the results.

*Activities for different age-levels (con't)*

### **7-8 year olds**

Create three-dimensional bubble-makers using pipe cleaners to construct a pyramid or a cube. Ask your daughter to predict whether the bubbles will be the same or different than the ones she made with two-dimensional bubble-makers. Ask how she thinks she can change the shape of the bubbles.

Weather permitting, take the bubble activity outside. Was it hard or easy to blow the bubbles outside? How quickly did they blow away? How far away did they get before they popped? Repeat the activity on a day with different weather — hotter, colder, windier, or less windy. Record those results and then compare the two.

### **If Your Child Has a Disability**

All the activities can be done with children with a wide range of disabilities by making some modifications. You are the best judge of what those modifications might need to be, but here are some suggestions that have worked well.

#### **For a child who is blind or visually impaired:**

Look for the commercial bubble making kits that make “touchable” bubbles. This can be useful to demonstrate the idea that a bubble is a skin with air inside. Put a half-inch

of bubble solution into the bottom of a cup, place a straw into the solution and blow gently. Have your child hold her hand over the top of the cup. When the bubble reaches her hand, she'll be able to feel the surface. Do the same with one of the bubble makers.

#### **For a child who is deaf or hard of hearing:**

Review ASL and English (or child's native language) vocabulary words and concepts, such as “bubbles,” “bubble-maker,” and “burst.” Some children may need assistance with breath control. If bubble-blowing is not an option, have your child create bubbles by moving the bubble maker through the air.

#### **For a child who has a physical disability:**

Attach foam rubber to a pencil with masking tape to make an easy-to-use hole maker.

If bubble-blowing is not an option, have your child create bubbles by moving the bubble maker through the air or use a small fan.

#### **For a child who has learning/emotional disabilities:**

Create a step-by-step chart indicating what your child will be doing. Use a limited number of materials for making the bubble-makers. Add different materials each time you do the activity.



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**Science:  
It's a Girl  
Thing!**