



Bubbleology

Focus: Physical Science

Grades K-4

Background:

Bubbleology is the study of surface tension. Surface tension is created in a liquid when very cold (magnetic) molecules are attached to a surface and to each other. This is a condition that takes place at the free surface of a liquid, gives the surface an elastic quality and causes tension. Tension begins when the molecules move inward and become unbalanced. This is reflected in the curvature of the molecule which forms a bubble. It is caused by the reaction of cohesiveness of the molecules and the contact of the liquid with the surface itself.

Objectives:

- ✓ Students will be able to identify the chemical makeup of water molecules.
- ✓ Students will be able to identify the chemical makeup of soap molecules.
- ✓ Students will be able to identify a physical change in water.
- ✓ Students will be able to understand the difference between physical and chemical reactions.
- ✓ Students will be able to describe in their own words why surface tension occurs.
- ✓ Students will be able to speculate which liquid would have the highest surface tension and make the best bubbles.

Learning outcomes:

Learning outcomes for this lesson are based on the 4th grade Ohio proficiency test standards.

- ✓ Select instruments, make observations and/or organize observations of an event, object or organism.
- ✓ Identify and/or compare the mass, dimensions and volume of familiar object in standard and/ or non-standard units.
- ✓ Analyze a series of events and/or simple daily or seasonal cycles and predict the next likely occurrence in the sequence.
- ✓ Evaluate a simple procedure to carry out an exploration.
- ✓ Identify and/or discuss the selection of resources and tools used for exploring scientific phenomena.
- ✓ Demonstrate an understanding of safe use of materials and/or devices in science activities.
- ✓ Identify characteristics of a simple physical change.



Bubbleology Cont.

Lesson: Overview

- ✓ Identify a molecule.
- ✓ Discuss molecules in a liquid form.
- ✓ How and why molecule form is round.
- ✓ What makes molecules move?
- ✓ Who is Wally?
- ✓ Who is Sophie?

Activity

1. Explain that a molecule is made up of 2 hydrogen and 1 oxygen atom.
2. Place a drop of water on a piece of wax paper; notice the shape and explain the reason the droplet is round. (It is spherical because the water molecules stay together reattaching themselves to one another).
3. Introduce Wally the water molecule.
4. Try to separate the droplet and chart the data.
5. Explain what would happen if you add a chemical to the water.
6. Discuss what would happen if you add soap to the water.
7. Introduce Sophie the soap molecule.
8. Add soap to the water and see what happens to the water.
9. Now that you have the soap and water mix, discuss bubbles.
10. Discuss the shapes.
11. Give the students different shaped objects and let them explore.

Bubble Web Sites

Soap Bubbles. Because of the remaining surface tension, a soap film always pulls in as tightly as it can, just like a stretched balloon. A soap film makes.

<http://www.sme.org/memb/newweek/actsoap.htm> - size 5K - 7 Feb 96

Soap Bubbles Internet Link-Science Museum of Minnesota

Soap Bubbles-Internet Link. This is a launch point from the Science Museum of Minnesota to Ron Hipschman's Soap Bubbles site. Ron works at the...

<http://www.sci.mus.mn.us/sln/tf/links/soapbubbles.html-size> - 8 Jul 96

Soap Bubbles

Copyright © 1982 Bruce McKibben. Blowing soap bubbles at -46 °F. Midwinter, 1982
McMurdo Station, Antarctica. Not pictured is Bob, who ran down...

<http://afrodite.fi.uib.no/~bruce/colddrkl.htm> -size 1002 bytes - 5 Mar 96

Soap Bubbles

By Ron Hipschman. What is so fascinating about bubbles? The precise spherical shape, the incredibly fragile nature of the microscopically thin soap film...

<http://www.exploratorium.edu/ronh/bubbles/bubbles.html> - size 2K -

23 Nov 95

Exhibit Cross Reference-Soap Bubbles

Light. Soap Bubbles. In SOAP BUBBLES, three wire forms are dipped into a soapy bath at the push of a button. Shortly after they are raised, bands of color.

http://www.exploratorium.edu/xref/exhibits/soap_bubbles.html - size 3K - 18 Jan 96

Bubble Mesh-Physically-based Triangulation Method

Japanese page is here. Bubble Mesh - Physically-based Triangulation Method - Abstract. A repeating hexagonal pattern is a common one, observed in soap...

<http://www.trl.ibm.co.jp/projects/s7340/meshing/bubbleE.htm> -size 6K - 1 Oct 96

ChemShorts on the Zia Site

Science of Soap Bubbles. Kids, did you ever wonder what a turtle shell, a bee's honeycomb, a soccer ball, a chicken wire fence and a bag full of bubbles...

<http://www.zia.com/tech/exp/c1195.html> - size 2K - 13 Apr 96

Bubble Solution Formula for Enrico

Bubble Solution Formula for Enrico. My son Enrico loves soap bubbles, this is the formula I use for big bubbles: 2/3 cup Dawn liquid dishwashing detergent.

<http://www.doe-mbi.ucla.edu/people/duilio/bubble.html> - size 422 bytes - 14 Jun 96

Page 15

You can blow soap bubbles that do not pop. The bubbles turn white and feel like thin onionskins.

<http://www.sci.mus.mn.us/sln/avocado/avocado14a.html> size 525 bytes - 12 Dec 95

Groundwater Quiz, Question 13

Lack of soap bubbles and lather = High concentration of calcium and magnesium. Return to the question

http://gwrp.cciw.ca/education/gwquiz/q13_c.html - size 203 bytes

Cleaning up with Liquid Crystals "Soap Bubbles and Lyot

Cleaning up with Liquid Crystals. Soap Bubbles and Lyotropic Liquid Crystals. Authors: Rich Ettinger-Biology. Brenda Bault-Mathematics. Meg Calby-...
<http://scorpio.kent.edu/~ravensh/> -size 10K - 27 Mar 96

Still Life with a Boy Blowing Soap-Bubbles

Gerard Dou. 1613 Leiden -= 1675 Leiden. Still Life with a Boy Blowing Soap-Bubbles. Ca. 1635/36 Oil on panel, 48 x 39.7 cm. The soap-bubbles, skull...
<http://www.nmwa.go.jp/col/col05.html> - size 1K - 19 Nov 96

The ACME SOAP Bubbles WEB SITE

Be warned! The next page is a heavy graphics page. Continue with graphics or go to the text page.

<http://rama.lyra.net/~luma/> -size 957 bytes - 21 Jun 96

The ACME Soap Bubbles WEB Site

Join the ART! Try the I M P R E S S I O N I S T. Benvenuti alla ACME Soap Bubbles Trading Co...

http://rama.lyra.net/~luma/home_ita.html - size 8K - 21 Jun 96

The ACME Soap Bubbles WEB Site

Benvenuti alla ACME Soap Bubbles Trading Co. Vi ricordate di Mastro Geppeto Con le sue mani capaci cvostrui il burattino più famoso del mondo.

http://rama.lyra.net/~luma/txt_ita.html - size 4K 21 - Jun 96

Science of Soap Films & Soap Bubbles

0-486-26960-4 \$9.95

<http://www.ishops.com/quantum/0-486-26960-4.htl> - size 2K - 27 Nov 96

SOAP FILMS AND BUBBLES

SOAP FILMS AND BUBBLES. AS A PEDAGOGICAL AID. PUBLICATIONS ON SOAP FILMS. By Göran Rämme. For more information, e-mail Göran Rämme. 1..

<http://www.fki.uu.se/FKIinfo/rampub.htm> - size 2K - 3 Dec 96

No Title

From: Colin.Douthwaite@equinox.gen.nz (Colin Douthwaite) Subject: Re: Soap Bubbles: Can anyone help me. I want the formula to a good stable soap bubble:

http://www.waite.adelaide.edu.au/~pclarke/science/better_soap_bubbles - size 8K - 12 Jul 96

Events by Ay-O

Events by Ay-O. Rainbow No. 1 for Orchestra. Soap bubbles are blown out of various wind instruments. The conductor breaks the bubbles with his baton. Date.

<http://www.deluxxe.com/fluxus/ay-o.html> -size 2K - 18 Aug 96

LHS BUBBLE-ology

Lawrence Hall of Science University of California at Berkley. Bubble-ology. Jacqueline Barber. Imaginative experiments with soap bubbles combine fun with.

<http://www.lhs.berkeley.edu/LHStext/GEM240.html> - size 2K 21 Sep 96

Properties of Air: Activity 12

Properties of Air. Heat Causes Air to Expand. Activity Number 12: Why do soap bubbles float? Level I. EQUIPMENT Bubble pipe Soapy water. DESCRIPTION Blow...

<http://phoenix.mcet.edu/nasa/activities/air12.html> -size 959 bytes-30 Jul 96

Basic Bubble Recipe

1 clean pail

1 cup Joy, clear Ivory or green Dawn

3-4 tablespoons glycerin (optional, from your pharmacy)

12 cups clean, cold water (up to 50% more on dry days)

Directions

1. Measure 12 cups water into the pail. Add 1 cup dish soap.
2. Add the glycerin. In most atmospheres, it makes the bubbles more durable by reducing evaporation.
3. Stir, but not too much. You don't want froth on the top because it tends to break the bubbles. If you get any, skim it off with your hand.