

BUBBLES!

STANDARDS

See summary of National Science Education Standards.

Original: <http://books.nap.edu/readingroom/books/nses/>

| Standard Concept | General standard | Specific standard | General standard | Specific standard | General standard | Specific standard |
|------------------------|----------------------------------|-------------------|----------------------------------|-------------------|----------------------------------|-------------------|
| Grade Level | | K-4 | | 5-8 | | 9-12 |
| Science as inquiry (A) | Abilities ... to do ... inquiry | A.1.4.1 | Abilities ... to do ... inquiry | A.1.8.3 | Abilities ... to do ... inquiry | A.1.12.6 |
| | | A.1.4.2 | | A.1.8.4 | | |
| | | A.1.4.3 | | A.1.8.7 | | |
| | | A.1.4.5 | | A.1.8.8 | | |
| | Understandings about ... inquiry | A.2.4.2 | Understandings about ... inquiry | A.2.8.1 | Understandings about ... inquiry | A.2.12.2 |
| | | | | A.2.8.3 | | |
| | | | | A.2.8.5 | | |
| Physical Science (B) | Properties of ... materials | B.1.4.1 | Properties ..of matter | B.1.8.1 | | |
| | | B.1.4.2 | | | | |
| | | B.1.4.3 | | | | |
| Earth Science (D) | Properties of Earth Materials | D.1.4.1 | Structure of Earth system | D.1.8.4 | | |
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INTRODUCTION

Volcanic rocks often contain bubbles. These activities explore the properties of bubbles as they affect the properties of volcanic rocks and volcanic eruptions.

PURPOSE

Using soap solutions to make bubbles, students will observe and draw (record) properties of bubbles. Students will make similar observations of rocks that contain bubbles to make correlations between soap bubbles and the bubbles in rocks.

MATERIALS

- Paper and colored pencils
- Bubble pipe and soap solution
- Diet Coke (in bottle, not can)
- Balloons
- Samples of the following rocks:
 - a) Vesicular basalt
 - b) Scoria
 - c) Pumice
 - d) Small basin of water

PROCEDURE (Student directions)

- 1) Blow soap bubbles with bubble solution and pipes.
 - a) Try to measure some of the bubbles.
 - b) Discuss what happens to the bubbles.
 - c) Draw pictures of the bubbles.
 - d) Older children should label the pictures with measurements, the word "bubble," and any other information like "soap."
- 2) Blow up some balloons.
 - a) Measure the balloons when fully inflated.
 - b) Blow some balloons up until they pop, or pop them with a pin.
 - c) Discuss how they were like the soap bubbles and how they differed.
 - d) Draw and label pictures of the balloons.
- 3) Shake the Coke bottles and observe the bubbles.
 - a) Discuss the observations.
 - b) Draw and label pictures of the bubbles formed in the Coke bottles.
 - c) If possible, go into the playground and open the bottles so the bubbles will come out.
 - d) Discuss the observations, draw and label pictures of the bubbles coming out of the Coke bottles.
- 4) Examine the rocks
 - a) Discuss observations about the rocks.
 - b) Place each rock into water.
 - i) Do any float?



- ii) If so, discuss why some do and do not.
 - c) Measure the bubbles in the rocks.
 - d) Draw the rocks and label the bubbles.
- 5) Can you make any other bubbles?
- a) For example, by blowing into a glass of milk with a straw.

EVALUATION

- 1) Compare the sizes of bubbles in the bubbles blown into the air with a bubble pipe with bubbles blown into a liquid with a straw.
- 2) When bubbles are blown into a liquid, where is the foam found (top of bottom of the liquid, for example)?
- 3) Relate these observations to rocks.
 - a) Are rocks that have bubbles in them lighter (less dense) than rocks without bubbles?

TEACHERS TIPS

- Pumice floats because the bubbles are enclosed. Scoria and vesicular basalt sink because the bubbles are no longer closed. The gases that made the cavities when the lava was hot worked its way out and left open channels rather than closed bubbles.
- The relative viscosity of the material determines whether gases escape quietly. The lavas in Hawaii can be viewed in safety because they are not very viscous due to their chemical composition. Other lavas, for example, at Mt. St. Helens, are so viscous that gas cannot escape from the lava without blowing the lava into tiny, shattered pieces of volcanic glass called “volcanic ash.” Pumice fragments are unexploded portions of the lava. Such eruptions are best viewed on television news!
- In this activity, soap and Diet Coke bubbles pop gently, like the beautiful “fire fountains” of runny Hawaiian lavas. Balloons pop violently, resembling explosive eruptions of the viscous lavas of Cascade volcanoes and other explosive volcanoes around the world.
- Many of the volcanic rocks in Nevada are composed of a type of rock made up of volcanic ash called “ash-flow tuff.” Bits of pumice enclosed in the rock are a good indicator that it is a tuff. Tuffs are usually light colors, gray, yellow, or pink, and often have small included crystals.
- Basalt is often black, dark gray, or red. It may or may not have gas cavities in it. There are usually fewer crystals, and if there are any, some may be green (the mineral olivine).

OPTIONS

- Compare the colors of the pumice and the vesicular basalt. The composition of lighter colored volcanic rocks is more likely to produce explosive volcanic eruptions.
- Show short videos on Hawaii or on Mt. St. Helens.
- Find out about active volcanoes are in the United States by reading World Book Encyclopedia and other resources.



FURTHER RESOURCES:

- GeoMan's Rock identification table:
<http://jersey.uoregon.edu/~mstrick/MinRockID/RockID/RockIDChart.html>
- GeoMan's Mineral and Rock Glossary
<http://jersey.uoregon.edu/~mstrick/MinRockID/MinRockGloss.html>

