

# 6th Grade Science

## Minerals

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This text is adapted from an original work of the Core Knowledge Foundation.



*Jonathan Carver*

In the 1700s a man named Jonathan Carver explored the Mississippi River. On his travels, Native Americans told Carver about the Shining Mountains to the west, which were covered with large crystals. Carver thought that these crystals were diamonds. In fact, the crystals that the Native Americans described to Carver weren't diamonds; they were crystals of snow that melted in the spring and fed the rivers and lakes of western America.

It's easy to make fun of Jonathan Carver for thinking that the crystals on the slopes of the Rocky Mountains were diamonds. But in a sense he wasn't as far off as you might think. No one has ever found diamonds in the Rocky Mountains, but the Rockies are bursting with other valuable minerals.

Gold was discovered in the Rockies near Pikes Peak in 1858. People rushed to the area to get their share of the riches. Mining camps and towns sprang up overnight. Very few people became rich from the gold. Very little gold is left today, at least near the surface. But people discovered other minerals during the gold rush—silver, lead, copper, zinc, and more.

Other mountain ranges around the world also contain minerals. The Ural Mountains in Russia are rich in zinc, silver, platinum, and nickel. Miners dig these minerals out of the mountains and send them to nearby factories. Pennsylvania's Allegheny Mountains are full of coal, as are the Appalachian Mountains in Pennsylvania, Ohio, West Virginia, Kentucky, and Tennessee. Coal from the Allegheny and Appalachian Mountains helped American industry to grow in the late 1800s and early 1900s.

#### **Cool Facts About Making the Most Out of Mountains:**

- Ten percent of the world's population lives in mountains.
- Coal is still an important resource. Today, approximately 40 percent of the world's electricity is generated by coal.
- The U.S. state of California depends on the snowpack on the Sierra Nevada mountains for water. Since 2001, the mountains have received less-than-normal amounts of snow. This has created an extreme drought in the state.

Look for these minerals and mineral products at home, in school, at a pharmacy, or in a hardware store.

Mineral or Mineral Product	Uses	Object Location
aluminum	aluminum foil, cosmetics, beverage cans, deodorant, hand lotion, antacids, cooking pots	
beryllium	fluorescent lamps	
chromium	chrome fixtures (cars, bicycles, lamps, kitchens, etc.), stainless steel	
copper	wires, pipes, cooking pots, old gutters and roofs, brass, pennies	
fluorite (fluoride)	toothpaste, drinking water	
gold	dentistry, jewelry, computers, electronics	
gypsum	wallboard, plaster	
halite (salt)	table salt, food preservatives, de-icers	
iron	cosmetics, hair dye, steel, wrought iron	
lead	car batteries, computers, fuel tanks, TV tubes, leaded glass, x-ray shields, fishing sinkers	
mica	sheetrock, paints, hair dye, cosmetics, soap, electronics	
molybdenum	fertilizer, filament supports in light bulbs, steel	
nickel	nickel coins, stainless steel, alnico magnets, sheetrock	
perlite	gardening	
phosphate	fertilizer, dishwashing detergent, laundry detergent	
potassium (potash)	fertilizer, toothpaste	
silica	computer chips, glass, cosmetics, antacids, paint, laundry detergent, drain cleaner, quartz watches	

silver	photography developer, jewelry, electronics, silverware, dentistry	
sulfur	fertilizers, matches, car tires	
talc	baby powder, cosmetics, antacids, sheetrock, primer	
titanium	cosmetics, hand lotion, soap, toothpaste, hair dye, bug spray, primer, paint	
tungsten	filament in light bulbs, drill bits (tool steel)	
zinc	sunblock, fertilizer, cosmetics, dandruff shampoo, pennies, galvanized metal, brass, dry-cell batteries	
zirconium	deodorant, jewelry	



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## Incredible Egg Geode



### Standard:

5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.

### Introduction:

*Don't fry or scramble your egg, turn it into a beautiful crystal egg geode! In this experiment we will create these incredible crystals and learn about the process of crystallization!*

### Materials:

- Paintbrush
- Glue
- Food coloring
- Alum powder (look in the spice section of your local grocers)
- Water
- Scissors
- Paper towels
- Bowl
- Beaker/glass
- Spoon
- Pushpin
- Egg

### Safety:

- Always have an adult with you to help you during your experiment.
- Always wear eye protection and gloves when doing chemistry experiments

**Procedure:**

1. You have an egg, now you need to get all the yolk and egg white out of it. WAIT! You can't just crack the egg like you're making breakfast. You need that egg in one piece. Use a pushpin to carefully poke a hole in each end of the egg.
2. Put your mouth on one end of the egg and blow the yolk out through the other hole. Blow the yolk into a bowl or garbage disposal, depending on whether you're hungry or not.
3. Now that you don't have an egg so much as an eggshell, carefully cut the shell in half, down the egg's length, with a pair of scissors. If there are any small pieces around the edges, go ahead and pull them off. They're of no use to you.
4. Continuing to exercise caution (who knew science was so fragile?), wipe out the inside of the egg with a paper towel. Get the interior surface of the egg as clean and dry as possible without cracking it.
5. Drop a small amount of glue into the egg and use a paintbrush to spread it around. Try to cover the entire interior surface, all the way up to the edges, of the egg with glue. Add more glue if needed.
6. Quickly, before the glue dries, cover it with alum powder. How much? Cover it all! Our experiment tester suggested the word "generously"... so use quite a bit.
7. So you covered the glue with alum powder, now what? Well, your options are to sit around until everything is completely dry or let it sit overnight. The first option gets really boring and you need your rest, so come back tomorrow and we'll pick the experiment up there.
8. Is it tomorrow yet? Yes? Then let's do this!
9. Bring two cups of water (that's 473 mL to everyone outside the U.S.) to the point where it is almost boiling. Pour the heated water into a beaker or glass and stir 30-40 drops of food coloring and 3/4 cup of alum powder into the heated water.
10. Let the colored alum solution cool for around thirty minutes.
11. Once the colored alum solution has cooled, place the egg, opening up, into the solution. Push the egg to the bottom of the beaker with a spoon and allow the eggs to sit in the solution for 12-15 hours. That's a long time, right? Good thing you practiced patience by waiting for the glue to dry earlier.
12. After the 12-15 hours have passed, check out your egg. It's grown crystals! Carefully remove the egg and place it on a paper towel or drying rack to finish the geode-creation process.

**Data and Observations:**

Record your observations in this space

What did you see? Anything you were not expecting? Describe it here.

**Questions:**

Why is it that the alum powder reacted the way it did?

Does the amount of alum powder have an effect on the experiment?

What role does sedimentation play in this reaction? Explain

**References:**

1. Stevespanglerscience.com  
<http://www.stevespanglerscience.com/experiment/incredible-egg-geode>  
(July 17, 2012).



## MAKE YOUR OWN ROCK CANDY!

### YOU WILL NEED:

- A wooden skewer (you can also use a clean wooden chopstick)
- A clothespin
- 1 cup of water
- 2-3 cups of sugar
- A tall narrow glass or jar

### WHAT TO DO

1. Clip the wooden skewer into the clothespin so that it hangs down inside the glass and is about 1 inch (2.5 cm) from the bottom of the glass. (as shown)
2. Remove the skewer and clothespin and put them aside for now.
3. Get a helpful adult!
4. Pour the water into a pan and bring it to boil.
5. Pour about 1/4 cup of sugar into the boiling water, stirring until it dissolves.
6. Keep adding more and more sugar, each time stirring it until it dissolves, until no more will dissolve. This will take time and patience and it will take longer for the sugar to dissolve each time. Be sure you don't give up too soon. Once no more sugar will dissolve, remove it from heat and allow it to cool for at least 20 minutes.

NOTE: While it is cooling, some people like to dip half of the skewer in the sugar solution and then roll it in some sugar to help jump start the crystal growth. If you do this, be sure to let the skewer cool completely so that sugar crystals do not fall off when you place it back in the glass.

7. Have your friendly ADULT carefully pour the sugar solution into the jar almost to the top. Then submerge the skewer back into the glass making sure that it is hanging straight down the middle without touching the sides.
8. Allow the jar to fully cool and put it someplace where it will not be disturbed.
9. Now just wait. The sugar crystals will grow over the next 3-7 days. Want colored rock candy? Add food coloring to your sugar water and make sure sure that it is pretty dark in color for the best result.

### HOW DOES IT WORK?

When you mixed the water and sugar you made a SUPER SATURATED SOLUTION. This means that the water could only hold the sugar if both were very hot. As the water cools the sugar "comes out" of the solution back into sugar crystals on your skewer. The skewer (and sometimes the glass itself) act as a "seed" that the sugar crystals start to grow on. With some luck and patience you will have a tasty scientific treat! Enjoy!

