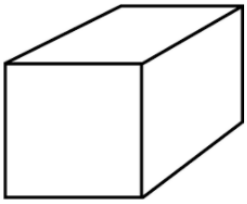
5. Halite (sodium chloride or NaCl)

Halite is the mineral name for what we know as table salt. Halite crystallizes as cubes and is usually white, but can be gray or pink. Halite is found in certain sedimentary environments as a result of evaporation of briny (salty) water and can accumulate in large beds that can be mined commercially. It is also extracted by evaporation from seawater in many places around the world.

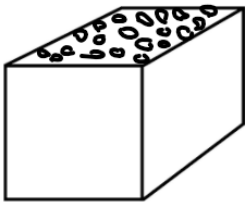
Halite is necessary in the human diet. In fact, your body contains about 100 cm^3 (20 teaspoons) of salt, which is stored in your bones and bodily fluids, such as blood and sweat. But too little or too much salt is not good for you. In addition to flavoring and preserving food, salt is used to tan leather and to make glass and ceramics. The biggest industrial use of salt is in the chemical industry to produce chlorine for chemical processes and also soda ash (sodium). In northern climates "rock salt" is used to melt ice and snow on highways. The halite sample in the economic rocks and minerals set comes from Hockley, in Waller County, Texas, where an underground operation mines a salt dome near the surface.

Activities:

K-3: Take two ice cubes and put each in a bowl. Heavily sprinkle one ice cube with salt. Check the ice cubes every 5 minutes for a total of 15 or 30 minutes. Circle which ice cube melted faster:



Ice cube



Ice cube with salt on it

As the ice cube starts to melt, the water dissolves the salt, and the component ions of the salt interfere with the chemical structure of the water to lower the freezing point (usually 0°C or 32°F). This is why salt is put on icy roads to speed the ice melting and delay any refreezing to make driving safer.

2-4: Halite is soluble in water. Put a teaspoon of salt in a glass of water. Stir the mixture of salt crystals and water and watch the salt crystals. What happens to the salt crystals?

_____

Now take a tiny sip of the water in the glass. Although you cannot see the salt crystals because they dissolved in the water, can you taste them? Circle your answer: Yes No

5. Halite continued

3-4: The mineral halite is in the cubic crystal system, which means that all three sides of the crystal look like a square. Draw a cubic crystal:

5-6: Put a small amount of table salt (not flaky finishing salt) onto a dark surface. Look at the crystals with a magnifying lens or with a cell phone camera. What shape are the crystals? _____

Crystal shapes are used to identify minerals because the atoms that make up the mineral crystals have a repeated orderly pattern.

5+: Halite forms when seawater evaporates, leaving the salt crystals behind. Put about 120 mL (half a liquid measuring cup) of water in a cooking pot and warm it (boiling is not necessary). Keep adding salt and stirring it until no more salt dissolves in the water. Let it cool and then pour the water into a clean bowl. Let it sit uncovered for a few days without disturbing it and look for crystals forming around the edge of the bowl. What shape are the crystals: _____. To make the crystals more interesting, add some food coloring to the mixture of salt and water while you are stirring it.

Where did the crystals first start forming? _____.

Why do you think they formed there? _____

_____.

8+: Adding salt to water changes the density of the water as the salt dissolves in it. Pour water into a tall clear glass until it is half full. Stir in about 6 tablespoons of salt. Wait for the water to stop swirling and pour in plain water without disturbing or mixing with the salty water until the glass is nearly full. Gently lower an egg into the water. Describe what happens:

_____

_____.

Is the salt solution more or less dense than the fresh tap water layer? Circle your answer:

More dense Less dense

How do you know? _____

_____