Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_

**Lab: Eggshell Geodes**

**Purpose 1:** Students will understand how geodes are formed in nature.

**Purpose 2:** Students will create and track the rate of geode formation over several days.

**Background:** The creation of natural geodes occurs very slowly. They form when mineralized water seeps into air pockets in rock. The water evaporated over time, leaving behind the minerals which solidified into crystals. Every geode is different; no two are alike. Opening a geode is like opening a treasure chest filled with beautiful crystals.

**Prior Knowledge: \*\*\*USE YOUR NOTES** to answer these questions.

1. What are the 2 types of liquids that minerals form from?
2. In this lab mineral crystals will form from salt dissolved in water. Which of the 2 types of liquid is this lab simulating?
3. What 2 conditions must be present for large mineral crystals to form??
4. List the 5 characteristics a substance must have to be classified as a mineral:

**Analysis Questions:**

1. Examine the crystals using a dissecting scope. **Draw the crystals large enough to clearly show their shape.** If the crystals are colored, use colored pencils. DRAW **and** describe the appearance, including the color, shape, and **RELATIVE** size of crystals.

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| **Table Salt** – color, shape, relative size | **Eggshell Geode WITHOUT food coloring**– color, shape, relative size | **Eggshell Geode WITH food coloring**– color, shape, relative size | **“Ocean” lab crystals** – color, shape, relative size |
|  |  |  |  |

1. You had 2 eggshell geodes: clear (uncolored) and colored. Did the color variation affect crystal shape? Explain describing the shape of both eggshell geodes.
2. Compare and contrast your drawings and descriptions of the **table salt** crystals and the crystals in the eggshell **geode**.
	1. Describe the similarities in their appearance.
	2. Describe the differences in their appearance.
	3. The “geode” crystals are probably larger than the table salt crystals they were made from. Why are the geode crystals larger?
3. Comparison of the lab geodes to a real geode:
	1. What part of a real geode does the eggshell represent?
	2. Most real geodes have quartz crystals in them.
		1. Quartz is a member of which mineral category?
		2. What are the two main elements present in that mineral category?
		3. Quartz is most often clear in color, yet it can be pink, yellow, purple, etc. What causes the variation in color in quartz and other minerals?
		4. Some silicates are dark in color. What two elements are usually responsible for silicates that are dark in color?
		5. Name 2 silicate minerals that are dark in color:
	3. Mineral crystals form when water evaporates away from a supersaturated solution. Besides stirring, what enabled the solution to become supersaturated with salt?

**Lab: Eggshell Geodes – Procedure Page**

**Materials:**

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| * Community Hot Plate with large beaker of hot (not boiling) water & hot pad
* Community station: 600-ml beaker with diluted bleach, 1000-ml beaker of rinse water
* 2 community stations. Each with: IODIZED NaCl, three 100ml beakers to measure the salt, 1 vial of food coloring (green or blue)
* Dissecting scope (2nd day), table salt, petri lid
 | * Class chart/paper to leave eggshells on & permanent marker
* 1 egg
* Mini muffin/cupcake liners OR egg cartons
* Lysol sprayers
* Hand sanitizer
* 100-ml beaker
* Tweezers
 |

**Safety:**

* Eggs can harbor harmful bacteria. Spray your table with disinfectant and use hand sanitizer after the lab.
* Bleach can damage clothes and irritate skin. Take care not to spill. If spilled, wash with lots of water.

**Procedure:**\*NOTE: Have ½ your group do the first set of steps and the other ½ the last set.

1. Carefully crack your eggs in half, dumping the raw egg into a wastebasket. Try to keep both halves intact, so you can make “clear” crystals in one and “colored” crystals in the other.
2. Prepare your eggshells by using tweezers or your fingers to remove the inside skin from the eggshell. (See demonstration by teacher)

\*\*Do this very carefully so as to not crack the shell. \*\*It is important to remove the inside skin to prevent bacteria and mold from growing on your crystals.

1. Bring your “cleaned” eggshell halves to the “Bleach Rinse” station. The instructor will gently rinse the shells with warm water, rubbing the insides to remove any membrane residue, then dip in diluted bleach to kill bacteria and mold, and finally rinse with water.
2. Gently dry the OUTSIDE of your shells and place your eggshell halves into mini-muffin liners to hold them upright.
3. Take your beaker to the hot water station to get 50 ml of hot water.
4. Go to the “NaCl” station and get 20ml NaCl. Pour mineral salts into the hot water and stir until no more will dissolve. (There should be some undissolved salt in the bottom – if not add more salt.) This will give you a saturated solution of mineral salts. \*\*Put the empty salt beaker back at NaCl station.
5. Pour the saturated solution into ONE of the clean eggshells, filling it about ¾ full.
6. To the left-over saturated solution, add a few drops of food coloring from the “NaCl station” and stir. Fill the 2nd clean eggshell ¾ full with the colored solution.
7. Place the eggshells in their mini-muffin liners, and place them on a block in the class chart/paper. Label the block with a name in your group. Leave disturbed until the water has evaporated.
8. Disinfect your lab tables with Lysol. Use hand sanitizer on your hands.