



Crystal Geodes

Did you know a geode is created within a hollow space? Beautiful crystals lie underneath the hard exterior. Mimic the natural crystal formation process as you create your own geodes in an eggshell.

TEKS:

SCI 2.7A: The student is expected to observe and describe rocks by size, texture, and color.

SCI 5.5D: The student is expected to identify changes that can occur in the physical properties of the ingredients of solutions, such as dissolving salt in water or adding lemon juice to water.

SCI 6.5D: The student is expected to identify the formation of a new substance by using the evidence of a possible chemical change, such as production of a gas, change in temperature, production of a precipitate, or color change.

SCI 6.6 C: The student is expected to test the physical properties of minerals, including hardness, color, luster, and streak.

Materials:

- Alum powder
- Hollowed-out eggshell
 - Egg blower (can be purchased [here](#))
 - Dremel tool with small drill bit
 - Eggs
 - Unfolded paper clip
- Craft stick
- Drying rack or newspaper
- Egg dye or food coloring
- Hot water
- Latex gloves
- Plastic or glass container
- Small paintbrush
- White glue

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How To:

Hollow out the Egg

1. Using the Dremel tool, drill a hole in the bottom of the egg (less than $\frac{1}{4}$ in diameter).
2. With the unfolded paperclip, pierce the yolk and mix it with the egg whites through the drilled hole.
3. Pierce the top of the egg with the needle tip of the one-hole egg blower, and push the needle into the egg so that the egg blower is against the top of the egg.
4. Hold the egg in one hand and gently squeeze the bulb of the egg blower with the other hand so that the insides of the egg come out of the bottom hole.

Create your Crystal Geode

1. Split the hollow eggshell in half by striking it against a surface or cutting it with a small pair of scissors. Make sure that the eggshell is clean and dry.
2. Using the small paintbrush, apply white glue to the inside and edges of each half of the eggshell. Sprinkle the glue with alum powder until completely coated. Let the eggshell halves dry overnight.
3. Mix 2 cups of almost boiling water and a packet of egg dye in your container. (If you don't have egg dye, 30 to 40 drops of liquid food coloring will also work.) Be sure to wear gloves for the remainder of this process.
4. Add $\frac{3}{4}$ cup of alum powder to the hot dye bath and stir until it has dissolved completely. If crystals remain at the bottom, place the solution in the microwave for a few minutes and stir again until they are fully dissolved.
5. Once all the alum has dissolved, let the solution cool for about 30 minute. Then, submerge one of the dried, alum-coated eggshells in the growing solution, allowing it to rest on the bottom of the container with the inside of the shell facing up.
6. Set the container aside in a safe place overnight to allow the crystals to grow undisturbed. The longer the eggshells are left in the solution, the larger the crystals in the geode will be. Generally, twelve to fifteen hours should suffice.
7. The next day, carefully remove the geode from the growing solution while wearing gloves. If you want the crystals to grow larger, leave the eggshell in the solution for another day or two.
8. Place your geode on a drying rack or newspaper and allow it to dry completely.

STEM Explanation:

Crystal formation follows certain patterns and timelines depending on the type of minerals that make it up. Alums are a class of chemical compounds called salts, which dissolve in water. When water is very hot, it can be saturated with a certain amount of compound, but as the water cools, this amount decreases and becomes more than the water can support at that temperature, causing the water to become supersaturated. Supersaturated solutions are quite unstable, and crystallization occurs when molecules in the solution interact and begin to separate from the supersaturated solution. When they crystallize, they form a shape determined by kinetic energy. In this case, alum crystals are octahedral.

Career Connection:

Geologists study Earth, the materials of which it is made, the structure of those materials, and the processes acting upon them. An important part of geology is the study of how Earth's materials, structures, processes and organisms have changed over time. One of these processes is the formation of crystals and geodes!

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Resources:

<https://www.marthastewart.com/266591/blowing-out-an-egg>

<https://www.marthastewart.com/343344/crystal-egg-geodes>

[https://www.amazon.com/Set-of-Three-Egg-](https://www.amazon.com/Set-of-Three-Egg-Blowers/dp/B01A7911S8/ref=sr_1_cc_1?s=aps&ie=UTF8&qid=1510858499&sr=1-1-catcorr&keywords=blas+fix+egg+blower)

[Blowers/dp/B01A7911S8/ref=sr_1_cc_1?s=aps&ie=UTF8&qid=1510858499&sr=1-1-catcorr&keywords=blas+fix+egg+blower](https://www.amazon.com/Set-of-Three-Egg-Blowers/dp/B01A7911S8/ref=sr_1_cc_1?s=aps&ie=UTF8&qid=1510858499&sr=1-1-catcorr&keywords=blas+fix+egg+blower)

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