Growing Crystals- Egg Geodes

Science Film Festival Knowledge Through Entertainment

FILM

GUB Explorer Channel – Experiments with Eggs

KEY OBJECTIVES

1. **To understand what crystals are**
2. **To understand how crystals are formed**
3. **To understand the characteristics of crystals**

INTRODUCTION

Crystals are a special kind of solid material where the molecules fit together in a repeating pattern. This pattern causes the material to form all sorts of unique shapes.

The process of crystal forming is called **crystallization**. Crystals often form in nature when liquids cool and start to harden. Certain molecules in the liquid gather together as they attempt to become stable. They do this in a uniform and repeating pattern that forms the crystal. In nature, crystals can form when liquid rock, called magma, cools. If it cools slowly, then crystals may form. Many valuable crystals such as diamonds, rubies, and emeralds form this way. Another way crystals form is when water evaporates from a **mixture**. Salt crystals often form as salt water evaporates.

Crystals can have very flat surfaces called **facets**. They can form geometric shapes such as triangles, rectangles, and squares. The shapes are a direct result of the type of molecules and atoms that make up the crystal. Smaller crystals and larger crystals that were formed of the same molecules and in the same method should have similar shapes. There are seven basic crystal shapes, also called lattices. They are Cubic, Trigonal, Triclinic, Orthorhombic, Hexagonal, Tetragonal, and Monoclinic.

TOPICS
Chemistry

KEYWORDS
Crystals, crystallization, saturated, soluble, dissolve, seedling, mixture, sedimentation

LEVEL
Early Learners

RESOURCE TYPE
Project

INTENDED AUDIENCE SIZE
Small group

MODE OF DELIVERY
Online

TIME FOR ACTIVITY
48 hours

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GUIDING QUESTIONS

- Why do you need to heat the water?
- What is the importance of applying the glue on the eggshell and sprinkling the alum powder or borax on it?
- What would be the difference in using less borax or alum powder?

MATERIALS/PREPARATION

- Large Eggs
- Alum powder / Borax
- Mason jars or similar
- Water
- Stove top
- Pot
- Spoons
- Measuring cups and measuring spoons
- Food coloring
- Masking tape or painters tape
- Thumb tacks
- Large bowl
- Scissors
- White glue
- Paint brush

TASKS/PROCEDURE

1. **Remove the yolk and egg whites**
This step is tricky! The concept is to create two holes, one on either end of the egg, then blow in one end so the insides of the egg are pushed out of the other side. The problem is that you need to ensure your hole is big enough without being too big, and that you break the membrane inside. The best way to do this step is to place some masking tape or painters tape on each end, then carefully use a thumb tack to poke a hole into each end. Then, over a large bowl, place your mouth over one end and blow into the egg to push the yolk and egg whites out the opposite end.

2. **Split the egg and clean it**
Once you have removed the yolk and whites, take some tape and wrap a strip around the egg. Following the tape, carefully cut the shell into two halves. Once cut into two halves, remove the tape and any little bits of broken shell along the edges. Then carefully clean the shell by removing the membrane.

3. **Adding the seeding agent step one**
To help seed our crystals we need to add some alum powder to the shells. To do this simply paint the insides of the shells (and we recommend a little on the outside edge too so your crystals "spill" over the sides), with a generous amount of standard white glue. Ensure you cover the whole area.

4. **Seeding the egg step two**
Then sprinkle a tablespoon of alum powder or borax over all the glue. Shaking it around to ensure you have coated the entire thing. Let sit overnight to dry completely.

5. **Making the saturated solution**
The next step is to create your supersaturated solution so your crystals will form. To do this bring 2 cups of water just to boiling. Remove from heat, but before it can cool, add 3/4 cup of alum powder or borax and stir until it dissolves.

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6 **Coloring the solution**
Divide the solution evenly into two mason jars. Add a generous amount of food coloring, about 20 drops, to each mason jar. Stir. Let the solution cool for about 30 minutes.

7 **Add the egg**
Carefully place one egg in each jar. Use a spoon to gently push it down, so it falls to the bottom of the jar. Leave it to sit for at least 24 hours.

8 **Reveal your egg geode**
Once it is finished, use a spoon to gently lift the egg geode from the solution. Let it dry.

FOSTERING DISCUSSIONS

The process we are witnessing here is sedimentation followed by crystallization. Sedimentation occurs because we are creating a supersaturated solution with the alum powder. A supersaturated solution is simply a solution that has more suspended particles than what would normally occur when dissolving particles into a liquid. To create a supersaturated solution, we heat it. Over time the particles fall from the solution to the bottom of the jar in a process called sedimentation where they then start forming the crystal structures. Seeding the shells, by coating them with the alum powder, gives the crystals a place to attach themselves and start growing.

SAFETY INSTRUCTIONS

Ask the children to be careful as they make holes on the eggs to avoid poking themselves.
Have an adult help the children make the supersaturated solution.

POSSIBLE EXTENSIONS

Why not try an experiment to compare the difference between seeded shells and unseeded shells. What happens?

AUTHORS AND SOURCES

Submitted by Discovery Centre Kenya

- www.steampoweredfamily.com/activities/growing-crystals-egg-geode-science-experiment/
- www.ducksters.com/science/crystals.php