

## Science: Gorgeous Geodes!

Hello everyone. This is Bill from the Okanagan Regional Library System. Welcome to the fun and inventive world of making STEAM projects in your own home. Each month, I will share a fun and interesting project that you can make using materials commonly found in your own home.

Even though we can't be together right now, we can still learn how to make exciting projects each month!

This month's project: How to Make a Gorgeous Geode.

### Gorgeous Geodes



Sometimes geologists – scientists who study the solid parts of our planet – are rewarded with beautiful surprises. When they break open rocks, they might find hollow spaces inside, packed with stunning crystals. These rock formations are called geodes, and while real ones take thousands of years to form, you can make yours in just a couple of days.

Instead of breaking open rocks in the hope of finding a geode, you will be using an empty eggshell, some food colouring, and a chemical compound called Alum to make yours. The alum forms crystals on the surface of the eggshell, and the food colouring will make them bright and colourful.

**Materials Needed:**

- 2/3 cup warm water
- Alum
- Food Colouring
- Glue
- Plastic Cup
- Glass Bowl
- Paint Brush
- Spoon
- Egg
- Optional: Gloves



**Time:** 1 hour plus 24 hours to grow.

**Steps:**

1. Before you start, wash your hands. Gently crack the egg against the edge of the bowl and pick away around the crack, to create a hole.



2. Empty the contents of the egg into the bowl. Break a few bits of shell inward and you should be able to begin to remove the delicate skin, or membrane, the lines the inside of the shell.
3. Wash the shell under running water to remove as much of the membrane as possible. Then, wash your hands again.
4. Pour a bit of glue into the clean, empty eggshell.



5. Use the paint brush to spread the glue evenly around the inside of the eggshell.



6. Use the spoon to sprinkle some alum into the eggshell. Pour out any alum that does not stick. You may want to wear gloves for this part, if not, be sure to wash your hands afterwards.



7. Gradually pour the remaining alum into the warm water and stir with the spoon. Keep adding alum until no more will dissolve, to make sure the solution is really concentrated.



8. Add some food colouring – enough to give the alum solution a deep colour. Stir the mixture again.



9. Pour the alum solution into the plastic cup. The solution should be deep enough for you to submerge the eggshell completely. Submerge the eggshell in the alum solution. Gently push it down with the spoon to fill the eggshell with solution, being careful not to break it.



10. Leave the eggshell in the solution for about 24 hours. It will work best somewhere warm and dry. Afterward, carefully lift it out of the cup.

11. Gently place the egg onto a paper towel.



12. Take a close look at your egg geode. The alum and the food colouring should have formed lots of small, shiny crystals.



## The Science behind your Eggshell Geode

When you dissolve the alum in the water, the alum breaks down into tiny parts called ions that mix with the water. The food colouring is already dissolved in the water, and that also exists as ions. Every so often, the different ions will meet and may stick together, forming solid crystals. They connect in a regular pattern, which is what gives the crystals their distinctive shape.

## Real World Science – Geodes



Geodes form inside holes in rocks. Often the holes are caused by big bubbles of air that form inside the molten lava that pours from a volcano. These bubbles become trapped as the hot lava cools and solidifies into rock. As water seeps through the ground, minerals dissolve in it, and those minerals crystallize inside the holes, creating these beautiful geodes.