



Epsom Salt Crystal Cave

Background

Caves are amazing places! Caves are underground caverns or passageways created by weathering and erosion. Specific minerals are commonly found in caves because of the ability to be dissolved into rainwater. This mineral-saturated water will leak into the cracks and openings that lead to the caves.

As the water travels down, pulled by gravity, it will run in patterns against walls, the ceiling, and even dripping down to the floor. Each drop will leave behind a little bit of mineral (think of your sink, shower, or drain if you have hard mineral-rich water). Over time, if enough mineral is deposited, amazing underground structures will form!

Here is a great picture of minerals being deposited by water drop from the Hallour cave in Austria. Photo taken by Herzi Pinki: <https://bit.ly/2UELu3e>

Cave Structures

<https://bit.ly/2UKJne0>



This is a beautiful picture of some of the common cave structures you can see! This is Carlsbad Caverns in New Mexico (photo by Eric Guinther). Let's break down these cave structures to take a closer look!

Stalactites

The easiest way to remember this overhead formation is by saying "stala**C**tites hole **TITE** to the **Ceiling**". These form when water drips from cracks in the ceiling and the mineral forms a pointed cone. These are similar in how they form and look to icicles, though made of hard minerals like calcite or aragonite.

<https://bit.ly/2UoIYip>

Photo of stalactites in Avshalom Cave in Israel; photo taken by Ricardo Tulio Gandelman.

Stalagmites

The easiest way to remember this ground-up formation is by saying “stalagmites grow **MITEY** (mighty) from the **G**round”. These form when the water dripping from the ceiling hits the ground and the minerals are deposited. They look like upside-down icicles.

<https://bit.ly/39BiuyM>

Photo of stalagmites at the entrance of aven d’Orgnac in France; photo taken by Caleda.

Cave Bacon

This structure forms when water runs down a tilted ceiling or wall rather than dripping straight down. Because minerals are deposited along an edge, it creates ribbons rather than a stalactite! Ribbons, draperies, or curtains are technically the proper terms, but cave bacon is fun to say!

<https://bit.ly/3dPxJXY>

Photo of Travertine draperies (aka cave bacon; photo taken by DanielCD.

Prep: The nice thing about this crystal growing activity is that you don’t need to use boiling water! Water that is microwaved will work!

- a) We will use a 1:1 solution of Epsom salt to water.
- b) Do not boil the water - 45 seconds per cup in the microwave works to get it hot but not boiling. If it’s too hot, the crystals have a higher chance of failing.
- c) You can put the Epsom salt into the container ahead of time if you’re doing this for a lot of kiddos!

What You’ll Need:

Epsom salt (1:1 ratio - so make sure you have enough)

Measuring Cup

Liquid watercolors

Stir Sticks (popsicle sticks work quite well)

Small glass jars (mason jars, or even a sturdy tall glass)

Coffee/Tea Cup (for the hot water)

Directions:

Step 1: Measure

You will be using a ratio of 1:1 water to Epsom Salt for this project. We are using 1 cup, but you can use more or less depending on the size of your container. Add the Epsom salt to your jar/glass container.

Step 2: Add Color

Add a dash of watercolor paint to the water (optional). A little goes a LONG way - one or two drops will do it.

Step 3: Heat the Water

Heat the water in the microwave to make it hot but not boiling (around 1 minute for 1-2 cups of water will do). Alternatively use very hot tap water and skip the microwave!

Step 4: Combine

Pour the water into the jar with the salt. Do this quickly so that the water is still warm enough. Stir the salt and water for 2 minutes (YES 2 MINUTES - set a timer on your cell) to dissolve the salt. Don’t worry if some of the salt remains undissolved at the bottom of the jar.

Step 5: Cooling

Quick cool the jars in the freezer for 10 minutes (definitely set a timer) before moving them into the fridge. After about 2-3 hours you should be able to see crystals forming! This activity works quickly, and you should see thin, spindly crystals filling the container 4-6 hours after they are put into the fridge! You can let them sit overnight, but don't have to.

A fun experiment would be to take a dry-erase marker and put the container on a lower shelf of the Fridge (if possible). Your kiddo(s) can mark their growth every hour until they're satisfied with the size of the crystals!

Step 6: Results

Take the containers out of the fridge and pour the excess water out. Remove as much water as possible as room temperature water will re-dissolve the salt. Turn them over gently as they are very fragile, and sometimes it works to place it upside down in the sink for 5-10 minutes to get the water slowly drain out. Explore your crystals with magnifying glasses/hand lenses - even under a microscope!

Word of Caution

About 15-20% of jars fail to grow crystals at all, or just grow small ones on the bottom. It's not a bad idea to have each kiddo do two, just in case!



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