



BORAX CRYSTALS: GROW YOUR OWN MINERALS

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Your Mission Today

Grow borax crystals and observe their formation and crystal shapes.

SCIENTIFIC BACKGROUND:

Minerals are the building blocks of rocks, which are the building blocks of the Earth. They are, quite literally, all around us! We use them to build our homes, cars, and toys. Our bodies even produce minerals, such as the apatite that forms your teeth.

In nature, minerals can form from molten rock below the surface of the Earth. Minerals can form as salts that precipitate out of water bodies, such as lakes. Some minerals even form from hot vapors!

Today you can put on your Mineralogist hat and grow some minerals of your own! Observe how they form, how they are shaped, and experiment with what conditions affect their growth.



Materials:

Wide-mouth glass jar	Borax (available in the detergent aisle.)
Pipe Cleaner	Boiling Water
String	Food Coloring
Pencil	Tablespoon
Scissors	Adult Assistant



PIPE CLEANER READY FOR BORAX



BORAX CRYSTALS AFTER 24 HOURS

Borax crystals are blocky to prismatic



Crystal Growing



- Instructions -

1. Cut a pipe cleaner into 3 equal pieces.
2. Twist the 3 pipe cleaner pieces together into a six-pointed star shape.
3. Trim the pipe cleaner star so that it fits comfortably within the glass jar. Remember that it will be larger when covered in crystals, so leave plenty of space.
4. Tie one end of a piece of string around the center of the pipe cleaner star.
5. Place a pencil across the top of the glass jar. Dangle the pipe cleaner star into the jar. Cut the string with enough length so that when tied to the pencil the star hangs close to but not touching the bottom of the jar. Tie the cut end of the string to the center of the pencil.
6. With an adult assisting, pour boiling water carefully into the jar. Make sure the pipe cleaner star gets wet, then remove the star from the jar temporarily.
7. Add 3 tablespoons of borax per 1 cup of boiling water to the jar. Stir until the borax is dissolved. Add a few drops of food coloring if desired.

Note: Borax should be treated with the same respect as any other household chemical. Use caution, particularly to avoid breathing in the borax dust.

8. Lower the pipe cleaner star gently back into the jar, resting the pencil across the jar's mouth.
9. Place the jar in a safe place where it will not be bumped and wait overnight.

Did you know:

Borax is actually Sodium Tetraborate!

A very famous borax mine exists in Death Valley National Park, and can still be visited today!

Do you know what else?

Hot water can hold more dissolved borax than cold water. That's why we use boiling water to dissolve things.

Borax is commonly found in evaporites. Those are old drying up lake beds. Neat.

Really? Wow!

People use and need so many types of crystals that we have learned to make new ones in the laboratory!

Even diamonds, which are also minerals, can be made by people!

Let's Do Some Scientific Pondering!

QUESTIONS TO CONSIDER

1. What shape are your borax crystals?
2. Do the crystals grow separately, or do they often grow together?
3. What color are your crystals? Are they shiny? Do the surfaces look flat or a little curved? These details are how mineralogists describe minerals. Try drawing your crystals and describing them to someone else!
4. Why did we use hot water to dissolve the borax? Why did it precipitate out, or form crystals, as it cooled down? Did it help that the water was evaporating?
5. What would happen if you put your borax crystals back into some hot water?

ADDITIONAL ACTIVITIES

1. What other shapes can you grow crystals on? How about other colors in the solution? Thinking artistically helps scientists to be more creative!
2. What conditions affect how crystals grow? Try putting your crystals in different environments and see what happens. How do they do in the refrigerator? On a sunny windowsill? In the garage? Try it!
3. Try documenting the growth of your crystals! Photos and videos are a great start! If you are really into movies, try learning about timelapse photography!
4. Are all crystals shaped the same? Do all crystals grow the same way? Many household salts can be dissolved and then grown into crystals. Try table salt, epsom salts, and alum for a start!
5. Do crystals grow on any surface? Try growing table salt crystals on a few household objects such as paperclips, nails, marbles, and strings. What happens?

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