

BORAX CRYSTALS

Safety Warning: Keep all chemicals used in this activity away from younger children. Avoid unnecessary contact, don't rub it in your eyes, and do not ingest. Adult supervision is required for this project.



During this project, you will help your kids dissolve Borax powder, also known as sodium borate, into hot water. You will continue to add Borax to the hot water, one tablespoon at a time until the solution has become fully saturated. You will know your solution is fully saturated when the hot water starts to become cloudy and Borax powder starts to settle on the bottom of the pan.

As you cool your saturated solution, crystals will appear on your pipe cleaner crystal base. This occurs because hot water can hold more Borax than cold water, causing crystals to form as the Borax 'falls' out of the solution. The hot water can hold more than the cold because the higher the temperature of the water, the more space between molecules, allowing more room for the powder.

Note: If you keep your container of Borax solution warm so it cools slowly, larger crystals should form.

Step 1 - Supplies:



Note: You will want to make sure your solution container is large enough to hold your kid's crystal base.

Step 2 - Procedure:

You and your kids have your supplies ready to go, now all you have left to do is follow the steps below and have fun!



Image 2.1



Image 2.2



Image 2.3

2.1 The first step is for your kids to create the pipe cleaner shape they'd like to use as their crystal base. Your younger kids may need help with this step since 3D shapes need to be tightly formed for best crystal formation. This is the one step where your kids can be creative. The only limit is their imagination, and the size of the container you will be hanging the crystal base in (see **Image 2.1**).

Note: We created our 3D heart shape with 5 red pipe cleaners, and ended up with a nice, dense set of geode type crystals. We created three pipe cleaner heart outlines, each one a little smaller than the last, then wove them together in a stack going from largest to smallest. We finished our heart by weaving the rest of the pipe cleaners around each other for the bottom of our heart, connecting the bottom to the sides as we went.

2.2 Once your kids have finished their crystal base, help them tie their crystal base to a popsicle stick or something similar. Be sure to tie the thread to the smallest end of your kid's crystal base so that the largest part of the base is at the bottom. As we discussed near the bottom of our Investigations Tab, crystals don't seem to grow on the underside of 3D bases as well (see **Image 2.2**).

Note: Crystals will most likely grow on the thread as well as the pipe cleaners. If this is something you'd like to prevent, use fishing line or something similar instead. The crystals are less apt to form on the smoother material. If your kids would like to hang their completed crystals, you could let them pick out some ribbon. It will be sturdier than thread and look more elegant.

2.3 Hang your crystal base in your container, wrapping any extra thread around your popsicle stick until you like the height of your base. Near the bottom half of the container, without touching the bottom or sides of the container, is a good location. Once you're happy with the location of the crystal base, tape the thread on the popsicle stick (see **Image 2.3**).



Image 2.4



Image 2.5



Image 2.6

2.4 Measure the amount of water your solution container can hold, then round this amount up to the nearest cup. This is the amount of water you will want to add to your pan (see **Image 2.4**).

2.5 Bring your pan of water to a boil, then remove from heat (see **Image 2.5**).

2.6 Add Borax to the hot water, one tablespoon at a time, stirring continuously until the water is fully saturated. Your water will be fully saturated with Borax when it starts to look cloudy and you can see the powder start to settle on the bottom of the pan (see **Image 2.6**).

Note: We used 6-7 tablespoons of Borax per cup of water for our geode crystals before our water started to look cloudy.



Image 2.7



Image 2.8



Image 2.9

2.7 If your kids have decided to color their crystals, add the food coloring to your saturated solution now, then bring the solution to a boil one more time. This will allow the last of the Borax to dissolve since the hotter the water the more Borax it can hold. Plus, you want your solution as hot as possible before pouring it in your container (see **Image 2.7**).

2.8 Carefully fill your container with the saturated solution, then gently place your pipe cleaner crystal base in the solution until the popsicle stick rests on the top of your container. Make sure that your pipe cleaner base isn't touching the bottom or sides of your container or the pipe cleaners will harden to the container as the crystals grow (see **Image 2.8**).

2.9 For larger crystals, place your container filled with the saturated solution & crystal base in a pan of hot water so it cools down slowly (see **Image 2.9**).



Image 2.10



Image 2.11



Image 2.12

2.10 Once the water in the pan from **step 2.9** has cooled, you can carefully remove the container and let it sit overnight for optimum crystal growth. You may want to leave it in an area where your kids can check how they're crystals are growing without moving the container (**Image 2.10**).

2.11 The next morning, carefully remove your kid's crystals from the container and set them on a rack or paper towel to dry (see **Image 2.11**).

Note: You can trim the thread and any crystals that grew on it at this time.

2.12 Once your kid's crystals are dry, you may want to seal them, so the food coloring doesn't fade. We used a spray can of clear finish on our Valentine heart geode, but you can also use nail polish or another clear sealant you have around your house (see **Image 2.12**).