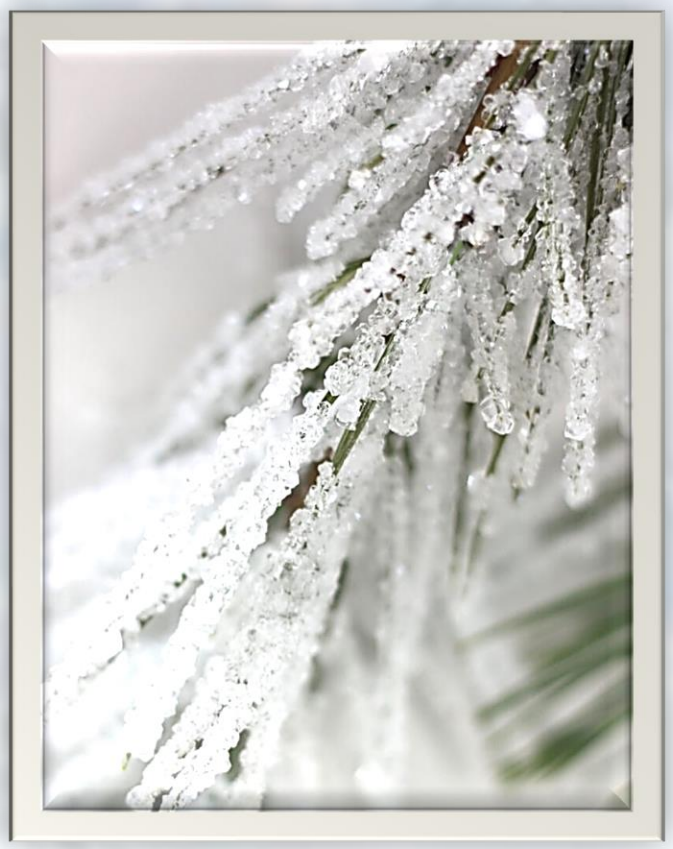
CRYSTALIZED EVERGREENS



Evergreen trees are all around us, and most noticeable in the cold, bare months of winter, but seldom are we lucky enough to see their branches covered in snow. By making "Crystalized Evergreens," you can create your own wintery forest right in the warm comfort of your home! Crystalized Evergreens are not only beautiful – they are also a fun science experiment!

MATERIALS

Evergreen Branches
Borax Powder
Water
Bowl
Spoon
Measuring Cup
Mason Jars or Tall Glasses

**Special thanks to Little Bins for Little Hands for the use of their photos.*

METHOD

1) Go on a nature walk and search for different types of evergreen pine trees. As you walk, notice all the different types of evergreen trees you find. What's different about them? What's similar? Do they have pinecones? Do the pinecones look the same on each tree? Do the pine needles arrange themselves differently on each tree? Do they feel different? Do they smell different? Collect sprigs/branches from them.
2) At home, spread your pine clippings out on a table. You can create a crystalized evergreen branch with each clipping you have, and examine how the crystals form and grow uniquely on each, depending on the type of tree they come from.
3) Boil a pot of water. While it's heating, add borax powder to a separate bowl. Use three tablespoons of borax powder for every one cup of boiling water. Increase the solution quantity depending on how many clippings you wish to crystalize/cups of solution you want to have.
4) Once the water is boiled, add the appropriate number of cups of boiling water to the bowl with borax powder in it, then stir thoroughly to mix the solution well. Note: The powder will not dissolve, and this is okay. We will explore why later!
5) Gently submerge your evergreen branch into the water, ensuring that part of it remains outside of the solution. You can let it touch the bottom, however the crystals will form more evenly if you suspend the branch in the solution – You can do this by clipping clothespins to the branch and resting them on the sides of the cup, or by tying the branch to a stick and resting the stick on the sides of the cup. Or: Try both ways, and compare how the crystals form on the different branches!
6) Let sit for 24 to 48 hours. When ready, slowly remove the branch from the glass to reveal your crystalized evergreens! Consider using a magnifying glass to examine the crystals more closely, or using your frosted branches as decorations!

THE SCIENCE BEHIND IT

Just like salt, sugar, and snowflakes, borax is an example of a crystal – "A solid with flat sides and a symmetrical shape because its molecules are arranged in a unique, repeating pattern." Based on its unique shape, every crystal has a repeating pattern. Snow crystals form a six-sided structure, while salt crystals are cube-shaped. Borax crystals have a square shape.

When we combine water and borax, we get a mixture, not a solution. A solution contains substances that are chemically missed to form something new, that can't be separated again – Like hot chocolate! A mixture, on the other hand, combines substances that can be mixed around together, but do not fuse chemically to form something new. In the case of crystalized evergreens, the borax powder does not dissolve in the water. Instead, you create what's called a "suspension mixture," meaning the particles of the powder are suspended in the water due to the heat. Hot water holds more borax crystals than cold water does, because heated water molecules move farther apart. As the water cools, the molecules move closer together again, causing the borax particles to settle onto the item placed in the mixture, upon which crystals begin to form and build on one another!

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