



## December 2012 – White Christmas Science

Are you dreaming of a white Christmas? With crystal-growing projects, you don't need snow or even freezing temperatures to enjoy a festive white Christmas this year! Use common household items to grow two different types of crystals for a sparkly snowflake ornament and frosted window panes.

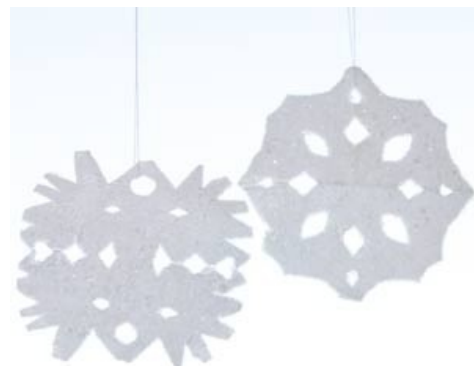
### Christmas Crystals

You've probably seen lots of crystals—even if you don't know it! Diamonds are crystals, and so are snowflakes. Even salt and sugar are crystals! To make these crystal projects, we'll first make super-saturated solutions. A *solution* is a liquid (called a solvent) with a solid (called a solute) mixed into it. Ours is super-saturated because no more of the solid (solute) can be mixed in; it's reached *saturation*. Crystals form as a result.

### Paper & Crystal Snowflake Ornament

What You Need:

- [filter paper](#) (or coffee filters)
- [sodium tetraborate](#) (Borax)
- water
- [600 ml beaker](#) (or other glass container)
- [stirring rod](#) (or spoon)
- scissors
- [petri dishes](#) (or plate)
- fishing line (or string)



What You Do:

1. Have an adult help you use the microwave to heat about 200 ml of water until boiling. Use caution when removing the glass from the microwave because it will be hot!
2. Mix in teaspoons of Borax until no more will dissolve. Allow the solution to cool.
3. If you're using a petri dish, use it as a template to cut your filter paper (or coffee filter) down to size so it will fit inside. Then fold the paper in half 2-3 times and snip the edges thinking about where the cuts will appear when you unfold it. You may want to practice on scratch paper first and figure out where to cut for the best snowflake design.
4. Unfold your snowflake and place it in the petri dish (or on the plate) and carefully pour the supersaturated solution over the snowflake, making sure it's completely immersed.
5. Let the snowflake sit in the solution for an hour or longer until it's covered in crystals. Pour off the solution and use a butter knife to carefully remove the snowflake. Place it on paper towels to dry. You may need to use a toothpick to knock crystals out of the snowflake's holes.

6. Once it's dry, feed fishing line or string through the snowflake and tie off a loop to hang your ornament on your tree. Or if it's a gift, wrap it up for Christmas!
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## Fun Facts

- Crystal colors depend on the minerals that created them and the how their atoms absorb light.
- Snowflakes start as ice crystals the size of a speck of dust that join other crystals to form snowflakes. The size of the snowflake depends on how many crystals hook together.
- Guinness World Records lists the largest snowflakes as having fallen during a storm in January 1887 at Fort Keogh, Montana.

## Silly Science

- What does December have that no other month has?
  - The letter "D!"
- Why is Rudolph always wet?
  - Because he's a rain-deer!

*Knock knock.*

*Who's there?*

*Hannah.*

*Hannah who?*

*Hanna partridge in a pear tree!*

## Way Cool Websites

- Make various [paper snowflakes](#) with these folding and cutting directions!
  - Check out this [snowflake chart](#) showing assorted snowflake crystals.
  - Make realistic "snow" at home with [Instant Snow Powder](#)!
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## Frosted Window Panes

What You Need:

- [magnesium sulfate](#) (Epsom salt), 75 grams (1/3 cup)
- liquid dishwashing soap, 1-2 drops
- water, 125 ml (1/2) cup
- lens cleaning cloth (or similar high-density cloth)
- [600 ml beaker](#) (or other glass container)
- [stirring rod](#) (or spoon)



## What You Do:

1. Make a supersaturated solution by stirring the Epsom salt (solute) into warm tap water (solvent) inside the beaker. If the salt doesn't dissolve completely, have an adult help you microwave it for about 30 seconds. Carefully remove it, and stir it again.
2. Add the dishwashing soap and stir again.
3. Use the lens cloth to "wash" the solution onto a glass window or mirror. Dab away the excess to avoid drips.
4. Let it dry and enjoy your homemade "frost!"

*Tips:* Try dipping a glass votive holder in the solution, then inverting it to dry. For windows, wetter is better and creates a more natural-looking frost. But drips give it away, so be careful. To remove the frost, simply wipe the surface down with water. If you have a magnifying glass, examine your frost crystals up close.

## Science Words

**Saturation** – when no more of something can be absorbed, combined with or added.

**Solute** – any solid substance dissolved in a liquid solvent to form a solution.

**Solution** – when a solid dissolves in a liquid and they're evenly mixed together. Salt water is a solution of salt and water. A solution can also be liquids mixed together.

**Solvent** – a liquid capable of dissolving a solid substance (called a solute) and creating a liquid solution.