



# GROW A SNOWFLAKE

## Grade Level

4-6

## Length of Lesson

50 minutes, split into two class periods

## Objective

By the end of this lesson, students will have a better understanding of chemical reactions and will be able to describe what variables are.

## Materials Needed

- Borax powder (6 Tbsp per student)
- Pipe cleaners
- String or ribbon
- Pencil
- Wide mouth jar
- Boiling water (2 cups per student)
- Food coloring (optional)

## Standards

### NGSS

5-PS1; MS-PS1

## Lesson Summary

This lesson is a fun, hands-on activity designed to help students understand chemical reactions all while getting a fun decoration or ornament out of it!

## Suggested Sequence of Events:

1. Set Up: To shorten the activity time, or for younger students, cut the pipe cleaners into different size pieces for students to create their snowflakes. You can also measure and cut the string for students to tie to their snowflakes and pencils (the length of the string will depend on the depth of your jar). Bring your water to a boil while students are creating their snowflakes.
2. Read "[Curious About Snow](#)" by Gina Shaw to snag student interest and learn more about snowflakes.
3. Read through the AITC Water Ag Mag to learn more about water and the states of matter. Interactive online versions can be found on our website.
4. Complete the activity following the procedures:
  - Have students create snowflakes with their pipe cleaners by twisting different size pieces together to create fun shapes. Make sure the snowflake designs fit in and out of the mouth of the jar easily.
  - Have students label their jars with their names for easy identification.
  - Using the string or ribbon, tie one end to the snowflake and the other to the pencil so that the snowflake is hanging from the pencil.
  - Measure out 6 tablespoons of borax powder and carefully pour into the jar.
  - Slowly and carefully pour the boiling water into the jar and mix the borax until it's dissolved. Optional: add a few drops of food coloring.
  - Place the pipe cleaner snowflake into the borax solution so that the pencil is resting on the mouth of the jar. The snowflake should be completely submerged into the borax solution.
  - Let the snowflake sit in borax solution overnight and check out the crystals the next day!
4. Whole class discussion and reflection of activity.

# TEACHER RESOURCES

## Background Information:

When water begins to boil, the molecules move faster and further apart, allowing the borax to dissolve easily, filling in the spaces between the water molecules. As the water starts cooling, the molecules will move closer together creating less space for the solution to hold the dissolved borax. The borax separates from the water and begins forming crystals, building first on the pipe cleaner and then on one another.

## Extension Ideas:

- Use different color pipe cleaners or use different colors of food coloring to make the snowflakes more colorful! Blues and whites work best for a winter look.
- Read "[Snowflake Bentley](#)" by Jacqueline Briggs Martin to learn about the first man to photograph snowflakes and identify that no single snowflake is identical! Have students share their snowflakes with their classmates and explain why the crystals 'grew'.
- Turn this into a scientific inquiry with older students and have them test different variables. Will the amount of borax or temperature of the water change the amount of crystal growth?
- Have students make snowflakes out of paper and hang them around your classroom.
  - Try to grow crystals on these with [this](#) salt experiment and compare and contrast both experiments. Available at <https://littlebinsforlittlehands.com/growing-salt-crystal-snowflakes-science/>
- Watch this [video](#) from PBS to learn about the formation of snowflakes. Available at [https://www.youtube.com/watch?v=fUot7XsX8uA&feature=emb\\_logo](https://www.youtube.com/watch?v=fUot7XsX8uA&feature=emb_logo)
  - Have students write a paragraph explaining why all snowflakes have a unique shape.
- Have students write poems about winter and snowflakes.
- Have students create a comic strip from a water droplet's point of view.
- Learn more about the water cycle and the different states of matter.
- Research the geographic locations where it snows. What type of climate and weather causes snow to fall?
- Go to [agintheclassroom.org](http://agintheclassroom.org) to contact your County Literacy Coordinator for free classroom sets of our Ag Mags!