

## Cloverbud Investigators: Career Detectives

January



### \*Make It Snow\*



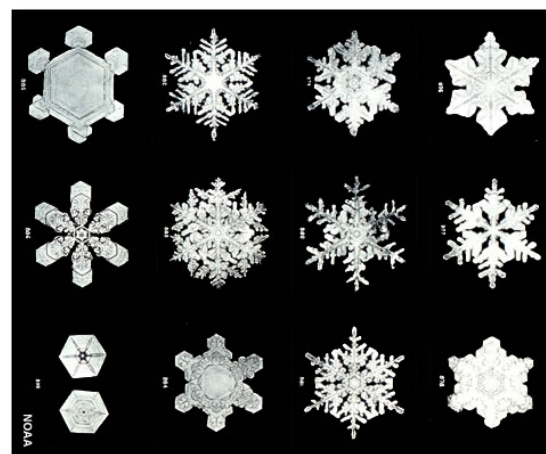
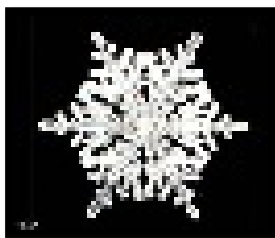
#### Background:

Snow, all children love to play in the snow! The only down side to snow is the freezing cold temperature and how soaking wet we get after playing in it. So why is snow so brutally cold? The temperature and the weather conditions need to be just right for it to snow. Snow occurs when the temperature in the clouds is so cold that water vapors in the air freeze. The freezing cause the water vapor to become a tiny ice crystal, which makes snow feel cold to the touch.

A snow storm is made up of millions of individual snowflakes and it is said that no two snowflakes are alike. So what makes the individual snowflakes look so different from each other? To understand that, we need to look at how a snowflake forms. Snowflakes begin as a tiny dust or pollen particle that has come into contact with a water vapor high in Earth's atmosphere. The water vapor covers the particle, causing it to freeze into an ice crystal. Once this happens the ice crystal is heavier than the surrounding air and it begins falling toward the ground. As it falls, the crystal passes through more humid air, allowing more water vapor to attach to the crystal's surface. Due to the chemical makeup of the water molecules, the vapors arrange themselves in a hexagonal structure, which gives all snowflakes their six sided design.

But wait, didn't we say all snowflakes were different? What makes studying snowflakes fun is that while all snowflakes have six sides, the way their water vapors arrange themselves can lead to millions of beautiful geometric shapes! The final shape of a snowflake depends on the amount of water vapors it attracts, the air temperature, and the humidity of the atmosphere through which the original ice crystal falls. Since no two snowflakes fall through the exact same path at the same time, they develop differently.

Let's look at some snowflakes, some have long needle-like sides, some have wide shorter sides, some look rounded while others look more star shaped. One snowflake alone could contain thousands of water vapors, and one snow storm can contain countless snowflake designs.



*Pictures of snowflake shapes from GeoScience News and Information*

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In our investigation, we will explore alternatives to snow that we can make, which look and feel like snow. In this experiment, we will be using a popular snow substitute called Insta-Snow. It is a super-absorbent polymer powder (sodium polyacrylate) that when combined with water turns into a fluffy white fake snow like substance. Insta-Snow was discovered by scientist working with other polymers to improve the absorption ability in disposable diapers. While the sodium polyacrylate was too fluffy for use in diapers, it's perfect for fake snow! Since its invention, the Insta-snow has been used in the movies to create a snow “look” without all the cold and wet that goes along with real snow!

**Local Career Connections:** Careers to discuss that provide community service needs:

- \* Weather: Meteorology and Weather for news.
- \* Emergency Responders: Snow Plows and Snow Removal.
- \* Environmental: Scientists, Engineers, and Geologist.
- \* Recreational Sports: Skiing, Tubing, and Snow Boarding.
- \* Entertainment: Movies, Shows, and plays that use snow for scenes.



**January's Mystery:** Can we make it snow inside?

### ***Supplies:***

- \* Instant Snow Polymer
- \* Plastic cup
- \* Measuring cups
- \* Measuring spoon (teaspoon)
- \* Water
- \* Paper Towels

**Safety:** \* *Do Not Put In Your Mouth,  
Keep Away from Younger Children.*



### **Science Behind Make It Snow:**

The Insta-Snow product, is a superabsorbent polymer called “sodium polyacrylate.” It is similar to the polymers found in baby diapers. The difference is that the Insta-Snow polymer swells into a fluffy white substance, while the polymers found in diapers become more jelly like. The Insta-Snow uses a process of osmosis (water molecules pass through a barrier from one side to the other) to draw the water into the polymer at a quick rate of speed. When water comes in contact with the polymer, it moves from the outside of the polymer to the inside and causes it to swell. The polymer chains have an elastic quality, but they can stretch only so far, thus they will reach a saturation point. At the point of saturation the product will look less like fluffy snow and more like slushy ice. Note: This experiment works best if you experiment with the amounts of powder and water to determine the exact affect you want to achieve for your end product. Too much water can result in more of a “jelly” look than the fluffy flakey look.

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Add on: Make up a batch of snow ahead of time and put it in the freezer for 8 hours. This will give your fake snow the cold feel of real snow. You can also “melt” your fake snow by adding a little salt to the fluffy mixture and watch as the water is pulled out of the polymers. This can also be related to using salt to melt real ice!

**What to Do:**

**Step 1:** Measure out 1 teaspoon using the provided scoop that comes with the product (about 5 grams) of Insta-Snow powder into the empty mixing cup.

**Step 2:** Measure 8 ounces (1 cup or 250ml ) of room temperature water.

**Step 3:** Quickly pour all of the water into the cup with the Insta-Snow powder.

**Step 4:** Watch as the fluffy flakes of snow erupt.

**Step 5:** Play with the snow!

*Note: If you let the snow sit out, the water will begin to evaporate leaving the mixture feeling cool to the touch! The “snow” will also turn back into the dry powder if you leave it out long enough. You may also try “melting” your snow by adding table salt to the snow and watch as the salt pulls the water back out of the polymers!*

**Go Over Findings:**

Can you tell us about a career involving snow that we learned about today?

How are snowflakes formed?

Why are snowflakes cold?

Is it true that all snowflakes are unique in shape?

What is a polymer?

**Investigate, Create, & Take: Investigators can take with them:**

- ✓ Optional Opening: Cut out snowflakes from coffee filters. Have them hold them up and point out that everyone’s snowflake is different, just like nature. (See Cutting Sheet)
- ✓ Let them add glitter to their Insta-Snow to take home. It will dry out and water can be added again.



**Sources:**

Easy Science For Kids-How Snow is Made, <http://easyscienceforkids.com/how-is-snow-made/>

Merriam-Webster: Word Central, Student Dictionary, Polymer.

<http://www.wordcentral.com/cgi-bin/student?book=Student&va=polymer>

GeoScience News and Information Geology.com, <https://geology.com/articles/snowflakes>

**Additional Links:**

*HooplaKidz TV - How Does Snow Form?:* [https://www.youtube.com/watch?v=Y-8ua\\_ZlGrI](https://www.youtube.com/watch?v=Y-8ua_ZlGrI)

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Cutting Snowflakes Ideas or Patterns

