



# CAPTAIN CURIOUSITY'S GUIDE TO THE UNIVERSE

## Topic: Snow & Ice

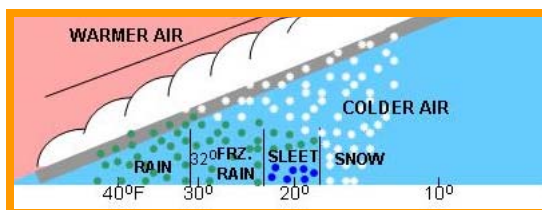
**EVER WONDER WHAT SNOW IS?** Water freezes at 32 degrees Fahrenheit (0 degrees Celsius). If a

cloud gets cold enough, water droplets freeze around specs of dust in the air and form chains of ice crystals. These chains then grow into lacy, six-pointed stars. By the way, if it seems like it's quieter outside after a fresh snowfall – it is. Soft, fluffy snow actually absorbs sound waves. But when snow crusts over, the opposite happens – it bounces back sound waves, making sounds louder and clearer. Snow also makes it look lighter outside because it reflects so much light.



**EVER WONDER IF SNOWFLAKES LOOK ALIKE?** Snowflakes usually have six points, and are always symmetrical (which means they look the same on both sides when divided down the middle). But while they may look alike from afar, up close snowflakes are almost always different. The size of a snowflake depends largely on how cold it is outside. If it is well below the freezing point (32 degrees Fahrenheit), “dry snow” occurs. This kind of snow is hard to clump together because it has very little liquid in it (it is mostly ice crystals). These snowflakes tend to be very small. The closer the air temperature is to the freezing point, the wetter the snow. Wet snow makes great snowballs!

**EVER WONDER WHAT IS ICE MADE OF?** Ice is water (a liquid) frozen into a solid. Ice is hard, cold and slippery. Freezing happens when the molecules in a liquid get cold and move closer together. Most liquids will eventually freeze into a solid.



**EVER WONDER WHAT THE DIFFERENCE IS BETWEEN ICE AND SNOW?** Snowflakes are small clusters of ice crystals that fall and lay on the ground like feathers, with air trapped between them. Ice is a frozen solid mound of ice crystals with little or no trapped air. Sometimes snowflakes melt before they reach the ground. This can cause freezing rain, sleet or hail.

Freezing rain is snow that hits a layer of warm air on the way down and becomes rain, then passes through a layer of cold air again. When the cooled raindrops strike frozen ground, they freeze too, causing ice. Sleet is raindrops or partially melted snow flakes that freeze into solid, clear, tiny ice pellets. Unlike freezing rain, sleet is a solid that bounces when it hits the ground. Sleet, like snow, is common in the winter. Hail is formed when ice pellets bounce around in the atmosphere, going in and out of warm and cold air, causing layers of ice to form. Sometimes so many layers form that the hail stone becomes the size of golf ball – or bigger! Hail is more common in the unstable air of spring thunderstorms than during the winter. Ice can also form on the ground when snow melts then refreezes.

**EVER WONDER WHY SALT MELTS ICE?** Salt makes water freeze at a lower temperature. So, at 32 degrees, water without salt is frozen, but water with salt is still a liquid.

# Snowy Day Science Projects

**MAKE A SNOWFLAKE CATCHER.** Find a lid in your kitchen. Cut out a piece of black craft foam, felt or construction paper to fit inside the lid. Put your catcher in your freezer for about half an hour until it is freezing cold. Go outside and catch a flake or two. Your pre-cooled catcher will keep the snowflakes intact long enough for you to study them!

**MAKE SALT WATER ICE ETCHINGS.** Find a lasagna pan or similar in your kitchen. Add about an inch of water. Put outside to freeze. Bring inside and experiment with drizzling salty water onto the top. (If you don't have a pipette, try poking a small hole in the corner of a plastic sandwich baggie and close the top. Water will drip out.) Add food coloring to the water to make your etchings even prettier.

**INVENT A NEW SLED.** Boots and tires are made not to slip on snow and ice, but sleds are just the opposite! Find things around your house to experiment with on a snowy surface. What slips? What sticks? Try garbage bags, shopping bags, cardboard boxes, plastic tablecloths, etc. Build the coolest sled on the block out of a cardboard box with a garbage bag bottom! (This is all about friction! Smooth surfaces slip better; bumpy or rough surfaces slip worse.)

**EXPERIMENT WITH BLUBBER.** Cold weather animals, like penguins, have a significant layer of blubber (fat) that helps keep them warm. Make a "blubber mitten" to demonstrate this principle: Find two plastic sandwich baggies (the zipping ones work best). Turn one of the zipping baggies inside out and place inside the other. Line up the "zippers" on top so that the entire thing zips up. Before zipping, put about 1/2 cup shortening on either side of the bags, in between the inside and outside bags. Now zip the tops to keep the shortening in (or tape them together). Smush the shortening around until it is evenly distributed. Now put your hand in the middle of the "mitten" and stick your hand in a pile of snow. How long does it take before your hand gets cold? This is how blubber works!

**MAKE PUFFY PAINT SNOWFLAKES.** Combine one part school glue with one part shaving cream. Add glitter or food coloring as desired. Stir vigorously to puff up. Cut out snowflakes (make sure they have 6 points like a real ice crystal) and dab them with the puffy paint. Hang your artwork on your window or Christmas tree.

**MAKE SNOWY FINGERPAINTS.** Now that you've got the shaving cream out, squirt some onto waxed paper and play with it like finger paint to make snowy scenes.

## Word Scramble

Can you unscramble these words?

WFEKLAONSS

\_\_\_\_\_ (water crystals that form in clouds during winter)

GEEFRINZ NTPOI

\_\_\_\_\_ (when water turns from a liquid to a solid)

DIIUQL

\_\_\_\_\_ (this is the form melted snow takes)

DLISO

\_\_\_\_\_ (this is the form frozen water takes)