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**EXPANDS**

When water freezes, the molecules line up in a crystal structure so that their positive and negative sides are perfectly matched. To make this lattice structure, they have to spread out. This is why ice expands when frozen.

The shape of the crystal that water molecules form is a hexagon, and this is why snowflakes are six sided.

## 1. Frost Wedging

- Materials:**
- Water
  - Oil
  - 2 identical containers
  - Plaster of Paris or gypsum
  - Balloons
  - Freezer
- Method:**
- Fill one balloon with water and one balloon with oil (optional).
  - Prepare containers for plaster, for example, by cutting a small cardboard container in half.
  - Place balloons in containers.
  - Mix plaster & water according to directions and pour it in the containers around the balloons.
  - Let dry and then freeze. Remove containers and observe.

**4. Ice Cream in a Can**

**Materials:**

- 1 can lite coconut milk
- 7 to 10 fresh pitted dates
- 1 to 2 Tbsp cocoa powder
- ½ c rock salt and ice
- 2 metal cans of different sizes
- Duct tape

**Method:**

- Mix ingredients for ice cream together and place the mixture in the small can.
- Seal the small can well and place it in the large can.
- Fill the space around the small can with ice and the salt.

**Method:**

- Seal a lid onto the large can and roll the can across the floor for 10 minutes.
- Carefully remove the small can and scrape down the ice cream forming on the sides. Drain the water from the large can.
- Refresh the ice and salt. Seal the cans again and roll them another 10 minutes.
- Scrape down sides and set the small can in the freezer for 20 minutes. (Optional)

**SCIENCE MOM'S**  
Guide to WATER **Part 4**

*Splash!*

**MOLECULES BEHAVE THE SAME WAY.**

Turn down the temperature, and you turn down the speed.

**solid**  
WE SPREAD OUT TO MAKE A CRYSTAL. (BUT STILL VIBRATING).  
WE'RE VERY CLOSE TOGETHER AND NOT MOVING MUCH AT ALL.

**liquid**  
WE'RE CLOSE TOGETHER AND TUMBLING AROUND.  
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**gas**  
WE'RE FAR APART AND MOVING FAST!  
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**Water (H<sub>2</sub>O\*)**  
**Most other stuff**

\*The elements silicon, bismuth, gallium, germanium, and antimony also expand when frozen.

**2. Magic Slushy**

**Materials:**

- Bottles of carbonated soda
- Freezer
- Cup and spoon

**Method:**

- Place the bottle of soda in the freezer for 3 hours. (YOU MAY WANT TO PLACE SEVERAL IN THE FREEZER AND TAKE THEM OUT AT 30 MINUTE INTERVALS ONCE THEY'VE BEEN IN THE FREEZER FOR AN HOUR. THE CORRECT TIME TO REACH THE "SUPER COOLED" STATE WILL VARY BY FREEZER.)
- Remove soda and be careful not to bump or jar it too hard. Open lid slowly and pour soda into an ice-cold cup. If it is super-cooled, it will freeze into a slushy as it is poured.

**3. Lift Ice with Salt**

**Materials:**

- Water
- Ice cubes
- Salt
- Matches, toothpicks, or yarn

**Method:**

- Get the yarn or wood wet and place it on top of the ice cube.
- Sprinkle with salt.
- Wait for about 15 seconds.
- Lift the ice!

Ice floats in liquid water, but the **OPPOSITE** happens for most other substances!

To see the "regular" way solids behave, place a frozen cube of oil into a cup of liquid oil. It will sink straight to the bottom.

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**WHAT IF ICE DIDN'T FLOAT?\***

IF ICE SANK, ALL THE OCEANS AND LAKES WOULD FREEZE FROM THE BOTTOM UP! THEN THAT FROZEN WATER WOULD REFLECT RADIATION FROM THE SUN, MAKING THE PLANET TOO COLD FOR LIQUID WATER.

WELCOME TO EARTH  
AN ICE PLANET

IF ICE SANK, WE WOULD LOSE THE REFLECTIVE FLOATING SEA ICE AT THE POLES! THEN THE PLANET WOULD HEAT UP SO MUCH THAT NEW ICE WOULDN'T HAVE A CHANCE TO FORM AT ALL.

WELCOME TO EARTH  
A STEAMING HOT PLANET

\*Scientists don't agree on what would happen.

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B	A	A	X
B	C	C	D
F	E	E	D
E	G	G	X