



## Sea Ice Experiment

### Introduction

What makes sea ice unique? Let's experiment and discover what makes it special. Gather the listed materials and then follow the given steps.

### Materials

- Water
- Table salt
- 2 containers
- Measuring cup
- Teaspoon
- Plates
- Food coloring

### Methods

1. When choosing containers, it is best to use two that have the same size and shape if possible, but if not, the shape will not affect your results. You should also make sure that the container has a wide neck, without any obstructions, that will prevent your ice from being removed. Label one of your containers "fresh water" and the other one "salt water".
2. Using a measuring cup, add two cups of water to each container. You need to leave room for the water to expand as it freezes, so reduce the amount of water, if necessary, for smaller containers.
3. Measure three teaspoons of table salt and add it to the water in the "salt water" container. (If your container has less than two cups of water, approximate about 1.5 teaspoons of salt per cup of water.) Stir the water to dissolve the salt and mix it throughout.
4. Put your containers in the freezer until the water is frozen; you may want to leave them overnight.
5. After you have two ice blocks, turn each ice block out onto a plate. Coat the top of each ice block with food coloring (approximately 12 drops) and then wait. What do you think might happen? Will the food coloring react differently to the fresh water and salt water ice?
6. You will begin to see the results upon adding the food coloring, but you may want to wait and see if it changes over time.

### My Experiment

Draw what happened during your experiment in the space below. Add labels to your drawing to make it more detailed.

## Results

You should see that the food coloring has run off the sides of your fresh water ice block, but it has seeped into your salt water ice block. This is because when salt water freezes, the ice is comprised of both ice crystals, made of fresh water, and brine channels, formed from the remaining concentrated salt solution. The brine channels create a network of tiny tubes throughout that ice that the food coloring traveled through.

## Discussion

Sea ice is dynamic, and in the Arctic, polar bears depend on it. The brine channels in the sea ice provide habitat for algae, which forms the base of the polar bear's food chain. The polar bears eat seals, and they rely on the sea ice for hunting. They are patient hunters waiting for seals to surface for breath at air holes in the ice.

We can help protect the sea ice for future generations of polar bears by accepting the thermostat challenge. If we all adjust our thermostat by two degrees, turning the air conditioning setting up two degrees in the summer and setting the heater two degrees cooler in the winter, we reduce the amount of energy we use.

This decreases the amount of fossil fuels that are burned to heat and cool our homes and reduces the amount of carbon dioxide that is added to our atmosphere. Regular carbon dioxide is needed for normal life processes, but when we burn fossil fuels, like coal, gas, and oil, for energy, we are releasing rampant amounts of carbon dioxide into the atmosphere. This buildup acts like a blanket that traps heat around the world, which is resulting in less sea ice.

By taking this challenge and working together, we are protecting the sea ice, the Arctic habitat, and polar bears.

## References

If you are interested in learning more about sea ice, you can visit Polar Bear International's website at <https://polarbearsinternational.org/polar-bears/habitat/> to read more detailed information about polar bear habitat along with a description of the four ice eco-regions.

## Next Gen and New York State Science Learning Standards

- Grades K-2
  - **K-PS1-1:** Plan and conduct an investigation to test the claim that different kinds of matter exist as either solid or liquid, depending on temperature.
  - **K-ESS3-1:** Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
  - **K-ESS3-3:** Communicate solutions that will reduce the impact of humans on living organisms and non-living things in the local environment.
  - **2-ESS2-3:** Obtain information to identify where water is found on Earth and that it can be solid or liquid.
  - **K-2-ETS1-1:** Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
  
- Grades 3-5
  - **3-LS4-4:** Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.
  - **3-ESS2-3:** Plan and conduct an investigation to determine the connection between weather and water processes in Earth systems.
  - **4-ESS3-1:** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
  - **5-PS1-4:** Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
  - **5-ESS3-1:** Obtain and combine information about ways individual communities use science ideas to protect Earth's resources and environment.