CURIOSITY AT HOME

OBSERVING OUR OCEANS

*The North and South poles are covered by ice. At the North Pole, **sea ice** made of saltwater floats on top of the Arctic Ocean like ice cubes in a glass of water. At the South Pole, giant **ice sheets** made of freshwater cover the continent of Antarctica. As the Earth warms due to **climate change**, some of this ice will melt. How will the differences in ice formation at the North and South poles affect sea level rise?*

MATERIALS

- Measuring cup
- Tablespoon
- Mixing bowl
- Mixing spoon
- Water
- Salt
- Ice cube tray
- Tape (for making labels)
- 2 identical transparent containers (4”–6” wide)
- Modeling clay or rocks (or another material to make an “island” that’s 1”–2” wide and 3”–4” tall)
- Ruler
- Science notebook or paper
- Something to write with

PROCEDURE

- Combine 4¼ cups of water with 2 Tbsp. of salt. Mix until the salt dissolves.
- Using tape and your writing tool, label one handle of the ice cube tray saltwater and the opposite handle freshwater.
  - Fill four cubes closest to the handle labeled saltwater with saltwater.
  - Fill four cubes closest to the handle labeled freshwater with tap water.
  - Wait for your ice cubes to freeze. This could take many hours depending on the temperature of your freezer, so come back to it later.
- Fill one container with 1 cup of saltwater. Use tape to label this container “sea ice.” This container will model the Arctic Ocean and North Pole.
- In your second container, place your “island” down in the center and slowly add about 1 cup of saltwater. Be sure to leave a little bit of your island poking up above the water. Use tape to label this container “ice sheet.” This container will model Antarctica and the surrounding ocean at the South Pole.

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- Add two saltwater ice cubes to the container labeled “sea ice”. Make sure they are floating and not touching the bottom of the container. Use tape to mark the water level on the side of the container.
- In the ice sheet container, stack two freshwater ice cubes on top of your “island.” Use tape to mark the water level on the side of the container
- Wait 1 hour. Return and mark the new water levels.
- Use a ruler to measure the change in water levels in cm.

EXPLORE MORE

- What challenges could rising sea levels cause for communities living near ocean coastlines? Record ideas in your science notebook.
- Engineers help design solutions to challenges. Discuss with someone possible solutions engineers could design to solve the challenges you listed above. Together, create a list with as many solution ideas as you can in 10 minutes.
- Select your favorite solution and sketch a design in your science notebook.

DID YOU KNOW?

Ice at the North and South Poles is melting due to climate change. When people burn fuels to create energy, it releases greenhouse gases into the atmosphere. Greenhouse gases are chemicals in the atmosphere like carbon dioxide and methane that create a blanket around the Earth, trapping heat from the sun. We need some greenhouse gases so that not all the sun’s heat escapes, but greenhouse gases have been increasing, which increases the temperature of the Earth’s surface. This causes changes like ice sheets melting and new weather patterns.

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K–2 GRADE EXPLORATION

- Why does ice melt?
- What happened to the water level in each container? Why do you think the water in one container rose but did not in the other container?
  - (You can explore this further by noting the existing water level mark on the container. Add more ice to the container and mark the new level of the water. Let this ice melt and note the water level.)
- If the ice sheets in Greenland and Antarctica melt, where do you think that water will go?
- What have you heard about climate change?
- Big problems like climate change need many people to work together to solve them. What are some things your community can do to help fight climate change?

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3–5 GRADE EXPLORATION

Explore the following questions and write your observations in your science notebook.

- Did you observe the same result in each container? Why or why not?
- What did you observe? Record your observations below

Container	Increase in water level (cm)	Observations
Sea Ice		
Ice Sheet		

- Why does melting sea ice affect the water level in this way?
- Why do melting ice sheets affect the water level in this way?
- Will melting sea ice, ice sheets, or both affect rising oceans? Why?
- In addition to Antarctica, where else do you find large amounts of ice on land?
- What have you heard about climate change?
- Big problems like climate change need many people working together to solve them. What are some things your community can do to help fight climate change?

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6–8 GRADE EXPLORATION

- How will this model help explain what might happen when global temperatures rise?
- What did you observe? Measure the increase in water level in each container and record your observations below.

Container	Increase in water level (cm)	Observations
Sea Ice		
Ice Sheet		

- Why does melting sea ice affect the water level in this way?
- Why do melting ice sheets affect the water level in this way?
- Will melting sea ice, ice sheets, or both affect rising oceans? Why?
- In addition to Antarctica, where else do you find large amounts of ice on land?What have you heard about climate change?
- Big problems like climate change require many people working together to solve them. What are some things your community can do to help fight climate change?