

Featured Researcher:

Divya Allu Peddinti

About Divya

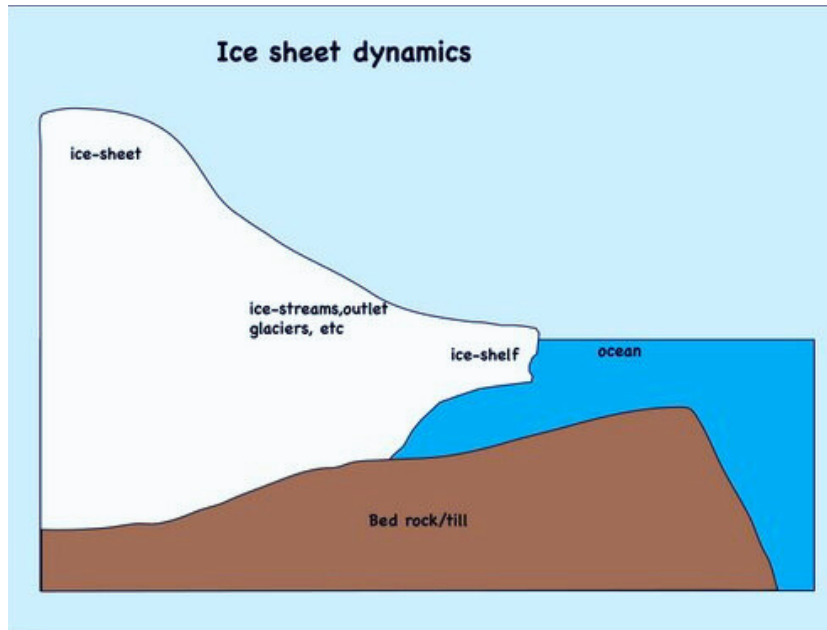
Meet Divya, a polar researcher

Divya is a polar researcher with training in physics and mechanical engineering. She works at Dartmouth University and studies the oceans interactions with Antarctic ice. The majority of her research is on glaciers in the West Antarctic region. In the past, Divya has studied the interaction of ice and the ocean on one of Jupiter's moon's. Using computers and experiments, Divya can assess the impact of water temperature and air temperature on ice in the Antarctic.



What Affects Ice?

Ice shelves are floating sheets of ice that are attached to a landmass. There are many of these ice shelves located in Antarctica. Divya has been studying a mass of ice called the Thwaites Glacier in Western Antarctica. Over thousands of years the glacier has grown and now hangs over the ocean. Divya is interested in modeling what affects ice over time. We can create similar models in our own homes to see what can affect glaciers the most over time.



For this activity, we will be looking at how the sea floor, ocean water, and ice sheet affect how the ice melts. We will use two paint roller trays with water to represent the ocean. The pieces of ice frozen on plates will represent the ice sheets. For this activity, we will be performing two experiments; 1) melt the ice as slowly as possible, and 2) melt the ice as quickly as possible.

Supplies:

1 or 2 paint roller trays	Several cups of cool water
1 or 2 plate of frozen “ice sheets”	1 or 2 cups of hot water
Food coloring	Kitchen or lab balance for measuring mass
Small rocks and pea gravel	Timer



Link to a video showing how you can set up your experiment.

(go.osu.edu/divyapuzzle)

Prepare beforehand:

- Add water to 1 or 2 dinner plates and place them in the freezer. The ice frozen should be about 1cm thick and will act as our ice sheet. For more lifelike models add a rock to the water before freezing.
- Prepare hot water to just before boiling and mix in food coloring once it has reached the desired temperature. Have an adult help you with this.

Experiment:

List three things you could change about the ocean or the ice sheet to affect how fast the ice melts.

1. _____
2. _____
3. _____

First Experiment - Slow Melt	Second Experiment - Fast Melt
Mass of ice before experiment:	Mass of ice before experiment:
Mass of ice after experiment:	Mass of ice after experiment:
Percentage left:	Percentage left:

Instructions:

1. Using your rock and pea gravel, construct the terrain of the ocean floor leading up to the slant of the paint tray and supporting the ice sheet so that it will not move.
2. After shaping your ocean floor, carefully remove the ice from plate and measure its mass on the balance or scale.
3. Place the ice sheet at the top of the paint trays most shallow part.
4. Pour water into the deepest part of the tray, until it touches the bottom of the ice sheet. Once the water has settled beneath the ice, add enough water to almost cause the ice to float.
5. Start your timer for 20 minutes when all of the water is added.
6. At the end of time, remove and measure the mass of the ice again. Determine the percentage left (current mass divided by starting mass, then multiply by 100).
7. REPEAT: If you would like to do both experiments, repeat the process again changing your setup.

Observations:

1. Which experiment had more of the ice sheet left?
2. What was different about your two experiments? What do you think causes the ice sheet to melt faster? How could you make each of these causes bigger?
3. Based on the dyed hot water, what did you notice about how the hot and cold water arranged themselves when they came in contact?

Divya's Polar Puzzle Activity

Getting Started:

1. Download the Activity
2. Print out the Puzzle Activity on an 11x17 sheet of paper, double sided.
3. Fold down the edges so that Divya's photos and the poem are on the front.

Explore (10 Minutes): Spend about 10 minutes looking at the Puzzle. Find 5 things that you look to be unfamiliar, exciting, or things that you may have in common with the researcher. Write your answer on a separate sheet of paper.

Explain (10 minutes): Answer the following question. You can write your answers on a piece of paper or say them loud. Make sure to describe which clues in the Puzzle helped you find your answers.

1. What does Divya do? Where does she work?
2. What was Divya's old password?
3. What are some of the differences between the two glacier profiles that Divya drew?
4. Which profile matches the glacier in 1992? What about 2017? What is your evidence?
5. What are two potential processes that could be warming the glacier?
6. In which year did she record the warmest and coldest temperatures for ice? What about the ocean and air?

Elaborate (10 minutes): When you are finished you can share your answers and reasoning with someone. Mention which clues helped you in the puzzle. A good clue is one that you can circle on the Puzzle - like a specific social media post or a feature on the cartoon.

Evaluate: Write a little or draw what you have learned or experienced during this activity. When you are done with that, think if you have any more questions about what Divya does or where she works.

Thanks for participating!