



Try This at Home Science: Freeze A Lake

Activity Overview:

Learn about how the surface of a lake freezes by creating a model of a lake using materials you may have at home!

Materials:

- A helpful adult
- Empty plastic bottle or container
- Scissors
- Tape (any type)
- Water
- Corn syrup
- Markers
- Construction paper
- Notebook



Create your lake:

1. Cut off the top 2-3 inches of the plastic bottle.
 - a. If desired, tape over the top edges of the plastic to save any fingers from getting cut or poked.
2. Add corn syrup to 3/4 of the bottle.
3. Tilt the bottle to the side, and slowly pour water on top of the corn syrup until the bottle is full.
 - a. Note: If the water and corn syrup mix, that's okay! Leave the container to sit for a few minutes, and the liquids should separate back into two layers.

Make and add fish:

4. Using the construction paper and markers, draw out a few shapes of fish.
5. Cut out the fish.
6. Use the tape to stick the fish to the outside of the bottle.
 - a. Place the fish where you think they live when the water gets really cold, and ice forms on top of the lake.
7. Put the model in the freezer.

Observe changes:

8. Check on your model every two hours until the top layer has completely frozen. Write some observations in your notebook.
 - a. Which parts of the “lake” are freezing first?
 - b. How is the corn syrup at the bottom of the lake changing?
 - c. How does this model compare to what you’ve learned about how a lake freezes over?
9. After your lake has “frozen over,” place your model in front of a window and observe how it changes. Note your observations in your notebook.
 - a. How long does it take for the ice to melt?
 - b. Once the ice melts, does the amount of water in the lake change?
 - c. Where do the fish move in the water once the ice melts and the water warms up?
Untape your fish from the side and move them into new positions.

How does a lake freeze over?

Freezing a lake doesn't happen overnight! The water-cooling process starts at the end of the summer - as the air temperature drops, the temperature of the water on top of the lake drops too. This colder, heavier water sinks to the bottom of the pond, and pushes the warmer water to the top. The lake continues to turn-over and become colder during the fall. In early winter, once the water drops below 39°F, water really starts to transform!



"Vintage Ice Fishing Michigan" by UpNorth Memories - Don Harrison

While the bottom of the lake maintains a constant chilly temperature around 39°F, the cold winter breeze continues to cool the surface of the lake. Unlike humans who like to curl up when it's cold out, the water molecules at the surface start to spread out as they get colder! As they expand, they become lighter, freeze into solid ice, and float on the surface of the water. Depending on how cold it gets and how deep the lake is, enough ice can form to allow people to walk, ride, and even fish on the surface!

Now try...

- Adding ice chunks, or “glaciers”, to the top of your frozen model lake. What happens to the amount of water in the lake once all the ice melts? Do you think this happens in nature?
- Adding more water than corn syrup. Does it take longer for the lake to freeze? Why?

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