DIGITAL ACTIVITY

Modeling Ocean Currents

florida MARITIME museum

heritage · culture · tradition

MATERIALS

- Large clear container (Aquarium tank or plastic bin)
- 2 paper or plastic cups that you can poke a hole in
- 2 thumb tacks
- Marker
- Food coloring (2 colors)
- Salt
- Tablespoon
- Water – warm and cold
- Ice
- Adult supervision

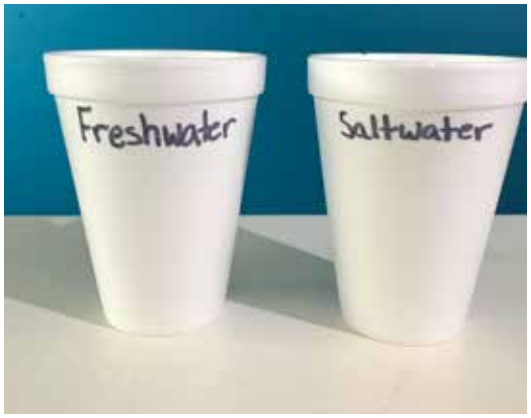
PROCEDURE

1. Label one of the cups "saltwater" and the other "freshwater."

2. Fill the "saltwater" cup at least 3/4 full with cold water (add some ice if available to keep water cold). Add about 1 tablespoon of salt and stir until dissolved.

3. Add a few drops of the first food coloring to the "saltwater" cup and stir.

4. Fill the "freshwater" cup at least 3/4 full with warm water. Add a few drops of the second food coloring and stir.



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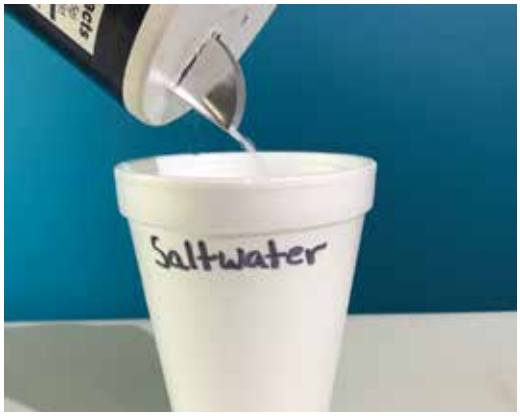

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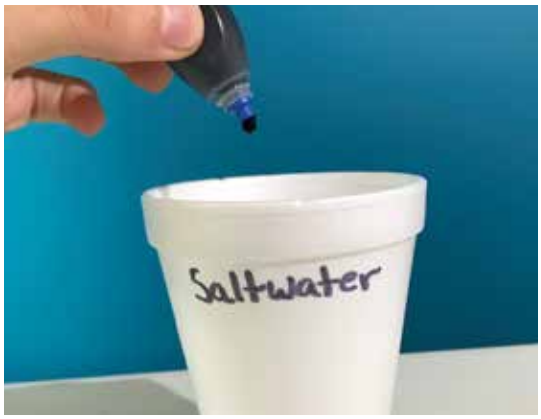

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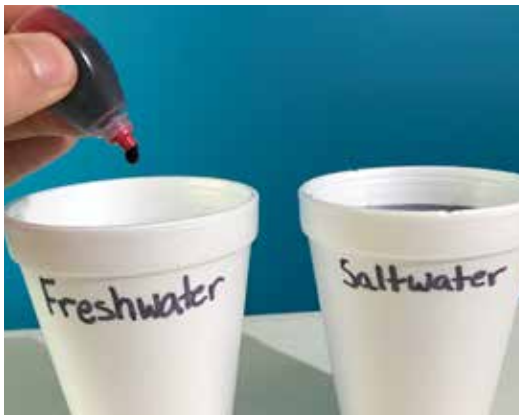

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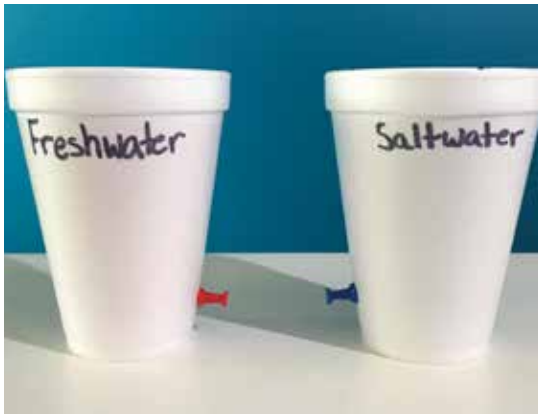
5. Press a thumb tack into each cup about 1 inch above the base. Do not remove it.

6. Place both cups into the clear container at opposite ends, making sure the thumb tacks are facing each other.

7. Add about 3 inches of room temperature water to the clear container. Note: the water in the container should not rise above the water in the cups.

8. Carefully remove the thumb tacks from each cup and observe the flow of water.



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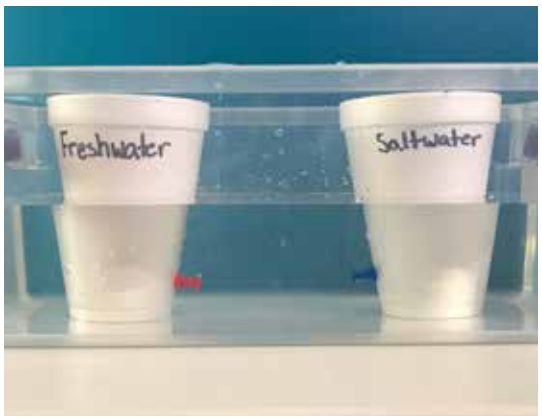

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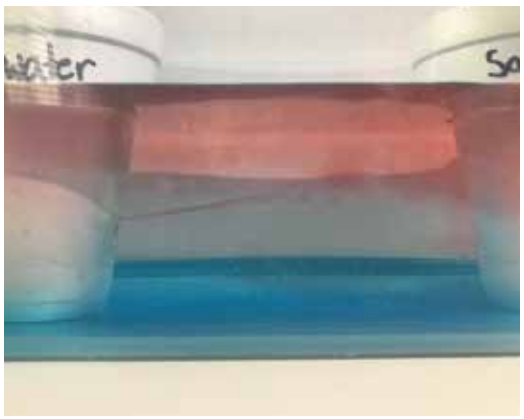
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WHAT'S THE BIG DEAL?

When the thumb tacks are removed from the cups, the saltwater and freshwater enter the container and are able to mix freely. You should see the salt water sinks to the bottom while the freshwater rises toward the water's surface, creating two distinct layers of water.

The saltwater sinks because the addition of salt, as well as the colder temperature, makes the water more dense than the surrounding freshwater. This process mirrors the circulation and layering of water in the ocean that helps form deep ocean currents.

In our oceans, water is in constant motion due to currents. Major surface currents, driven primarily by wind, move warmer surface water towards the poles. At the poles, the water becomes colder, saltier, more dense, and sinks in the water column. The cold salty water then begins its long journey moving along the bottom of the ocean until, after several hundred years, the water eventually rises back to the surface. This process is known as thermohaline circulation.

Thermohaline circulation is a current that is driven by differences in temperature and salinity (salt concentration) and it has many important functions. These functions include helping maintain a stable climate as well as transporting nutrients and oxygen throughout the ocean ecosystem.

TRY THIS!

After completing this activity try it again but have the water in each cup be the same temperature and do not add any salt. What happens in this situation when the thumb tacks are removed?

Be sure to check out our
Modeling Ocean Currents video at
FloridaMaritimeMuseum.org/pip-the-pelican