Explorer Education Programme

Explorers Science Experiments - Water Salinity, Temperature and Ocean Currents
Class: 4th, 5th and 6th
Strand: Materials
Strand Unit: Materials and change
Group size: 2-3 students

Aim

To examine how the differences in water movement between salt water and freshwater and how they interact with each other.
Students completing the worksheets will also develop writing and literacy skills.
Experiment suitable for demonstration by a teacher with students assisting.

Materials

- 2 jam jars (same size)
- Squares of card / plastic
- Table salt
- Food colouring
- Paper towels
- Plastic / baking tray

Methods

1. Fill one jar with colourless fresh water (from the tap is fine) and the other jar with coloured salty water (tap water with salt added can be used). Place both the jars in the tray.
2. Place a piece of card on top of the jar with the salty water and turn the jar upside down, holding the card in place. When you remove your hand, the upward pressure of air will hold the card in place (most of the time).
3. Place the saltwater jar on top of the freshwater jar. Then carefully remove the card. Do this over the tray in case of spillages. Observe the results.
4. Repeat steps 1 to 3 – this time put the freshwater on top of the salt water, remove the card and observe the results.
5. Repeat steps 1 to 3 – this time put the fresh water on top of the salt water and turn the jars horizontally (sideways). Note the jars will need to be held together. Remove the card and observe the results.
6. Repeat steps 1 to 3 – this time with warm freshwater and cold freshwater to see which is denser?

What Happens

- When the saltwater was placed on top, the water in the two jars mixed together.

- This is because saltwater is heavier than freshwater and sunk down through the freshwater in the bottom jar.
- When the freshwater is placed on top it floats on top of the saltwater at the bottom.

Discussion Points

- Two of the most important variables in seawater are temperature and salinity. Before the experiment, discuss with students what water density is (e.g. the quantities of salt and temperature work in conjunction to control the density of seawater)?
- Ask the students do they know any of the currents that traverse the oceans?
- Discuss where in the oceans freshwater and saltwater mix?
- Discuss rainfall and the water cycle.
- Discuss ice melts in the Arctic and Antarctic Oceans in relation to ocean currents and climate change.
- In what habitats do freshwater and saltwater mix on a daily basis (e.g. intertidal areas, estuaries)?
- Discuss how Ireland's climate is more temperate than other areas at the same latitude and how ocean currents may be the cause of this (Gulf Stream).
- Get students to use the web and/or their school library to research these discussion points and the worksheet questions.

Outcome

The children in the class will have developed skills in the following:

- Questioning
- Observing
- Predicting
- Investigating and experimenting
- Analysing
- Recording and communicating
- Exploring
- Planning
- Making
- Evaluating

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In addition the following skills in English will be developed:

- Reading for pleasure and information
- Developing competence, confidence and the ability to write independently
- Developing interests, attitudes, information retrieval skills and the ability to think

Useful Links

- http://seawifs.gsfc.nasa.gov/OCEAN_PLANET/HTML/oceanography_currents_1.html - Details of ocean currents
- http://www.thefreeresource.com/ocean-currents-data-information-and-resources - Information on ocean currents
- http://geography.about.com/od/physicalgeography/a/gulfstream.htm - Article about the Gulf Stream
- http://nsidc.org/cryosphere/seaice/characteristics/difference.html - Arctic vs. Antarctic sea ice
- http://www.epa.gov/climatechange/effects/polarregions.html - Climate change effects in the polar regions
- http://www.ryaninstitute.ie/wp-content/uploads/what_goes_up_must_come_down.pdf - An in-depth look at the water cycle (presentation by the Primary School Outreach Programme of the Ryan Institute in the National University of Ireland, Galway)

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Worksheet

Record the results you observed when the saltwater jar was placed on top of the freshwater jar and the card was removed.

Record the results you observed when the freshwater jar was placed on top of the saltwater jar and the card was removed.

Record the results you observed when the freshwater jar was placed on top of the saltwater jar and then turned horizontally before the card was removed.

Record the results you observed when the warm freshwater jar was placed on top of the cold freshwater jar and the card was removed. Which is denser?

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Worksheet

What is saltwater?

Where in the oceans do freshwater and saltwater mix?

Can you name habitats where freshwater and saltwater mix on a daily basis?

Can you name any of the currents that traverse the oceans?

Why is Ireland's climate more temperate than other countries / areas at the same latitude?