



Science/Geography

Strand: Energy and Forces

Strand unit: Heat

Strand: Natural Environments

Strand units: Lands, rivers and seas/ Weather

Aims:

- Explain how ocean currents are formed
- Use the website www.physicalgeography.net/fundamentals/8q_1.html to identify some of the ocean currents
- Investigate which is heavier/ denser, cold water or hot water
- Identify that heat when transferred through water or air is known as convection as opposed to conduction (in solids), and radiation (via the sun)
- Set up an experiment to investigate convection currents
- Use the 'Follow the Fleet' website and the map of the ocean currents to estimate what ocean current the ship is nearest too at different locations.

- Explain what is meant by a current.
A current is a stream of cold and warm water that runs through the seas. Currents are created by a combination of winds, differences in temperatures and salt content.
- Recall the sea that has a high salt content and discuss the findings from floating and sinking experiment using fresh water and salt water.
- Experiment to investigate if cold water or warm water is heavier/denser.
 1. Freeze water with ink in it to make coloured ice cubes.
 2. Fill a glass jar or container with warm water.
 3. Drop the coloured ice cubes into the cold water.
 4. Observe what happens and record the results.

Result: As the ice cubes melt, the coloured water will sink to the bottom of the container illustrating that cold water is denser than warm water.
- Discuss warm currents and cold currents.
As we can see from the experiment cold water is denser than warm water. Cold currents come from the seas around the North and the South Poles, warm currents come from equatorial and tropical seas. Cold currents will flow at lower depths in the ocean and warm currents will float at higher depths, near the surface of the ocean. Ocean currents are a major factor in determining the climate of coastal countries. Looking at the maps of the ocean currents, it can be seen that the Gulf Stream is a warm current and hence is responsible for Ireland's mild winters. The North Atlantic Drift is also a warm current.
- Locate the Gulf Stream and the North Atlantic Drift on the map of the ocean currents.
- Demonstrate through experimentation convection currents of the oceans.
 1. Fill a transparent container with cold water
 2. Fill a small bottle with hot water (not boiling).
 3. Add a few drops of food colouring and fasten the lid on the bottle.
 4. Slowly, lower the bottle of water into the bowl of water.
 5. Ensure that the entire bottle is under the water.
 6. Remove off the lid and observe what happens.
 7. Observe what happens and record with a drawing the results.

Result: The warm, coloured water will rise and spread out at the top of the container. After a few moments, the coloured water begins to sink and is replaced by warm coloured water rising from the bottle. These are convection currents.
- Use the 'Follow the Fleet' website to find the location of the ship. Have a look at the map of the ocean currents and identify what ocean current the ship is nearest to for its different locations.