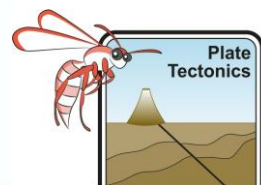
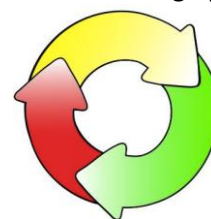


Convection Currents - Student Worksheet



Convection currents are the result of expansion of a liquid or gas as its temperature rises. Taking up a larger volume whilst having the same mass means that the substance will be less dense and rise. This is why smoke rises and a layer of hot water is found at the top of standing bathwater!

Convection currents in the partially melted asthenosphere are believed to power plate tectonics.



There are two sources of heat energy within our Earth, residual heat released during compression of cosmic dust at the time of formation of our planet and radioactive heat resulting from the spontaneous breakdown of radioactive minerals.

Materials per teacher or group

- Large beaker of cold water straight from the fridge. (Add ice cubes if using warm water from the tap).
- Empty, clean, small container
- Lead weights or 5c pieces to weigh down the jar (if it is plastic)
- Kettle of hot water (CARE!)
- Potassium permanganate or food dye
- Plastic wrap and scissors
- Small elastic band
- Two skewers

Method

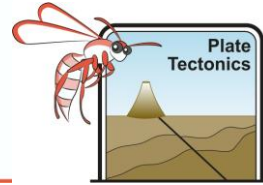
1. Fill the large container with very cold water.
2. Lay two long skewers beside it
3. If the small container is plastic add materials suggested by your teacher to give it negative buoyancy.
4. Drop a few pieces of potassium permanganate or food colouring into the bottle. Use forceps if you are using potassium permanganate as it stains.
5. **Carefully** pour hot water to completely fill the bottle
6. **Carefully** cap the bottle with plastic wrap and hold in place with an elastic band
7. Lower the bottle to the foot of the large container
8. Using the skewers make two holes in the cap of the small container

OPTION: Small polystyrene “continents” can be placed on the water to demonstrate movement due to rising convection currents.

Observations

Describe what happens when the little container’s cap is holed. An annotated diagram may help (see next page).

Convection Currents - Student Worksheet



Using your knowledge of Kinetic Theory, explain why this happened. (HINT "density")

What does the hot purple water represent in this experiment?

What do you think would happen when the rising melted rock gets to the surface?

What happened when the purple water reached the surface and cooled?

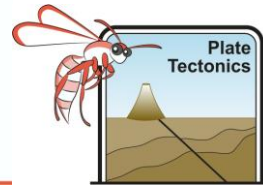
THINK

What was the source of energy in this experiment?



What name is given to energy that increases the rate of movement of molecules?

Convection Currents - Student Worksheet



Why were two holes punched in the lid of the little bottle?

Which material was the solvent? _____

Which material was the solute? _____

What is the chemical formula of potassium permanganate? _____

Where does the heat that powers convection currents within the Earth come from? _____
