

Convection

Year 9, Lesson 2

Week commencing 19th March 2012

Title: Convection

Objectives

- I must be able to describe the process of convection in terms of particles
- I should also be able to explain how expansion and changes in density cause convection currents

Starter: Hot seat

- I need a volunteer
- The volunteer will be a piece of science equipment or something we can relate to science
- He or she can only answer yes or no
- Find out what he/she is

The other day we learnt:

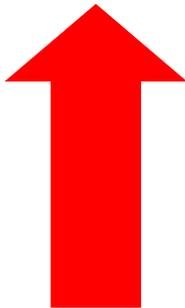
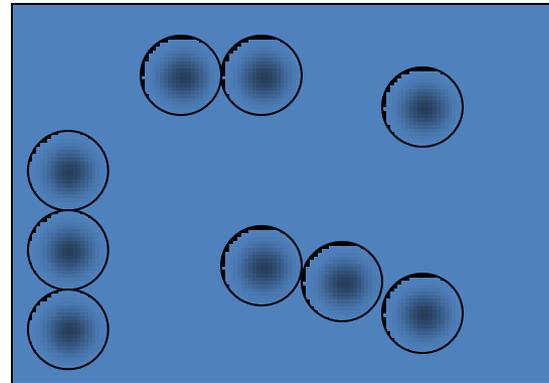
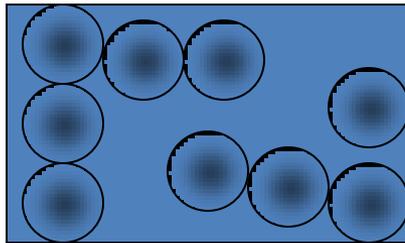
- That when particles in a **solid** get hot, they
- This is called
- An example of a good conductor is

- **Conduction** is most important in solids
- **Convection** occurs only in liquids and gases

Heating fluids

What happens to the particles in a liquid or a gas when you heat them?

The particles spread out and become less dense.



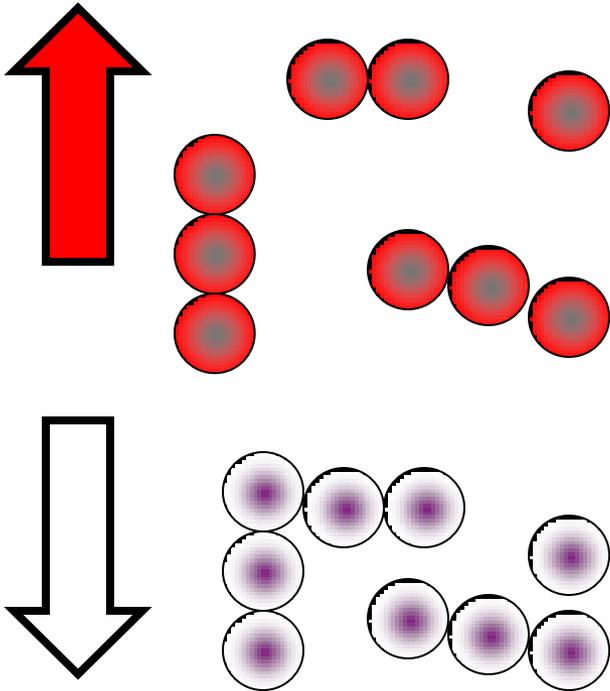
This effects fluid movement.

Fluid movement

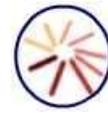
Cooler, more dense, fluids sink through warmer, less dense fluids.

In effect warmer liquids and gases rise up.

Cooler liquids and gases sink.



Water movement

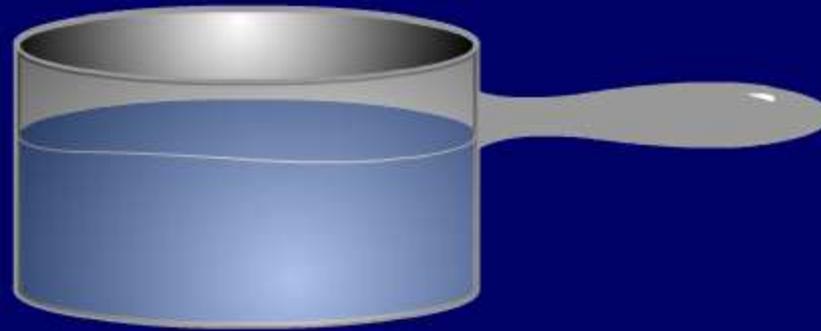


Cools at the
surface

Convection
current

Cooler water
sinks

Hot water
rises



Why is it windy at the seaside?



Why is it windy at the seaside?

The land is warmer than the sea.



This land warms the air above it, and it rises.



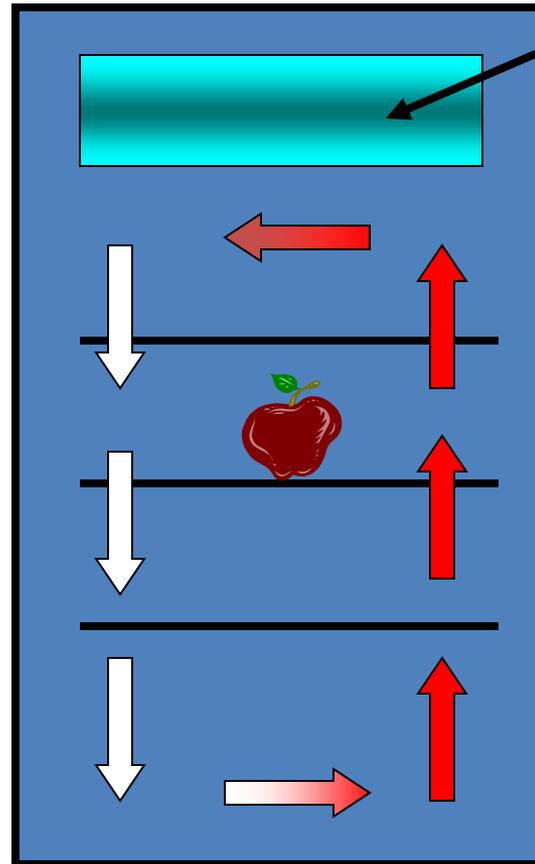
The cold air from above the sea moves in to take the place of warm air that has risen.



Cold air sinks

Where is the freezer compartment put in a fridge?

It is put at the top, because cool air sinks, so it cools the food on the way down.



Freezer compartment

It is warmer at the bottom, so this warmer air rises and a convection current is set up.

Convection questions

Why does hot air rise and cold air sink?

Cool air is more dense than warm air, so the cool air 'falls through' the warm air.

Why are boilers placed beneath hot water tanks in people's homes?

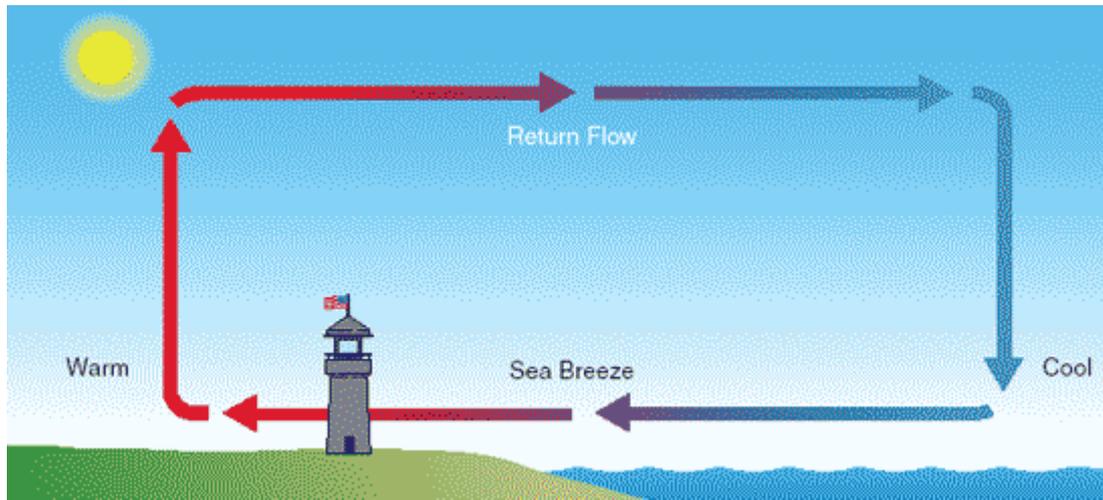
Hot water rises.

So when the boiler heats the water, and the hot water rises, the water tank is filled with hot water.

Convection occurs when more energetic particles move from a hotter region to a cooler region – and take their heat energy with them

How does this differ from conduction?

1. When you heat a liquid or gas, the particles move faster and the fluid expands – becoming less dense
2. The warmer, less dense fluid rises above the cooler, denser fluid
3. As the warm fluid rises, cooler fluid takes its place – causing a circulation of fluid (called **convection currents**).



To reduce convection....

- You need to stop the fluid moving
- Blankets and wall foam insulation work by blocking pockets of air

Homework

- Stick the worksheet into your books and answer the questions in your books in full sentences.
- To be handed in on Friday

Demonstrating convection currents

- Draw a quick diagram of what you saw and annotate it with a few notes of what you observed

Plenary: *In groups of 6*

- Invent a way to use drama to demonstrate the processes of conduction and convection
- You have 5 minutes