THE EFFECT OF TEMPERATURE ON THE VISCOSITY OF OIL

Purpose

To determine how temperature affects the speed at which oil will flow through sand.

Activity

1. ***If you are the first pair of students to use the apparatus pour some oil into the tube and let it drain through so that the sand grains are covered with oil. Once it has drained through discard this oil. If someone has already used the apparatus start at instruction 2.***

2. ***Put an empty collecting beaker under the cylinder.***
3. ***Measure the temperature of the oil you are about to pour in.***
4. ***Fill the tube up with oil so that the top is just above the 100ml mark.***
5. ***Start the timer when the top of the oil is on the 100ml mark.***
6. ***Stop the timer when the top of the oil has reached the top of the sand.***
7. ***Measure the temperature of the oil that has just percolated through the sand.***
8. ***Calculate the average of the two temperatures.***
9. ***Repeat with the other two cylinders using oil at a different temperature***
10. ***Plot average temperature against time.***

Teacher's section

Requirements

Three lots of sunflower oil, one at room temperature, one at about 60°C and one at 0°C
A timer
A thermometer
3 small beakers and a beaker for discarded oil
3 100ml measuring cylinders
Fine metal gauze
200ml of coarse sand between 1mm and 2mm diameter
The stand

Making and setting up the apparatus

Saw the ends off three 100ml plastic measuring cylinders. Attach a disc of metal gauze with holes about 5mm by heating the gauze and then quickly pressing the end of the measuring cylinder onto the gauze so that it melts in.
Fill each cylinder up to the 60ml mark with the coarse sand
Make the stand as shown in the photo.

Notes

The measuring cylinders and sand should be cleaned before being put away. Pouring paraffin through the tube dissolves and removes the oil.

Results

Average temperature	*time*
45°C	*3 minutes*
20°C	*4 minutes*
10°C	*8 minutes*

Time

15 minutes