Viscosity

Learning objectives

1   Compare the viscosity of different liquids by making careful observations.

2   Apply your understanding of particles to explain your observations.

3   Design an experiment.

Introduction

You are going to measure the times it takes for a bubble to rise through different liquids. This is a way to compare the viscosity of the liquids.

Equipment (per group)

Apparatus

- Stopwatch
- Sealed tubes of different liquids
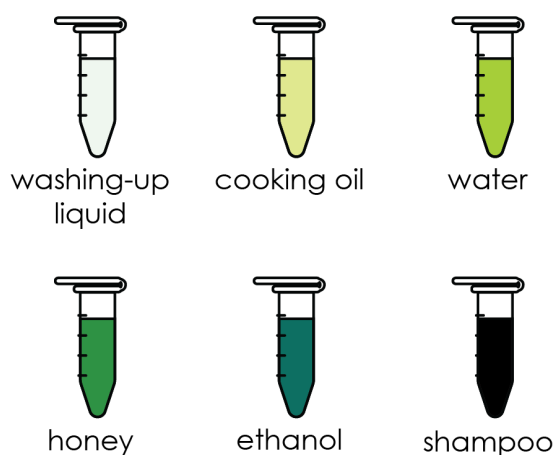
Chemicals

Choose from:

- water
- cooking oil
- Washing up liquid
- Ethanol
- Shampoo or bubble bath
- Conditioner

Safety equipment

- Eye protection: safety glasses to EN166F

Diagram

washing-up liquid   cooking oil   water

honey   ethanol   shampoo

Procedure

Take one of the tubes provided.

1. Ensure the bubble is at the top and the tube is held vertical.
2. Quickly invert the tube and measure the time it takes for the bubble to reach the top.
3. Repeat this measurement for all the samples.
4. Complete the table provided.

Results

Liquid	Time taken (s)			Average time (s)
	Test 1	Test 2	Test 3	
Water				
Cooking oil				
Washing-up liquid				
Ethanol				
Shampoo or bubble bath				
Honey				

Questions

1. State the meaning of the word viscosity.

_____

_____

2. Use your results to identify the most viscous liquid? Why did you choose your answer?
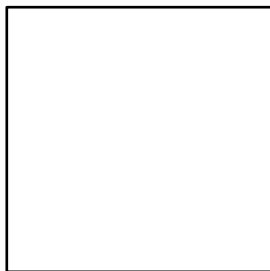
Liquid _____

Reason _____

3. Use your results to identify the least viscous liquid? Why did you choose your answer?

Liquid _____

Reason _____

4. Draw a diagram to show how the particles are arranged in cooking oil.

5. Describe what happens to the particles when a sample of cooking oil is poured into a frying pan.

_____

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_____

6. Explain why the viscosity of water is less than the viscosity of bubble bath.

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7. Predict how the viscosity of honey will change as the temperature of the honey is increased. Suggest a reason for your answer.

_____

_____

_____

8. Design an experiment to investigate how the temperature effects the viscosity of a liquid. You should include:

• a prediction

• variables (identify the independent, dependent and control variables)

• equipment list

• method

• results table