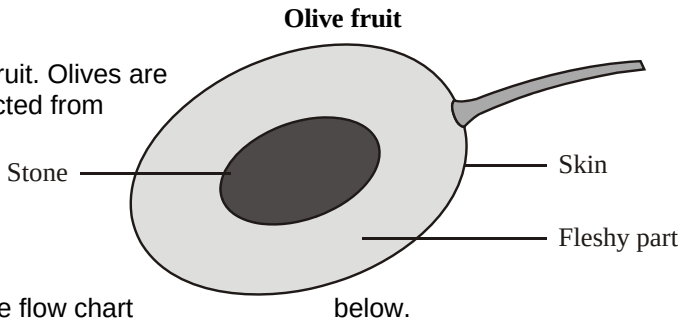
## Vegetable oils and emulsions

**1.** This question is about extracting oil from a fruit. Olives are fruits of the olive tree. Olive oil can be extracted from olives.




The stages in the extraction are shown in the flow chart below.

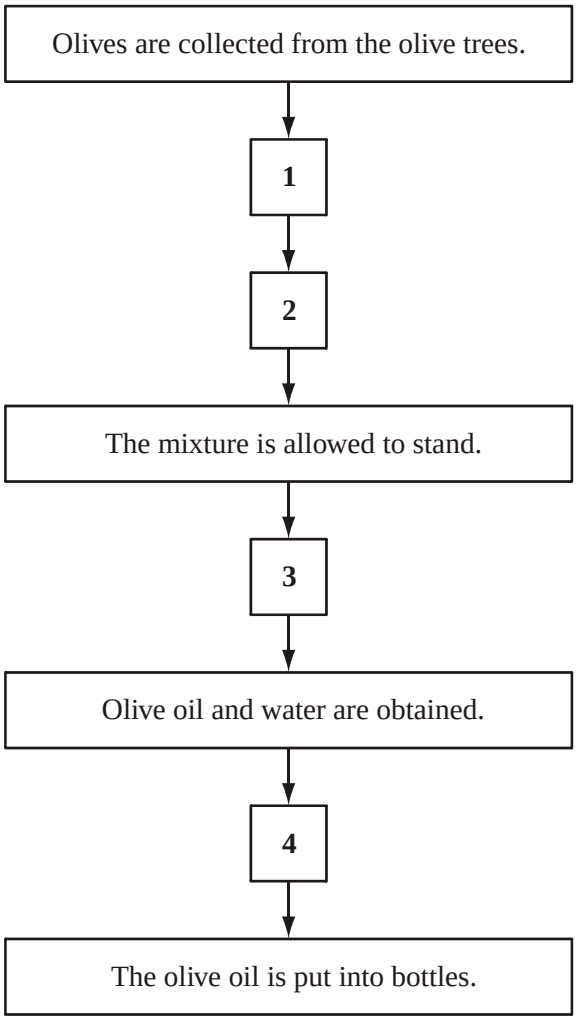
Match sentences, **A**, **B**, **C** and **D**, with the numbers **1– 4** in the flow chart.

**A** Olive oil separates from the water.

**B** The mixture is pressed.

**C** Water is added and the mixture is stirred.

**D** The olives are crushed.



**2.** Plant oils have many uses.

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

**A** a fuel

**B** an emulsion

**C** energy

**D** temperature

Vegetable oil can be burned as . . . **1** . . . .

Vegetable oils are useful foods because they contain a lot of . . . **2** . . . .

Vegetable oils cook food at a higher . . . **3** . . . than water.

In some foods, vegetable oil is mixed with another liquid to form . . . **4** . . . .

**3.** Ice-cream is a foam because it has small air bubbles trapped inside it.

Ice-cream is sold by volume. Ice-cream manufacturers increase the volume of air in a product so that they make more money.

A student investigated the volume of air in four different ice-creams, **K**, **L**, **M** and **N**. The four ice-creams were kept in the same freezer.

For each ice-cream, the following procedure was carried out:

- the student measured the volume of some ice-cream straight from the freezer
- the ice-cream was then melted down, allowing the air to escape
- the volume of the ice-cream was re-measured to give the final volume.

The results are shown in the table.

| **Ice-cream** | **K** | **L** | **M** | **N** |
|---|---|---|---|---|
| **Initial volume in $cm^3$** | 100 | 100 | 100 | 100 |
| **Final volume in $cm^3$** | 96 | 91 | 87 | 95 |

(a) Which ice-cream originally contained the most air?

**1** **K**

**2** **L**

**3** **M**

**4** **N**

(b) The investigation was fair because . . .

**1** the same volume of ice-cream was used each time.

**2** four samples of ice-cream were used.

**3** the investigation was repeated.

**4** the temperature of the ice-creams was kept constant during the investigation.

(c) The student could have improved the reliability of the investigation by . . .

**1** allowing the ice-cream to melt over a longer period of time.

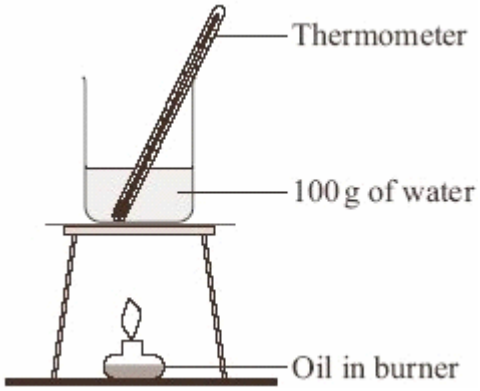
**2** checking that the temperature was constant throughout the investigation.

**3** using more than four ice-cream samples.

**4** repeating the investigation.

**4.** A student was comparing two vegetable oils, **X** and **Y**, to find out how much heat they release when they burn.

She used the apparatus shown in the diagram. The oil was allowed to burn for 6 minutes in each test.




Her results are shown in the table.

| | **Oil X** | **Oil Y** |
|---|---|---|
| Mass of empty oil burner | 60 g | 60 g |
| Mass of oil burner + vegetable oil | 67 g | 66 g |
| Mass of oil burner + vegetable oil after burning | 62 g | 63 g |
| Initial temperature of water in the beaker | 24 °C | 24 °C |
| Final temperature of water in the beaker after heating | 49 °C | 42 °C |

(a) How many grams of oil **X** were burned during the experiment?

**1** 2 g

**2** 4 g

**3** 5 g

**4** 7 g

(b) Oil **X** produced a temperature rise of 5 °C per gram of oil burned.

What rise in temperature was produced by burning 1 g of oil **Y**?

**1** 3 °C

**2** 6 °C

**3** 18 °C

**4** 42 °C

(c) How could the student improve the reliability of the results for each oil?

**1** Repeat the experiment several times and take the mean (average) value.

**2** Burn the same mass of oil **X** and oil **Y** in the tests.

**3** Burn the same mass of oil **X** and oil **Y** but for a shorter length of time.

**4** Use several other oils and compare the results with those for oil **X** and oil **Y**.

(d) The student could get more accurate results if she improved the design of her apparatus.

One improvement would be to . . .

**1** use a larger beaker.

**2** use a thermometer with a larger range of temperatures.

**3** burn a smaller quantity of oil each time.

**4** protect the flame from draughts.