**Reversible and irreversible changes – Checkpoint Primary chemistry**

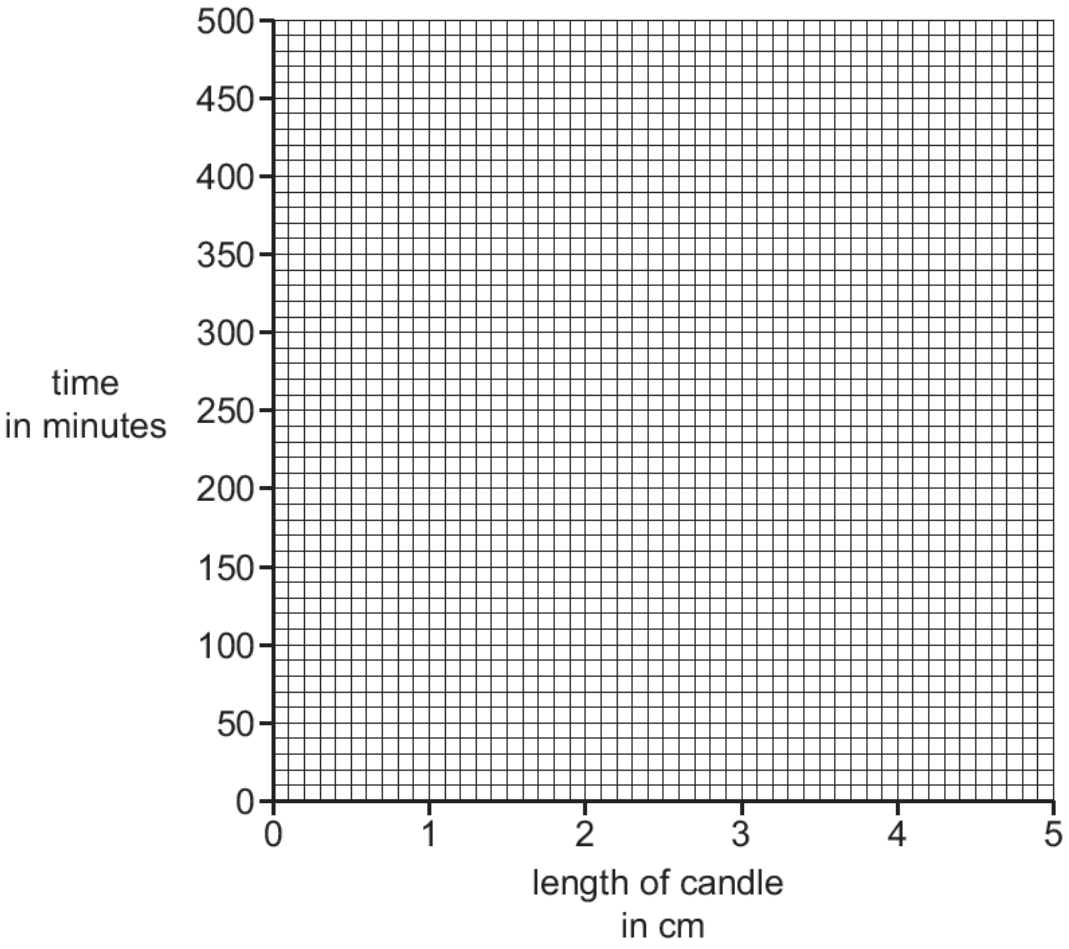
**1.** No.13

Mia and Chen investigate how the length of a candle affects the time it takes to burn completely.

The table shows the time it takes for different lengths of candle to burn completely.

| candle length in cm | time to burn completely in minutes |
|---|---|
| **1** | 75 |
| **2** | 150 |
| **4** | 300 |
| **5** | 370 |

**(a)** Draw a line graph to show their results.




[2]

**(b)** Which length of candle takes the **least** time to burn completely?

..... cm [1]

**(c)** Predict how long it takes a 3 cm candle to burn completely.

..... minutes [1]

**(d)** Mia says,

**'I think our investigation was <u>not</u> a fair test.'**

Suggest **one** reason why Mia thinks their investigation was **not** a fair test.

..... [1]

**2.** No.13

Chen cooks some rice.

He puts the rice in boiling water.

He keeps the water boiling for 15 minutes until the rice is cooked.

**(a)** What is the temperature of the boiling water?

..... [1]

**(b)** Describe how Chen separates the rice from the water.

.....

..... [1]

**(c)** What type of change is cooking rice?

Tick (✓) the correct answer.

reversible ☐ irreversible ☐

Explain your answer.

.....

.....

[1]

**3.** No.8

Gabriella investigates what happens when substances are added to water.

Gabriella:

- puts 10 $cm^3$ of cold water in a test-tube
- measures the temperature of the water at the start
- adds 1 g of substance to the water
- stirs the mixture
- measures the temperature of the water at the end.

Here is her results table.

| substance | appearance of substance | temperature of water at start in °C | temperature of water at end in °C | other observations |
|---|---|---|---|---|
| ammonium chloride | white solid | 20 | 10 | dissolves to give a colourless solution |
| calcium | silver / grey solid | 20 | 30 | fizzes and gives off a colourless gas and makes a milky solution |
| ethanol | colourless liquid | 20 | 20 | dissolves to give a colourless solution |
| sodium chloride | white solid | 20 | 20 | dissolves to give a colourless solution |

**(a)** Gabriella wants to use **one** of the substances to cool some water.

Write down the name of the substance she uses.

..... [1]

**(b)** Sodium chloride dissolves in water.

This process is reversible.

Describe how Gabriella reverses this process to get solid sodium chloride.

.....

..... [1]

**(c)** Look at the table.

What evidence is there that adding calcium to water is an irreversible process?

.....

..... [1]

**4.** No.9

Here is a list of sentences.

Decide if each sentence is true or false.

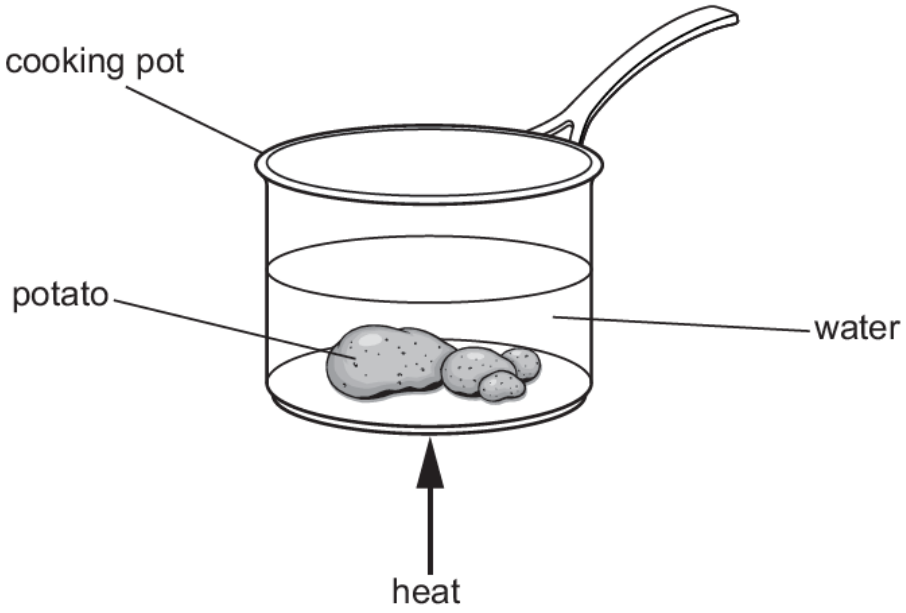
Tick (✓) the correct box.

| sentence | true | false |
|---|---|---|
| Burning diesel fuel in a truck is irreversible. | ☐ | ☐ |
| Condensation of steam is reversible. | ☐ | ☐ |
| Sugar dissolves in water to form a solution. | ☐ | ☐ |
| Sand is soluble in water. | ☐ | ☐ |
| Evaporation separates a mixture of sugar and sand. | ☐ | ☐ |
| Dissolving a solid in water is reversible. | ☐ | ☐ |
| A magnet separates a mixture of gold and silver. | ☐ | ☐ |
| Rusting of iron is reversible. | ☐ | ☐ |

[4]

**5.** No.5

Anastasia cooks potatoes in hot water.




She puts the cooking pot over a flame and heats the water for 25 minutes.

**(a)** What happens to water when it is boiling?

..... [1]

**(b)** Explain why boiling water is a **reversible** change.

.....

.....

[1]

**(c)** Explain why cooking a potato is an **irreversible** change.

.....

.....

[1]

**6.** No.2

Ice melts into liquid water.

**(a)** The melting of ice is a **reversible** process.

Explain why.

.....

..... [1]

**(b)** Complete the sentences.

The melting point of ice is ..... °C.

The boiling point of water is ..... °C. [2]

**7.** No.2(d)

**(d)** The car engine burns gasoline.

What type of change is the burning of gasoline?

Circle the correct answer.

**irreversible** **reversible**

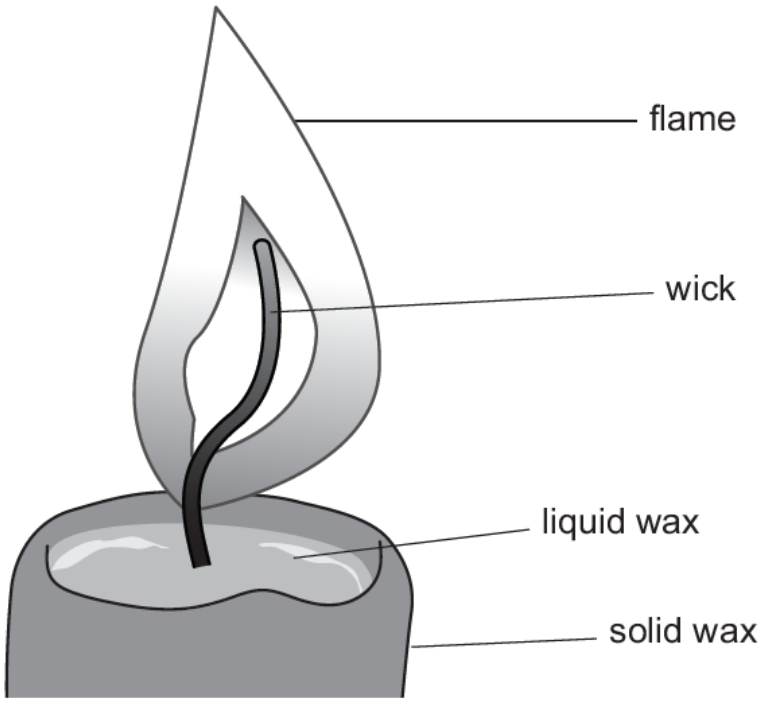
Explain your answer.

.....

..... [1]

**8.** No.7

A candle is made from a solid called wax.




**(a)** At the top of the candle **solid** wax changes into **liquid** wax.

What is the name of this process?

..... [1]

**(b)** Solid wax changing into liquid wax is a **reversible** change.

Explain why.

.....

..... [1]

**(c)** Some of the **liquid** wax changes into a **gas**.

What is the name of this process?

..... [1]

**9.** No.17

Which of the following is a reversible change?

Circle the correct answer.

**baking bread**

**burning a match**

**frying an egg**

**melting ice cream**

[1]

**10.** No.16

Mia puts a substance into a beaker.

She measures the temperature of the substance.

She heats the substance for 10 minutes.

She measures the temperature of the substance every minute.

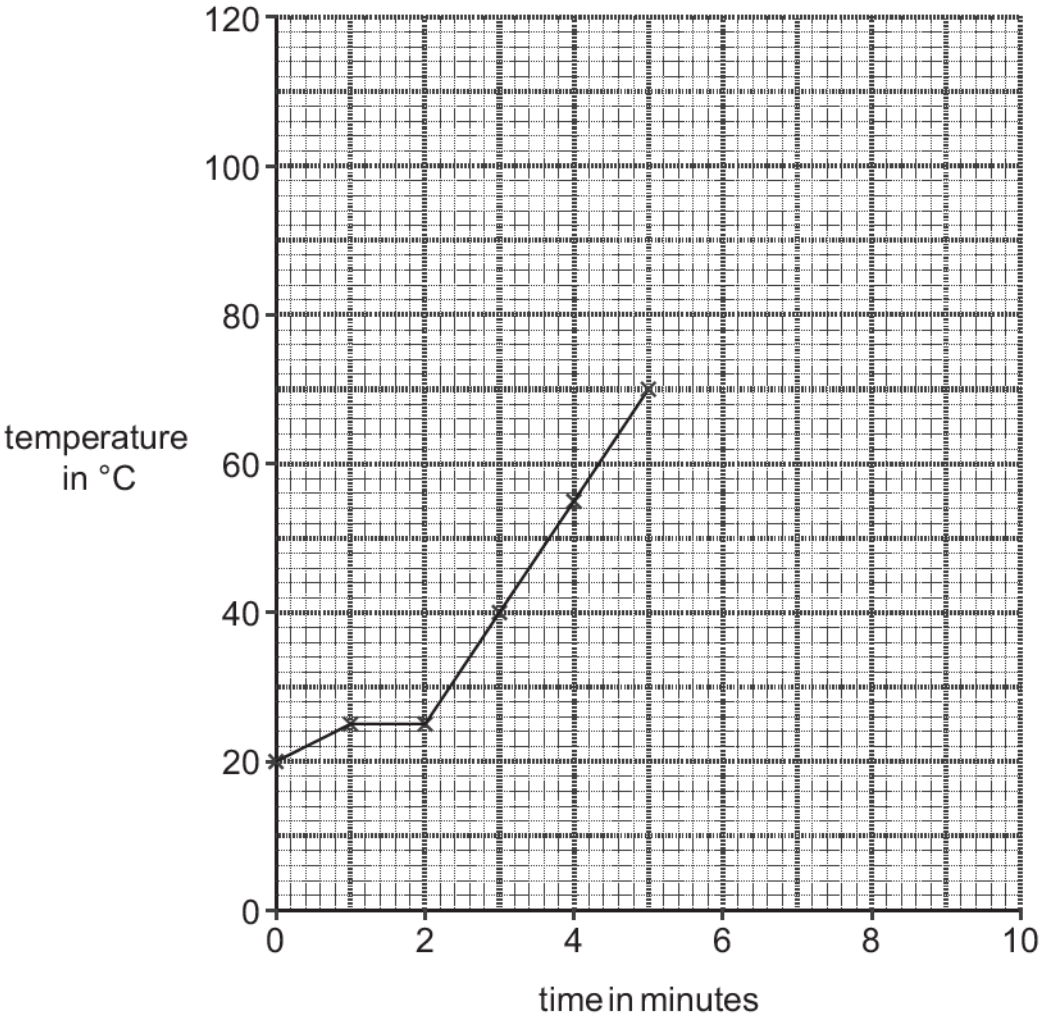
**(a)** What equipment does Mia use to measure the temperature?

..... [1]

**(b)** Here are her results.

| time in minutes | temperature in °C |
|---|---|
| 0 | 20 |
| 1 | 25 |
| 2 | 25 |
| 3 | 40 |
| 4 | 55 |
| 5 | 70 |
| 6 | 85 |
| 7 | 100 |
| 8 | 110 |
| 9 | 115 |
| 10 | 115 |

Complete the line graph of these results.




[3]

**(c)** The melting point of the substance is 25 °C.

What is happening to the substance at 115 °C?

..... [1]

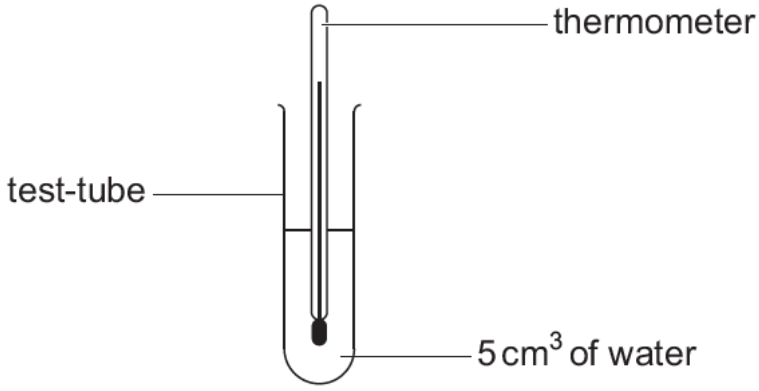
**(d)** At what time was the temperature of the substance 50 °C?

..... minutes [1]

**11.** No.14

Mike investigates what happens when some white solids are added to cold water.

Here is the equipment he uses.




Mike measures the temperature of the water **before** adding the white solid.

Mike stirs the solid and water.

He then measures the temperature of the water **after** he adds the solid.

Mike tests four white solids.

Here is his results table.

| solid | temperature before in °C | temperature after in °C | other observations |
|---|---|---|---|
| **A** | 20 | 32 | blue solution forms |
| **B** | 20 | 17 | fizzes and forms a colourless solution |
| **C** | 20 | 13 | colourless solution forms |
| **D** | 20 | 20 | white solid remains at bottom of test-tube |

**(a)** Which solid in the table increases the temperature of the water?

.....

[1]

**(b)** Which solid in the table makes a gas when added to water?

.....

[1]

**(c)** Solid **B** shows an **irreversible** change when added to water.

What is an irreversible change?

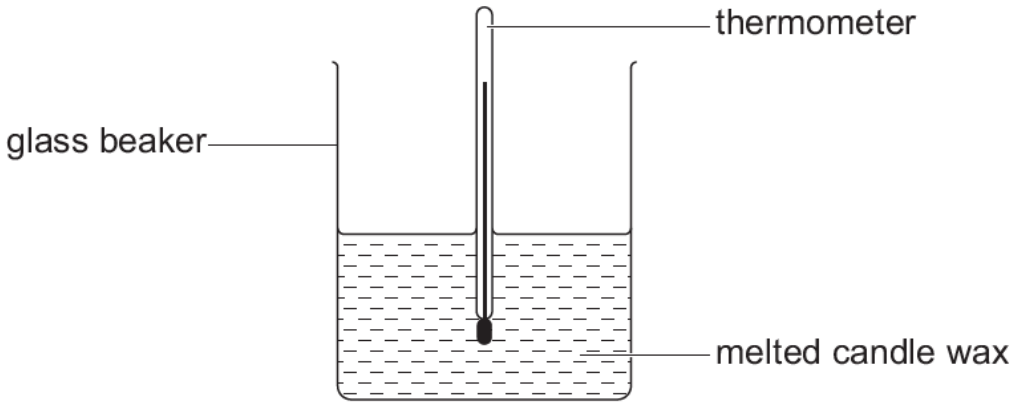
.....

..... [1]

**12.** No.16

Gabriella investigates the cooling of melted candle wax.

Here is the apparatus she uses.



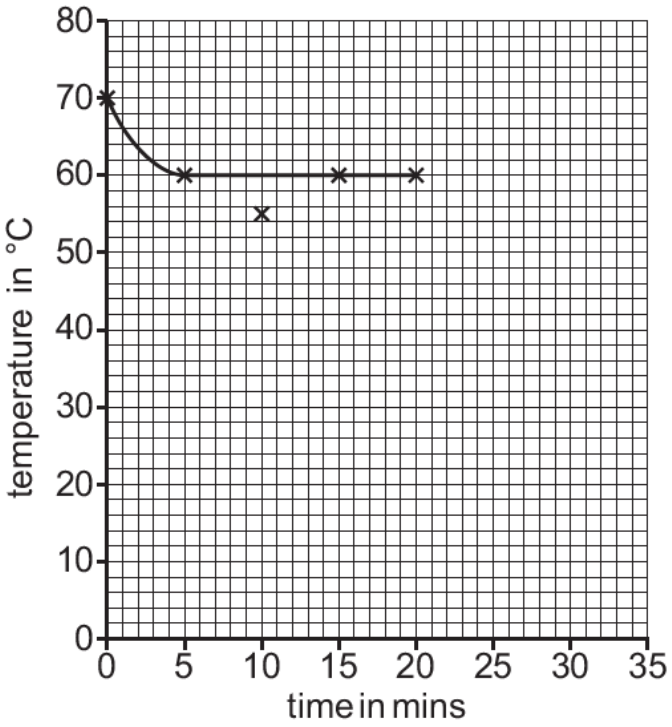

She measures the temperature of the candle wax every 5 minutes.

Here are her results.

| time in minutes | temperature in °C |
|---|---|
| 0 | 70 |
| 5 | 60 |
| 10 | 55 |
| 15 | 60 |
| 20 | 60 |
| 25 | 55 |
| 30 | 50 |

**(a)** Gabriella has plotted the first five results on this graph.

Plot the other two results.




[2]

**(b)** Complete the line graph. [1]

**(c)** One of the results is **not** correct, it does **not** fit the pattern.

This result is at ..... minutes. [1]

**13.** No.5

Angelique works in a large kitchen.

She is cooking rice in boiling water.

**(a)** Boiling water is a reversible process.

Cooking rice is an irreversible process.

Explain why boiling water is reversible but cooking rice is irreversible.

.....

.....

..... [2]

**(b)** The walls of the kitchen get wet.

Angelique knows that the water comes from the boiling water.

Explain how the walls of the kitchen get wet.

.....

.....

..... [2]