

Blast-off : Becoming a scientist Mark Scheme

Page 3: Health and Safety

1. Match the rule to the explanation for the rule:

- Follow teacher instructions → To ensure safety during practical work.
 - Wear safety goggles → Protect your eyes from harmful chemicals.
 - Tie back long hair → Prevent it from catching fire or getting in the way.
 - No eating or drinking → Avoid ingesting harmful substances.
 - Handle glassware carefully → To prevent accidents and injuries from breakage.
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Page 5: Hazard Symbols

1. Fill in the blanks:

- This symbol means *irritant*. Chemicals with this symbol can cause red or *blistered* skin or rashes.
- This symbol means *corrosive*. Chemicals with this symbol *burn* and destroy living tissue, such as skin and *bone*.
- This is the symbol for *toxic*. This symbol is used for chemicals which are poisonous and can cause *death* if they enter the body.
- This is the symbol for *flammable*. Chemicals with this symbol *catch fire* or ignite easily. They must be stored safely and used with care.
- This symbol means *explosive*. Chemicals with this symbol are unstable and can detonate under the right conditions. Therefore, they must be stored safely and handled with *care*.

2. Hazard Symbol Questions:

- **Bleach:** Draw the corrosive and toxic hazard symbols.
 - **Concentrated Hydrochloric Acid:** The corrosive hazard symbol.
 - **Barbecue Lighter Fuel:** Draw the flammable hazard symbol.
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Page 8: Laboratory Equipment

1. Complete the table:

Apparatus Name	Use
Beaker	To hold and mix liquids or solutions.
Test tube	To hold small samples of substances.
Bunsen burner	To heat substances.
Measuring cylinder	To measure the volume of liquids.
Tripod	To support equipment being heated.
Stopwatch	To measure time accurately.

2. Label the apparatus in the diagram:

- Include labels for beaker, test tube, Bunsen burner, tripod, gauze, and measuring cylinder.
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Page 13: Measuring Liquids

1. State the capacity shown in ml for each measuring cylinder:

- A: 50 ml
- B: 100 ml

- C: 75 ml
- D: 125 ml
- E: 25 ml

2. Read the following scales:

- a) 20 ml
- b) 45 ml
- c) 60 ml

Page 14: Converting Units

1. Convert the following units into metres:

- a) 200 cm → 2 m
- b) 500 cm → 5 m
- c) 150 cm → 1.5 m
- d) 740 cm → 7.4 m
- e) 3 km → 3000 m
- f) 10 km → 10,000 m
- g) 1.5 km → 1500 m
- h) 20 cm → 0.2 m
- i) 653 cm → 6.53 m
- j) 0.23 km → 230 m

2. Convert the following units into kilograms:

- a) 2000 g → 2 kg
- b) 5500 g → 5.5 kg
- c) 500 g → 0.5 kg
- d) 6 t → 6000 kg
- e) 1.5 t → 1500 kg
- f) 3.56 t → 3560 kg
- g) 200 g → 0.2 kg
- h) 980 g → 0.98 kg
- i) 320 t → 320,000 kg
- j) 800 mg → 0.0008 kg

3. Fill in the blank spaces:

- a) 3000 millilitres is the same as 3 *litres*.
- b) 0.6 litres is the same as 600 millilitres.
- c) 20,000 millilitres is the same as 20 litres.
- d) 50 litres is the same as 50,000 millilitres.
- e) 5000 millilitres is the same as 5 litres.

Page 17: The Bunsen Burner

1. Safety precautions:

- Wear safety goggles.
- Tie back long hair.
- Ensure the gas tap is off when not in use.
- Place the burner on a heatproof mat.
- Keep flammable materials away from the flame.

2. Setting up the Bunsen burner:

- Place a heatproof mat underneath the Bunsen burner.

- Attach the Bunsen burner to a gas tap but DO NOT turn on the gas tap until ready.
- Make sure the air hole is in the closed position.
- Light a splint and hold it over the top of the chimney.
- Carefully open the gas tap.
- Once lit, open the air hole to adjust the flame.

3. Types of flames:

- Safety flame: Yellow, used when not heating.
- Blue flame: Hotter, used for heating substances.
- Roaring flame: Very hot, for strong heating.

Page 22: Presenting Data

1. Eye Colour Data:

- Draw a bar chart with "Eye Colour" on the x-axis and "Frequency" on the y-axis.
- Label the bars for brown, blue, green, hazel, and grey.

2. Monthly Average Temperatures:

- Draw a line graph with "Month" on the x-axis and "Temperature (°C)" on the y-axis.
- Plot points for each month and connect them with a smooth line.

Page 30: Shell Measurements

1. What is the length of the shell above?

- The length of the shell is **40 mm**.

2. What was the most common range of lengths of shells Jay collected?

- **21–25 mm**.

Page 31: Bar Chart and Conclusions

1. Add the missing numbers to the side of the bar chart:

- Add increments of **1** for the number of shells (0, 1, 2, 3, etc.).

2. Draw the bar for shells measuring 16–20 mm:

- The bar height should correspond to **3 shells**.

3. True/False/Cannot Tell Conclusions:

- The oldest snails have the darkest shells: **Cannot tell**
- He did not find any shells longer than 30 mm: **True**
- He found a total of eight snails: **True**
- All the snails he found are the same type: **Cannot tell**

Page 32: Volume Measurement

1. What is the new reading on the measuring cylinder?

- **60 cm³**.

2. What is the volume of the steel ball?

- **10 cm³**. (60 cm³ – 50 cm³)

Page 33: Object Measurements

1. Which object is the heaviest?

- **Lead weight (800 g)**.

2. Which object takes up the most space?
 - Wood puzzle (500 cm³).
 3. Give one reason why aluminium is a suitable material for the bike frame:
 - Aluminium is **lightweight** and **resistant to rust**.
 4. What is the name of the force between the tyres and the road?
 - **Friction**.
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Page 34: Mass and Weight Graph

1. Plot the point for 150 g on the graph:
 - Plot at (150 g, 1.5 N).
 2. Draw a line of best fit:
 - Draw a straight line connecting the points as closely as possible.
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Page 35: Analyzing the Graph

1. Circle the point that does not fit the pattern:
 - The point at (300 g, 3.8 N).
 2. Use the graph to predict:
 - (i) The mass of an object weighing 6.5 N: **650 g**.
 - (ii) The weight of an object with a mass of 50 g: **0.5 N**.
 3. Why is it more useful to present the results as a line graph rather than a table?
 - A line graph shows trends and patterns more clearly, making predictions easier.
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Page 36: Plant Growth Investigation

1. Draw lines to match equipment to measurements and units:
 - Stopwatch → Time → Seconds (s).
 - Thermometer → Temperature → Degrees Celsius (°C).
 - Ruler → Length of plant → Centimetres (cm).
 - Scale → Mass of plant → Grams (g).
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Page 37: Choosing the Best Measuring Container

1. Which is the best container to use to measure 15 cm³ of water? Write the letter.
 - **C**.
2. Why did you choose this container?
 - Container C has a scale that allows precise measurement of 15 cm³.