Student worksheet

1.1 Science laboratories contain hazards

Pages 2–3

Safety in the science laboratory

1 What is a hazard?

2 What is a chemical hazard?

3 What five safety precautions should you follow when working with chemicals?

4 When observing chemical reactions, what are two things you should never do?

5 What is the correct procedure for smelling any gases produced in a chemical reaction?

6 Why can’t chemicals be disposed of down the sink?

7 What should you do if you do not know how to dispose of a chemical?

8 Match the hazard symbol to its meaning.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 1 | SW0106_00951-r | 2 | SW0101_00951-r | 3 | SW0105_00951-r |
|  |  |  |  |  |  |
| 4 | SW0102_00951-r | 5 | SW0103_00951-r | 6 | SW0108_00951-r |
|  |  |  |  |  |  |
| 7 | SW0107_00951-r | 8 | SW0109_00951-r | 9 | SW0104_00951-r |
|  |  |  |  |  |  |

A Substance that can cause irritation (redness or rash).

B Can cause death if touched, inhaled or swallowed.

C Substance that may explode if exposed to fire, heat, movement or friction.

D Substance that is corrosive (destructive) to living tissues, such as skin and eyes. Also used for substance that is corrosive to metals.

E Substance is toxic to marine organisms and may cause long-lasting effects in the environment.

F Provides oxygen to make other substances burn more fiercely.

G Contains gas under pressure. Released gas may be very cold. Gas container may explode if heated.

H Substance that catches fire easily.

I Substance can cause serious health effects if touched, inhaled or swallowed.

Extend your understanding

9 How would you dispose of the following materials?

a Olive oil

b Plasticine

c A dilute acid

d A rat in a dissection

e Ammonia (a base – alkali)

f Untreated eucalyptus leaves

Student worksheet

1.2 Dissection is an important science skill

Pages 4–7

Dissection

1 What is dissection?

2 What are the four main pieces of specialised equipment that is required to perform a dissection?

3 State the name and function of these four specialised pieces of equipment.

|  |  |
| --- | --- |
| D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0110_00951-r.jpg | Name:  Function: |
| D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0111_00951-rf.jpg | Name:  Function: |
| D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0112_00951-r.jpg | Name:  Function: |
| D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0113_00951-r.jpg | Name:  Function: |

4 Why would you wear safety glasses in a dissection?

5 Your first dissection may be conducted of the chicken wing, which is outlined on pages 6–7. Complete a flowchart that acts as a step-by-step summary of the method you will follow in the laboratory.

Extend your understanding

6 Elly has completed her frog dissection and is starting to clean up her workbench. She takes off her gloves and lab coat and packs them away. She then washes her hands and heads back to her bench where she picks up her frog and places it on the teacher’s bench with her dissection equipment. After this, she sits down to complete her dissection questions before the bell rings for lunch.

If you were Elly’s teacher, how would you assess her safety? What five recommendations would you make to ensure that Elly is safer in the future?

Assessment

Recommendations

Student worksheet

1.3 Scientists design their own experiments

Pages 8–9

Designing experiments

1 For all of the ‘What if?’ questions on page 8, write a hypothesis and identify the dependant variable, independent variable and three control variables in the spaces below.

a What if the balloon was blown up more?

Hypothesis

Dependant variable

Independent variable

Three control variables

b What if the string had less friction?

Hypothesis

Dependant variable

Independent variable

Three control variables

c What if the string had more friction?

Hypothesis

Dependant variable

Independent variable

Three control variables

d What if the straw were shorter?

Hypothesis

Dependant variable

Independent variable

Three control variables

Extend your understanding

2 An experiment was performed where a student dropped a fizzy Alka-Seltzer tablet in 100mL of room temperature water and timed how long it took the tablet to dissolve.

Students were then given four ‘What if?’ questions to investigate the ways to make a chemical reaction go faster.

• What if the water was warmer?

• What if the tablet was crushed into powder?

• What if the tablet was coated in Vaseline?

a In each of the questions, what is the variable that you are testing? What is the name of this variable?

b Name the three factors that you are changing in the above questions.

c For two of the ‘What if?’ questions above, write a hypothesis and identify the dependant variable, independent variable and three control variables in the spaces below:

Question 1

Hypothesis

Dependant variable

Independent variable

Three control variables

Question 2

Hypothesis

Dependant variable

Independent variable

Three control variables

d After designing your experiment you complete it in the laboratory. The next day, one of your classmates replicates your experiments, but finds that their Alka-Seltzer tablet dissolves faster every time. State one possible reason that this may be happening.

Student worksheet

1.4 Scientists keep a logbook and write formal reports

Pages 10–11 and 159

Logbooks

1 A student writes an entry in their laboratory logbook. The entry is shown below.

|  |  |  |  |
| --- | --- | --- | --- |
| Temperature rise of different volumes of water | | | 10th March 2016 |
| Results: |  |  |  |
|  | 1 min | 2 min | 3 min |
| 50 mL | 18ºC | 40ºC | 80ºC |
|  |  |  |  |
|  | 1 min | 2 min | 3 min |
| 100 mL | 20ºC | 30ºC | 70ºC |
|  |  |  |  |
| Observations | The water heated up faster in the 50 mL beaker. 200 mL of water rose from 19ºC to 25ºC and then to 60ºC. | | |
|  |  | | |
| Aim | To heat up water. | | |
|  |  | | |
| Hypothesis | The smaller beaker will heat up faster. | | |
|  |  | | |
| Conclusion | Water heats up. | | |

Each section has an error or has not been included. Below, state the errors that the student made.

a Aim

b Hypothesis

c Method

d Results

e Observations

f Conclusion

Extend your understanding

2 Use the incorrect logbook entry on the previous page and re-write it in the lined logbook on the following page to show what it should look like. Assume that the experiment below is the one that this logbook entry was based on.

|  |  |
| --- | --- |
| The Effect of Volume on Boiling Time | |
| **Purpose:** To discover whether the volume of water in a beaker determines how long it will take to boil. | |
| **Materials:**   3 beakers: 100 mL, 250 mL and 400 mL   2 measuring cylinders: 100 mL and 200 mL   Bunsen burner   Thermometer   Tripod |  Heat-proof mat   Gauze mat   Matches   Stopwatch   Heat-proof gloves |
| **Method:**  1 Put 50 mL of water into the 100 mL beaker using a 100 mL measuring cylinder and record its temperature. This will be your temperature at time zero.  2 Set up the Bunsen burner equipment and place the beaker on top of the gauze mat.  3 Once set up, use your Bunsen burner rules to light the Bunsen burner. Start timing.  4 Record the temperature of the water every 30 seconds until it boils.  5 Once the water has boiled use the heat-proof gloves to remove the beaker from the top of the gauze mat. Leave it to cool and then tip it down the sink.  6 Repeat steps 2–6 using 100 mL of water in the 200 mL beaker (with a 100 mL measuring cylinder). Record your results.  7 Repeat steps 2–6 using 200 mL of water in the 400 mL beaker (with a 200 mL measuring cylinder). Record your results.  8 Graph the relationship between water temperature and time for all three volumes of water. Put these on the same graph. | |

Correct logbook entry:

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

Student worksheet

1.5 Tables and graphs are used to represent data

Pages 12–13

Graphing and interpretation

1 What are the four features that all graphs have in common?

2 What is the most common type of graph used to represent data in science?

3 What do the following graph shapes mean in terms of the dependant and independent variables?

a Positive slope upwards

b Horizontal line

c Negative slope downwards

4 What is the name of the relationship when the data experiences

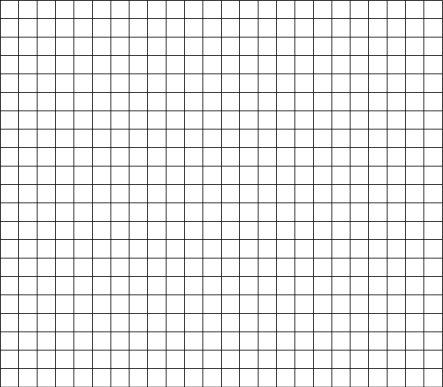
a a positive slope upwards?

b a negative slope downwards?

5 A student reacted two chemicals together and recorded the temperature of the reaction for 8 minutes.

|  |  |
| --- | --- |
| Time (mins) | Temperature (ºc) |
| 0 | 20 |
| 1 | 30 |
| 2 | 40 |
| 3 | 50 |
| 4 | 60 |
| 5 | 65 |
| 6 | 68 |
| 7 | 69 |
| 8 | 70 |

a Create a line graph of the set of data that was obtained.



b What is the shape of the graph?

c What is the relationship between the independent variable and the dependant variable?

Extend your understanding

Mathematics can often be used to determine the relationship between variables on a graph. For most graphs you can calculate the slope of the graph as .

6 A student wishes to test two methods of heating water. In the first method he uses a Bunsen burner, and in the second method he uses a hotplate.

a Graph the results of the two methods below.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Bunsen burner   |  |  | | --- | --- | | Time (min) | Temp (ºc) | | 0 | 18 | | 1 | 34 | | 2 | 50 | | 3 | 66 | | 4 | 82 | | 5 | 98 |   D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0114_00951.jpg | Hotplate   |  |  | | --- | --- | | Time (min) | Temp (ºc) | | 0 | 18 | | 1 | 26 | | 2 | 34 | | 3 | 42 | | 4 | 50 | | 5 | 58 |   D:\OS8 worksheets and aw\jpgs ready for worksheets\SW0114_00951.jpg |

b Using the graphs drawn in part a, calculate the slope of each graph.

c Which heating method is more effective? Use your answers in part b to support your answer.