Kirkcaldy High School

BGE Science

Introduction to Science

Name:_____

Class:_____

Teacher:_____

Expectations and Outcomes Learner Evaluation

Topic: Introduction to Science

Experience and Outcomes	Date Completed (dd/mm/yy)	Evaluation How happy are you with it? (☺ ? ☹)
I can identify the dangers of working in a Science classroom.		
I can keep the laboratory a safe environment.		
I can understand all the safety symbols shown in a laboratory.		
I can safely light a Bunsen burner.		
I can change the flames of a Bunsen burner.		
I can use a Bunsen burner to burn magnesium.		
I can use a Bunsen burner to boil water.		
I can state the temperature at which water boils.		
I can name various apparatus in the lab.		
I can understand why we need to measure accurately in Science.		
I can understand how to obtain accurate measurements.		
I can correctly interpret results of a bar graph.		
I can produce a bar graph from a set of results.		
I can make conclusions from a set of results.		
I can identify variables in any experiment.		
I have investigated how quickly hot water cools.		
I understand ways to control variables in any experiment.		

Date: _____

Science Safety

Starter:

1. Why is Science important in our everyday lives?

_____

_____

_____

2. A Science classroom is different from other classrooms. What differences can you see?

_____

_____

_____

_____

Learning Intentions

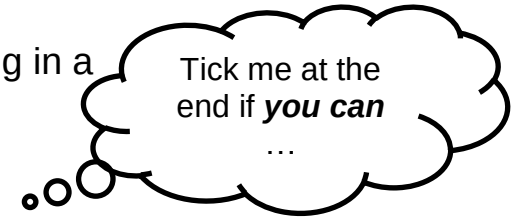
- To understand the dangers associated with working in a science classroom (laboratory).
- To describe how to keep the laboratory a safe environment.
- To identify the safety symbols in a science classroom

Success Criteria

☐ I can state the dangers associated with working in a Science classroom

☐ I can describe a safe laboratory environment

☐ I can identify the safety symbols shown in a laboratory.

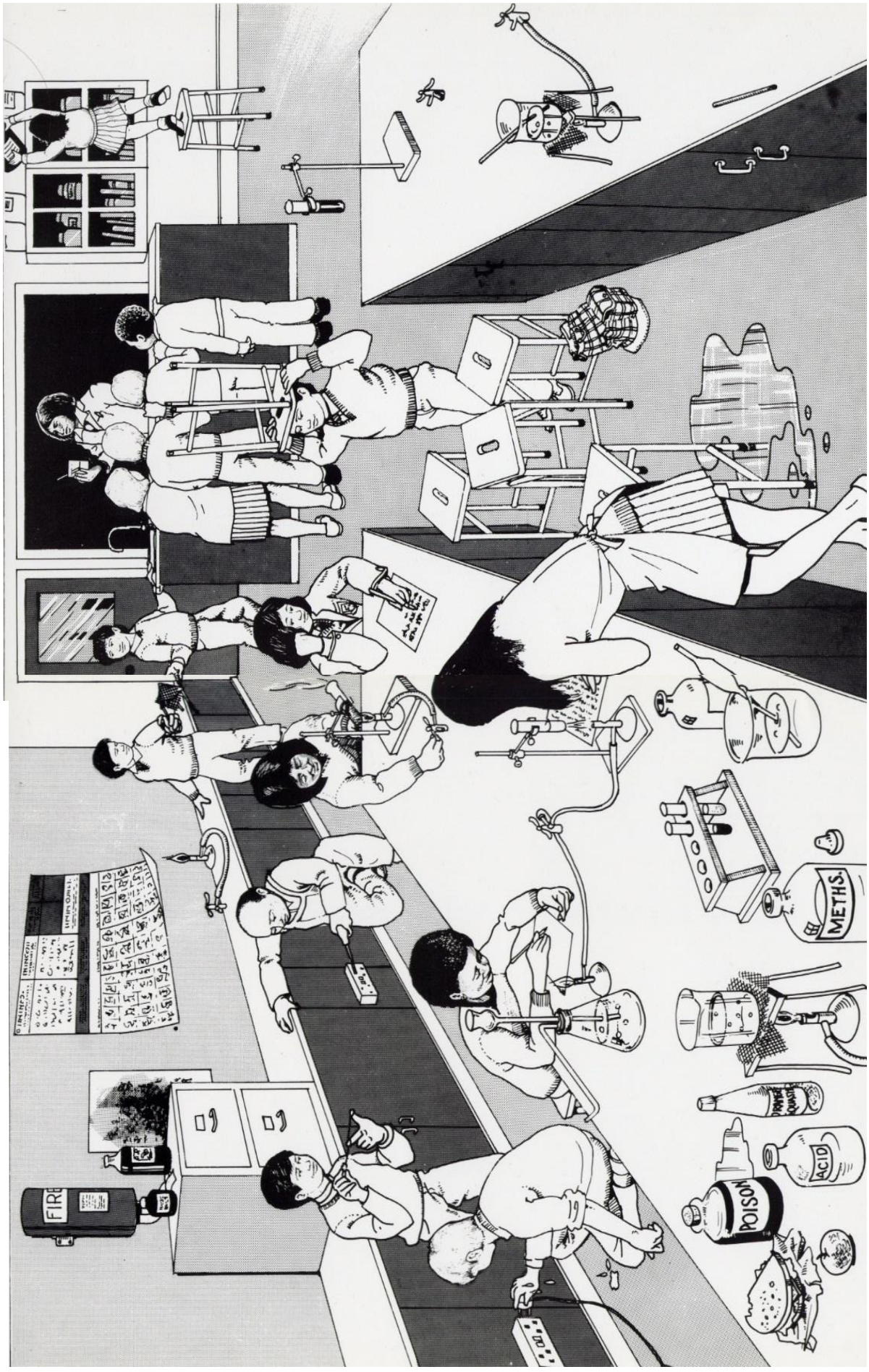


Hazards in a Science classroom

A science classroom is different to others you have been in. There are many hazards for you to encounter here. To make science as safe as possible, there are rules which must be followed in the class. This is especially important when doing experiments.

In pairs, discuss the hazards which are present in a science classroom. What can you think of?

Circle the safety issues in the picture below.



Activity: Can you think of your own safety rules? (HINT: Use the picture on the previous page for inspiration). Write down **at least 3** science safety rules.

_____

_____

_____

_____

_____

_____

Science Safety Rules

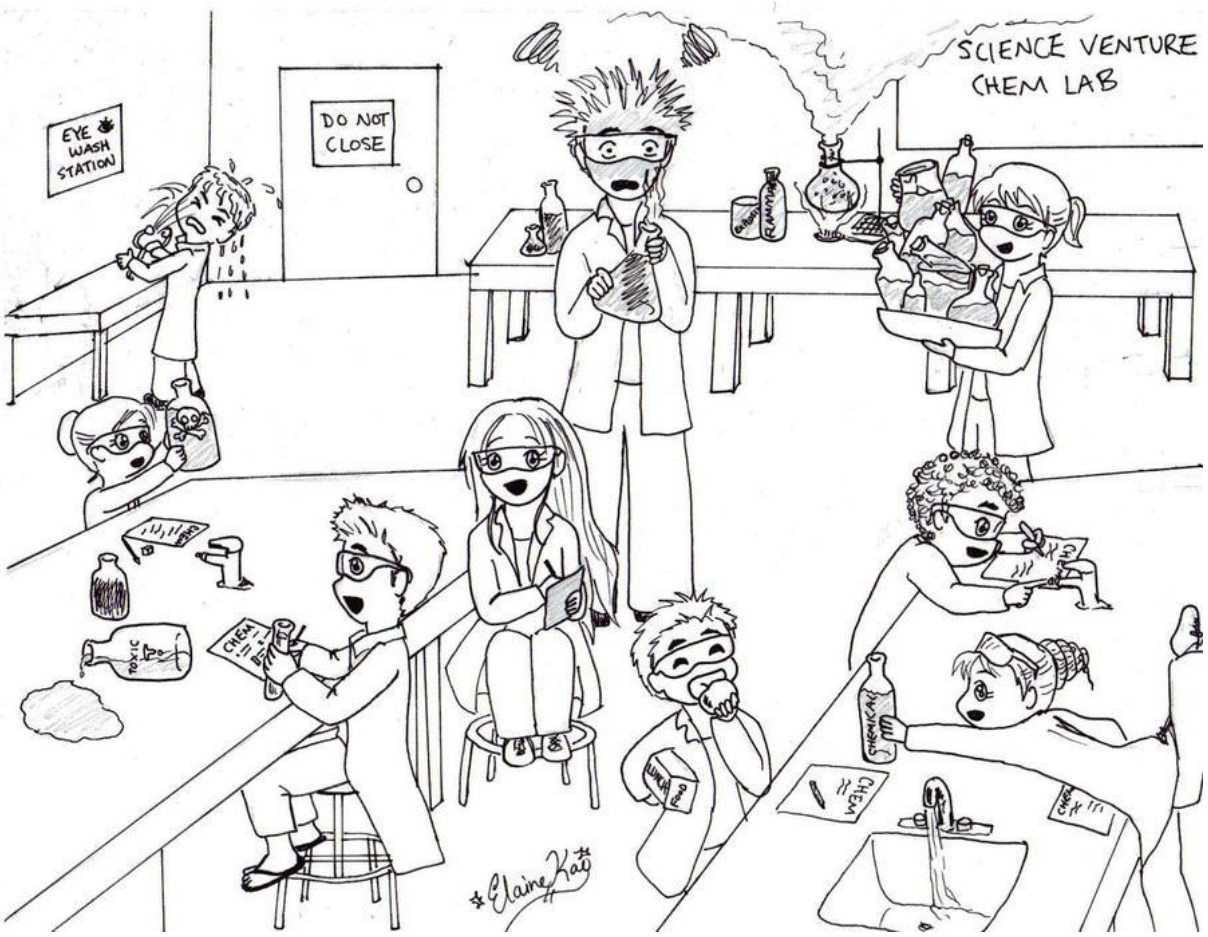
1. Never _____ a science lab until a teacher is present.
2. C_____ and outside garments MUST be removed.
3. Always wear _____ _____ when performing an experiment.
4. Only perform the _____ you are told to do.
5. Never eat, _____ or taste anything in the lab.
6. Always inform the teacher of _____ straight away.
7. Make sure all chairs and _____ are pushed under desks to avoid accidents.
8. Never _____ in the lab.
9. When in doubt, **ASK A TEACHER**

Date: _____

Safety Symbols

Starter

The Cartoon shows (at least!) 12 Safety Hazards in a Science Lab. What hazards do you see?



Learning Intentions

- To understand the dangers associated with working in a science classroom (laboratory).
- To describe how to keep the laboratory a safe environment.

Success Criteria

☐ I can name the dangers associated with working in a Science classroom

☐ I know how to keep the laboratory safe

☐ I can identify the safety symbols shown in a laboratory.

Tick me at the end if ***you can*** …

Safety Symbols

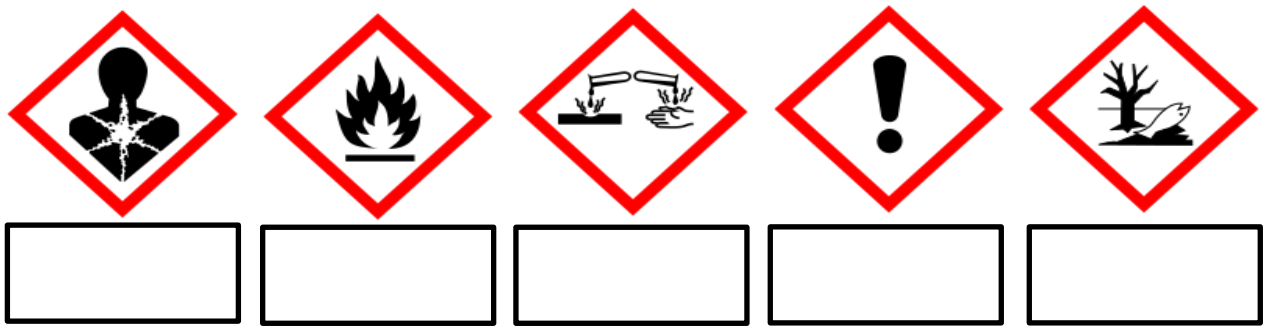
In the Science classroom, you will be working with lots of different pieces of equipment and _____, all of which must be handled _____.

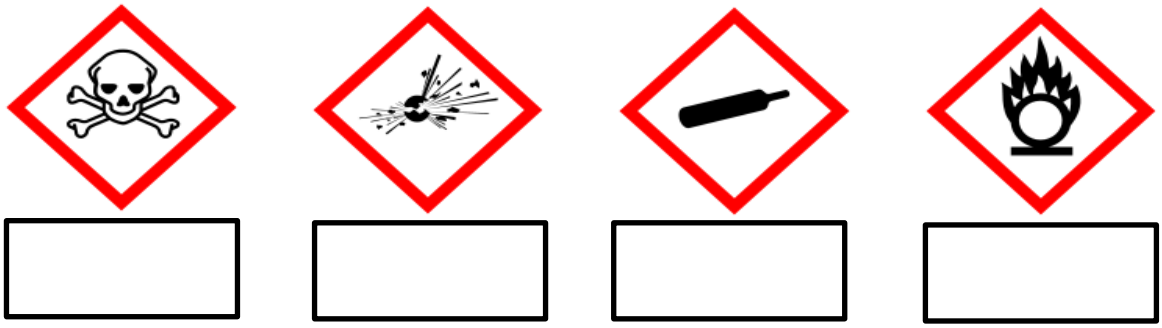
In order to keep you safe, chemicals that can cause _____ are labelled with _____ Symbols.

These same symbols are used all over the _____, so it doesn't matter if you speak the local language, you can always be safe!

These are examples of the common symbols found within the Science Lab.

Activity: Label the safety symbols below:



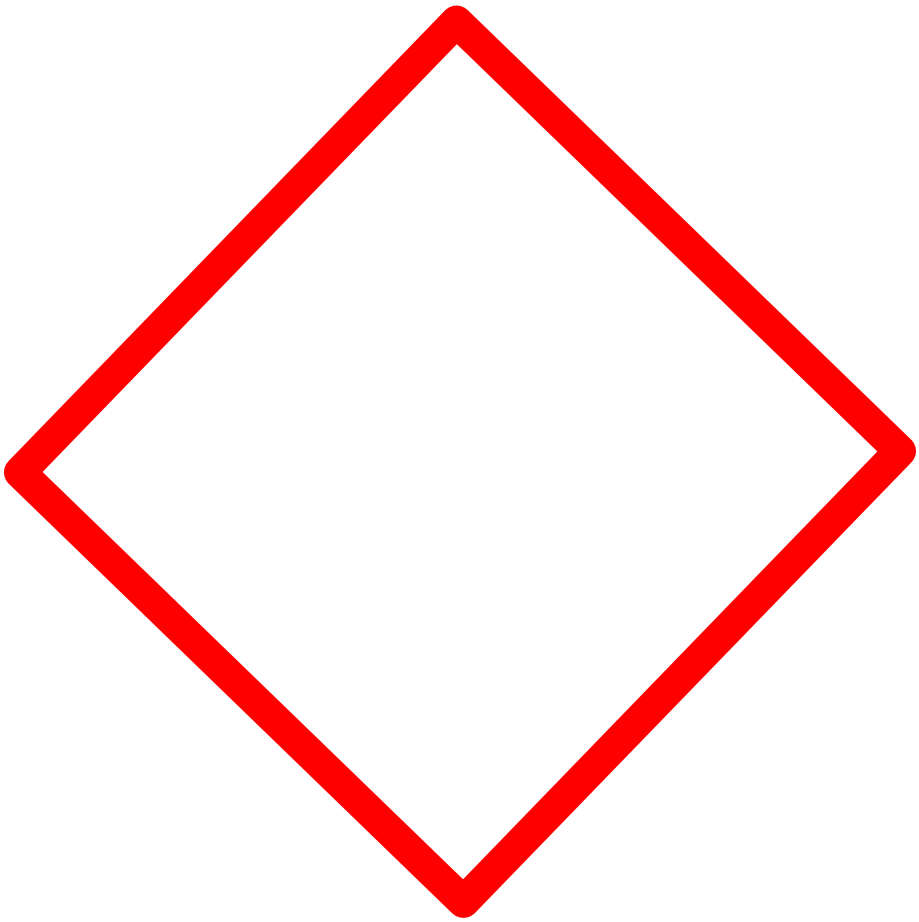


Activity: Design your own safety symbol

Design your own safety symbol. Your safety symbol could refer to the science safety rules.

Examples:

		
Always wear safety glasses during experiments.	Never run in the laboratory.	Stand up when doing experiments.



Extension: Go to the back of the booklet and complete a word search, riddle or colouring page.

Date: _____

Bunsen Burners

Starter

What safety rules must be followed when using the Bunsen burner?

_____

_____

Learning Intentions

- To learn how to safely light a Bunsen burner.
- To be able to change the flames of a Bunsen burner.

Success Criteria

Tick me at the end if ***you can*** …

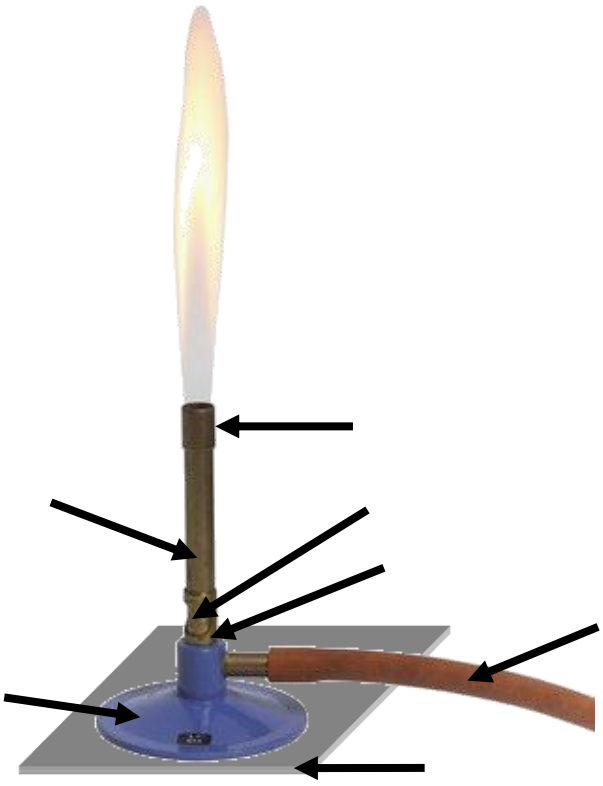
☐ I can safely light a Bunsen burner.

☐ I can change the flames of a Bunsen burner

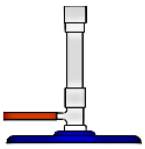
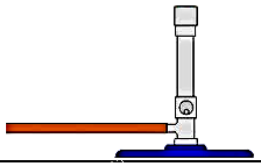
Activity: Label the diagram of a Bunsen burner below (HINT: Use the word bank to help you)

Word Bank

barrel air hole gas jet gas pipe collar base heat proof mat



Activity: Complete the diagram below.

YELLOW FLAME	BLUE FLAME
	
This is called the flame. When the Bunsen burner is not in use we use a yellow flame so it can be	This flame makes a noise. It is used to heat and is difficult to .
Position of Airhole	Position of Airhole

Practical: Safety checklist

- ☐ Safety glasses were worn.
- ☐ Long hair was tied back and loose items of clothing tucked away.
- ☐ The Bunsen burner was placed on a heat resistance surface.
- ☐ The Bunsen burner is not too close to the edge of the desk.
- ☐ The burner was connected to the gas tap correctly.
- ☐ The air hole on the Bunsen burner was closed before lighting.
- ☐ The splint was lit before the gas was turned on.
- ☐ The splint was positioned correctly while the gas was turned on.
- ☐ The splint is disposed of safely
- ☐ The student can adjust the flame safely

Date: _____

Burning Magnesium

Starter

1. What flame should you always light the Bunsen burner on?

_____

2. What do you need to do immediately if the flame on your Bunsen burner goes out?

_____

3. Which flame is the hottest flame?

_____

4. What part of the flame is the hottest part?

_____

5. Why is the safety flame named the safety flame?

_____

Learning Intentions

- To use a Bunsen burner to burn magnesium.

Success Criteria

☐ I can **safely** use a Bunsen burner to burn magnesium

Burning Magnesium Experiment

Aim: What happens when magnesium ribbon burns?

Method: *(draw a labelled diagram)*

1. Safely light your Bunsen burner so you have a _____ flame.
2. Change the flame to a _____ flame.
3. Using _____, hold the magnesium in the flame.
4. Record what you see.

Conclusion: _____

_____

Date: _____

Boiling Water

Starter

Name 3 pieces of scientific equipment you have used in science.

_____

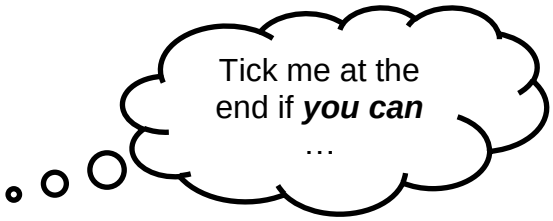
_____

_____

Learning Intentions

- To use a Bunsen burner to boil water
- To state the temperature at which water boils and ice melts.

Success Criteria



☐ I can boil water using a Bunsen burner

☐ I can state the temperature at which water boils and ice melts

---

Temperature

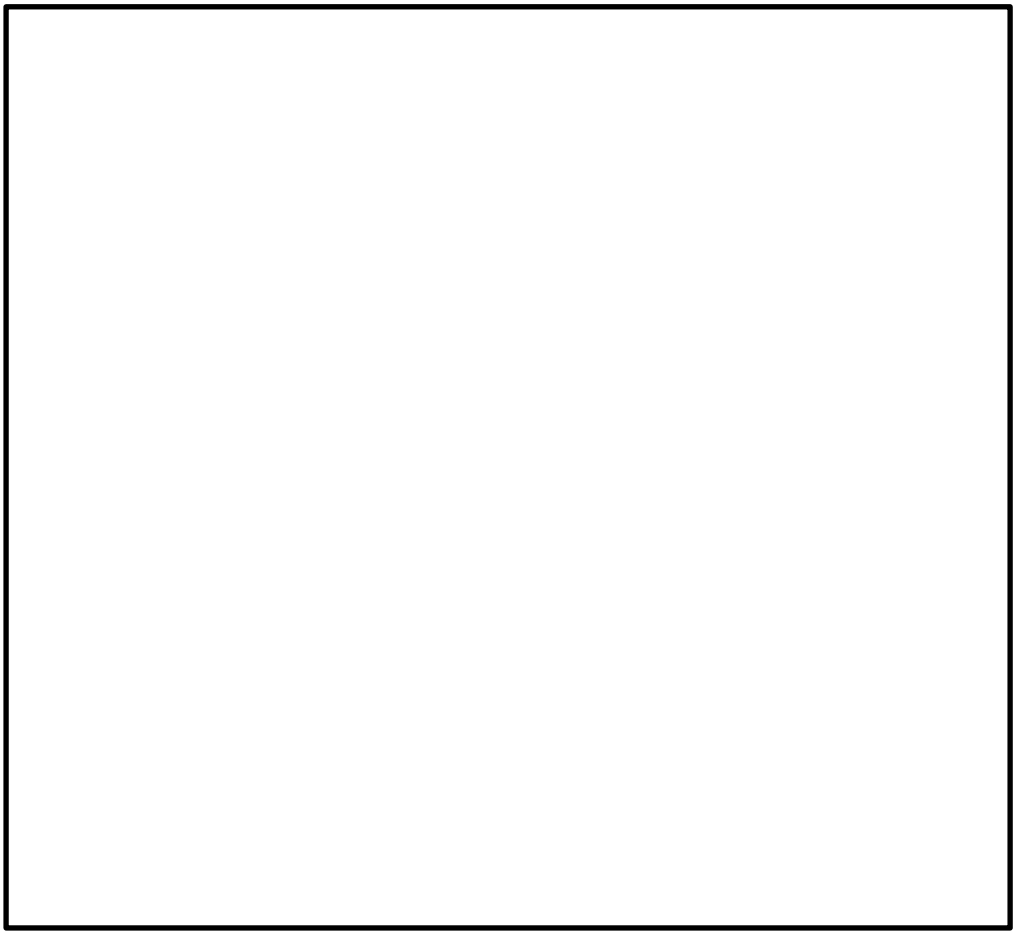
Temperature is a measure of how _____ or _____ something is. Temperature is measured using a _____. Temperature is measured in _____ _____ (____).

Boiling Water

Aim:_____

_____

Method:



Conclusion: *(remember your aim)*

The temperature of melting ice is _____.

The temperature of tap water is _____.

The temperature of boiling water is _____.

Date: _____

Measuring in Science

Starter

Name the science equipment pictured using the word bank to help you.

A = _____ **B =** _____

C = _____ **D =** _____

E = _____ **F =** _____

Learning Intentions

- To identify various apparatus in the lab.
- To understand why we need to measure accurately in Science.
- To understand how to make accurate measurements.

Success Criteria

Tick me at the end if ***you can*** …

- ☐ I can identify various apparatus in the lab
- ☐ I can explain why we need to measure accurately in Science
- ☐ I can make accurate measurements

Measurements and units

We all make measurements in our everyday life. What do we measure?

Every measurement should include a _____ followed by a _____ of measurement.

For example: 4.23 cm or 62 minutes

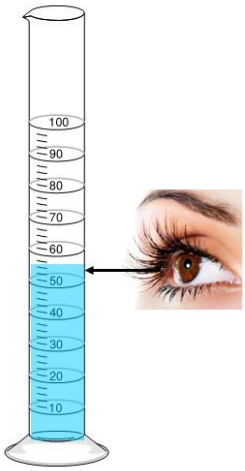
Activity: Underline the unit of measurement in each of the statements below.

1. The patient's temperature is 38 ^{O}C.
2. The sack holds 5 kilograms of potatoes.
3. It is 4 kilometres from your house to school.
4. The bottle holds 2 litres of cola.

Steps for Measuring Volume

1. Take a reading by checking to see exactly what point the water reaches on the scale.

2. Try to position yourself so that you are level with the scale on the measuring cylinder – if you read it from above or below, you may not get an accurate reading.



Activity: Making measurements

Aim: To make accurate measurements

Situation	Measurement (including unit)
Hand span	
Length of desk	
Temperature of room	
Temperature of tap water	
Volume of test tube	
Volume of boiling tube	
Time taken for the ball to drop 1 metre	
Time taken to complete 5-star jumps	
Mass of a pencil	
Mass of a jotter	

Summary:

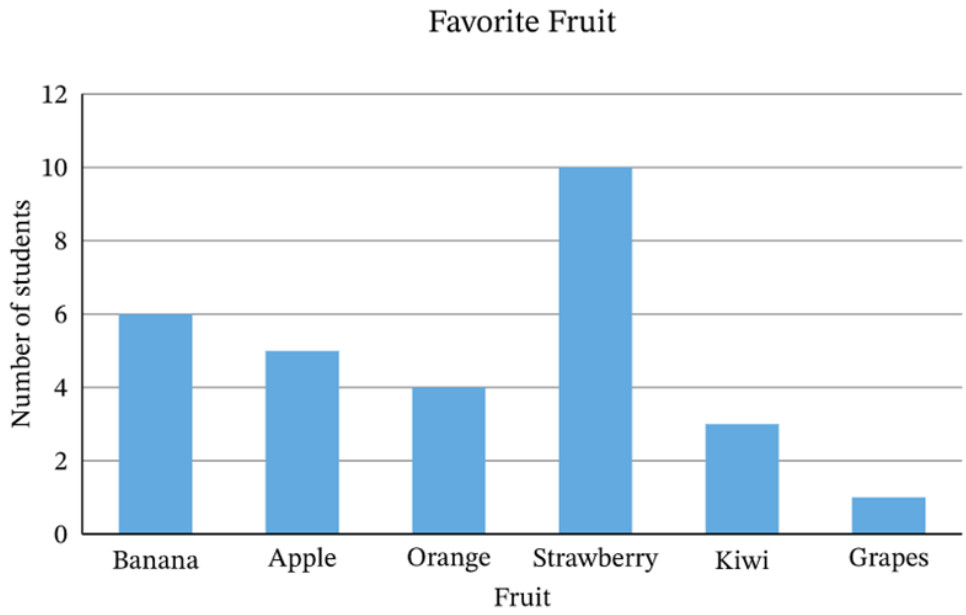
- Length is measured in _____.
- Volume is measured in _____.
- Mass is measured in _____.
- Temperature is measured in _____.
- Time is measured in _____.

Word bank:
seconds (s)
cm^3
degrees Celsius (^oC)
metres (m)
kilograms (kg)

Date: _____

Bar Graphs

Starter



1. How many students like apples the most? _____
2. How many more students like berries than apples? _____
3. How many fewer students like peaches than mangoes? _____
4. Which is the most liked fruit? _____

Learning Intentions

- To correctly interpret results of a bar graph.
- To produce a bar graph from a set of results.
- To make conclusions from a set of results.

Success Criteria

Tick me at the end if ***you can*** …

- ☐ I can interpret results of a bar graph.
- ☐ I can produce a bar graph from a set of results.
- ☐ I can make conclusions from a set of results.

Bar Graphs

In Science, graphs are often drawn to make information from the results easier to understand.

Sometimes it is appropriate to draw a:

- _____ graph
- _____ graph
- _____ graph with a best fit line

It depends on the type of information you are dealing with.

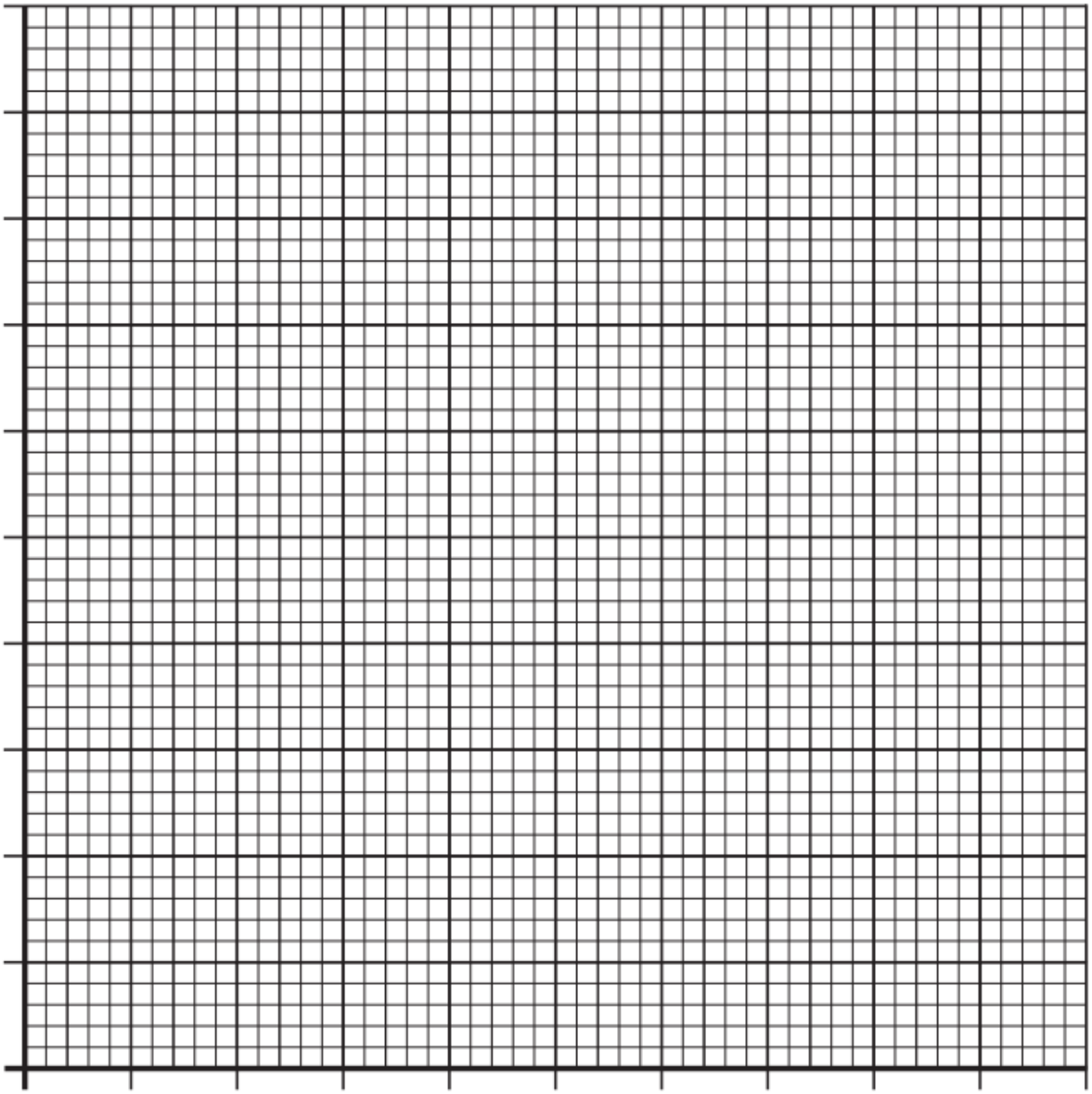
Hair Colour Investigation

Aim: To investigate the most popular _____ _____ in class _____.

Results:

Colour of hair	**Number of pupils**	
	Tally	Total
Brown		
Blond		
Red		
Black		
Other		

Graph:



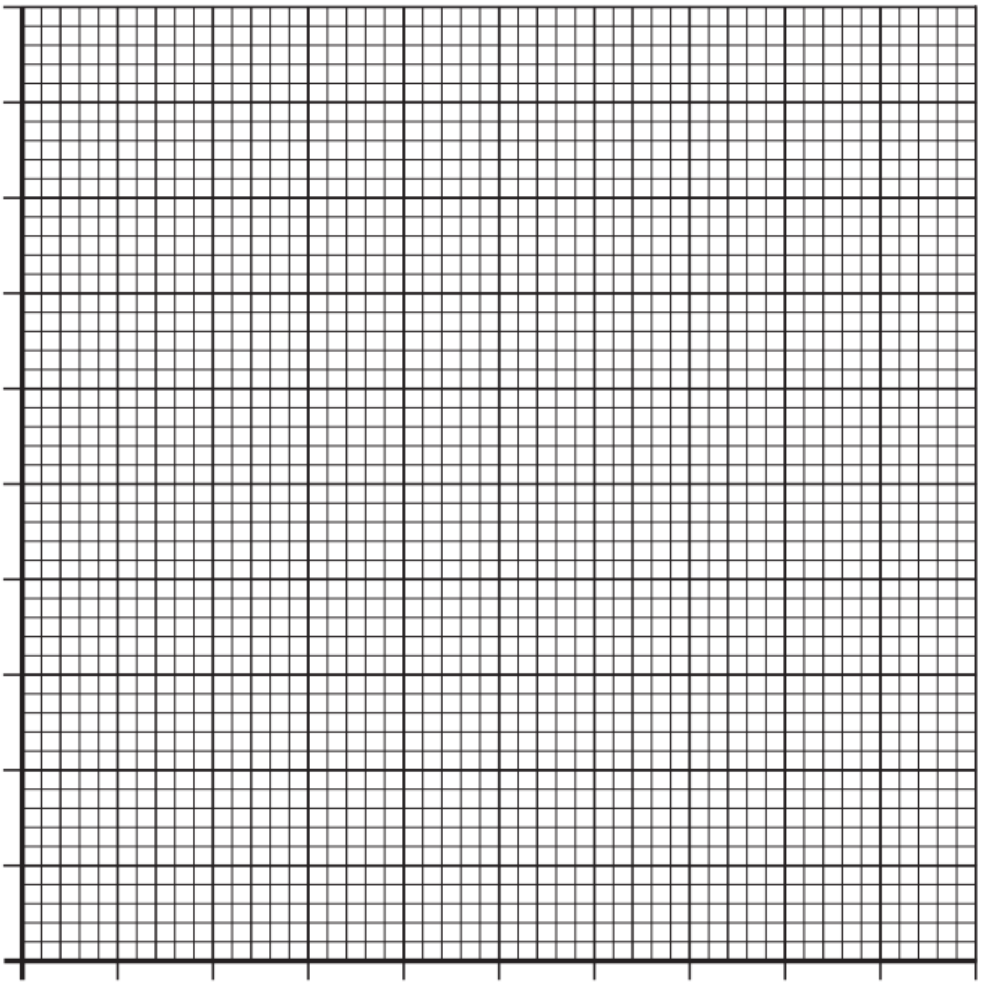
Conclusion:

The most popular hair colour in _____ is _____.

Bar Graph Practice (*additional graph paper at back of booklet)*

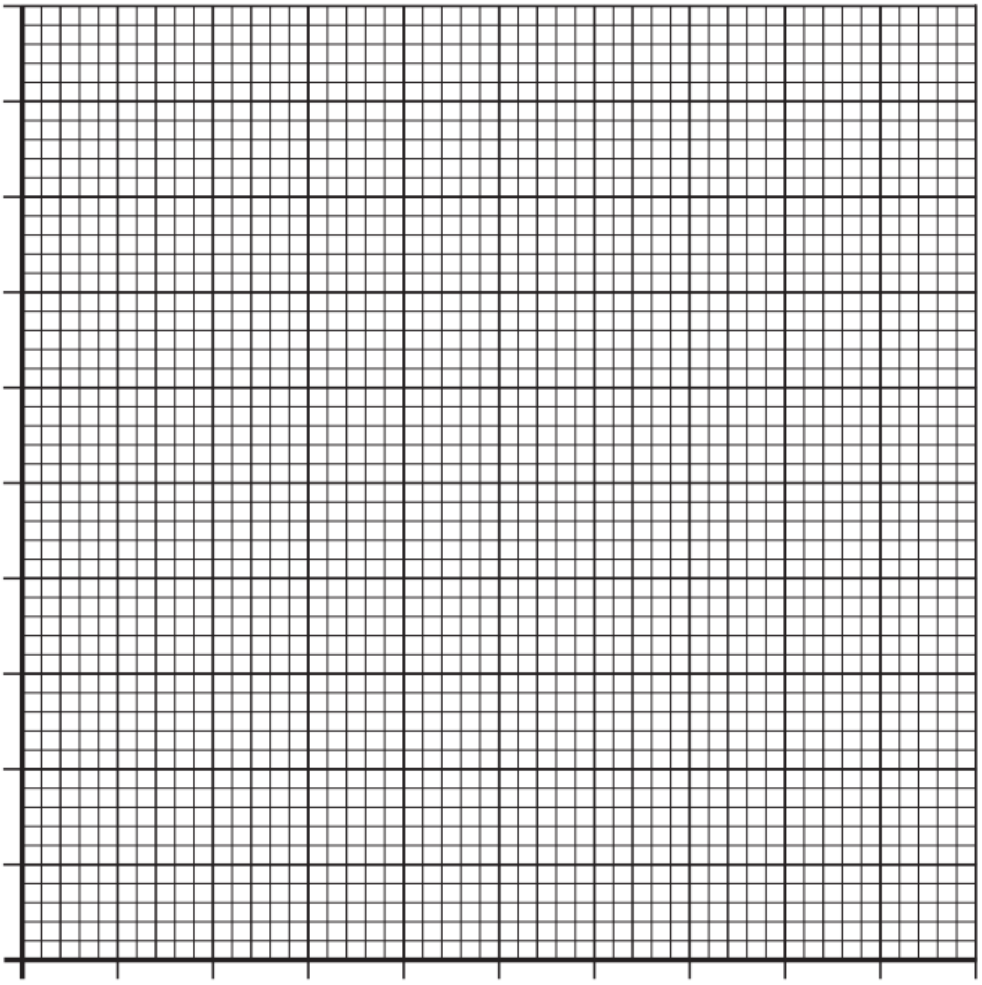
Louise planted seeds in her garden. Draw a bar graph of her crops.

Crop	Number of seedlings
Pumpkin	60
Squash	90
Lettuce	50
Tomato	60
Courgette	30



A survey of pupils produced the following data for favourite after-school activities. Draw a bar graph of the data.

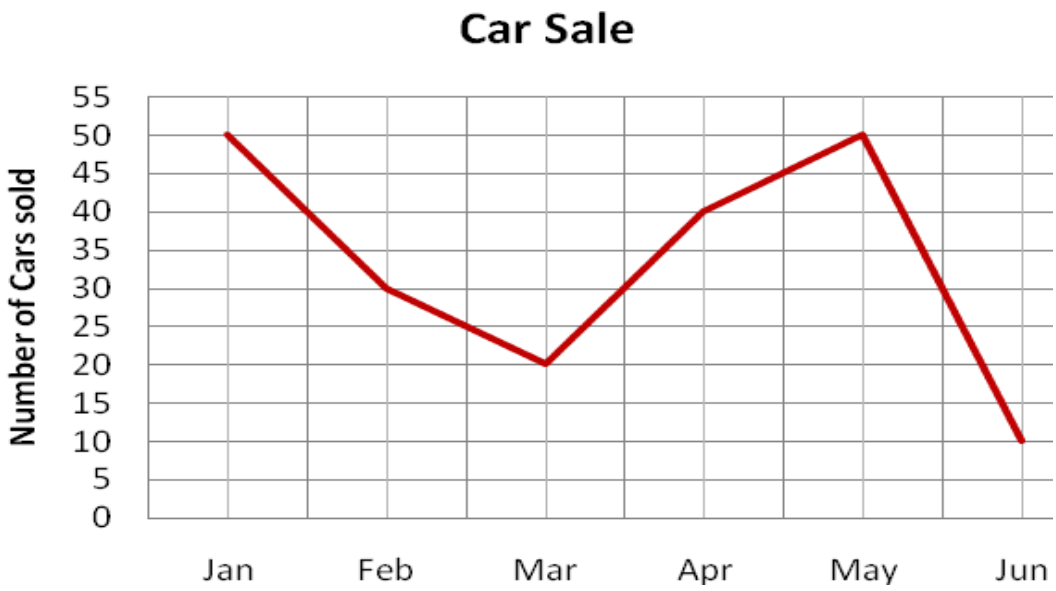
Activity	Number of pupils
Play sports	45
Talk or text on phone	53
Visit friends	55
Earn money	44
School clubs	22
Chat online	66
Watch TV	37



Date: _____

Investigating Cooling

Starter

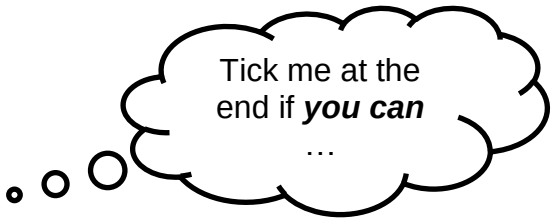


1. How many cars were sold in April? _____
2. In which two months were the same number of cars sold? _____ & _____
3. What is the difference in number of cars sold in the months of March and June? _____

Learning Intentions

- To understand and identify variables in any experiment.
- To understand ways to control variables in any experiment.
- To investigate how quickly hot water cools.

Success Criteria



☐ I can identify variables in an experiment

☐ I know ways to control variables.

☐ I have investigated how quickly hot water cools

Investigating Cooling

Aim: To investigate how changing the _____ of water affects how quickly water cools down.

Method:

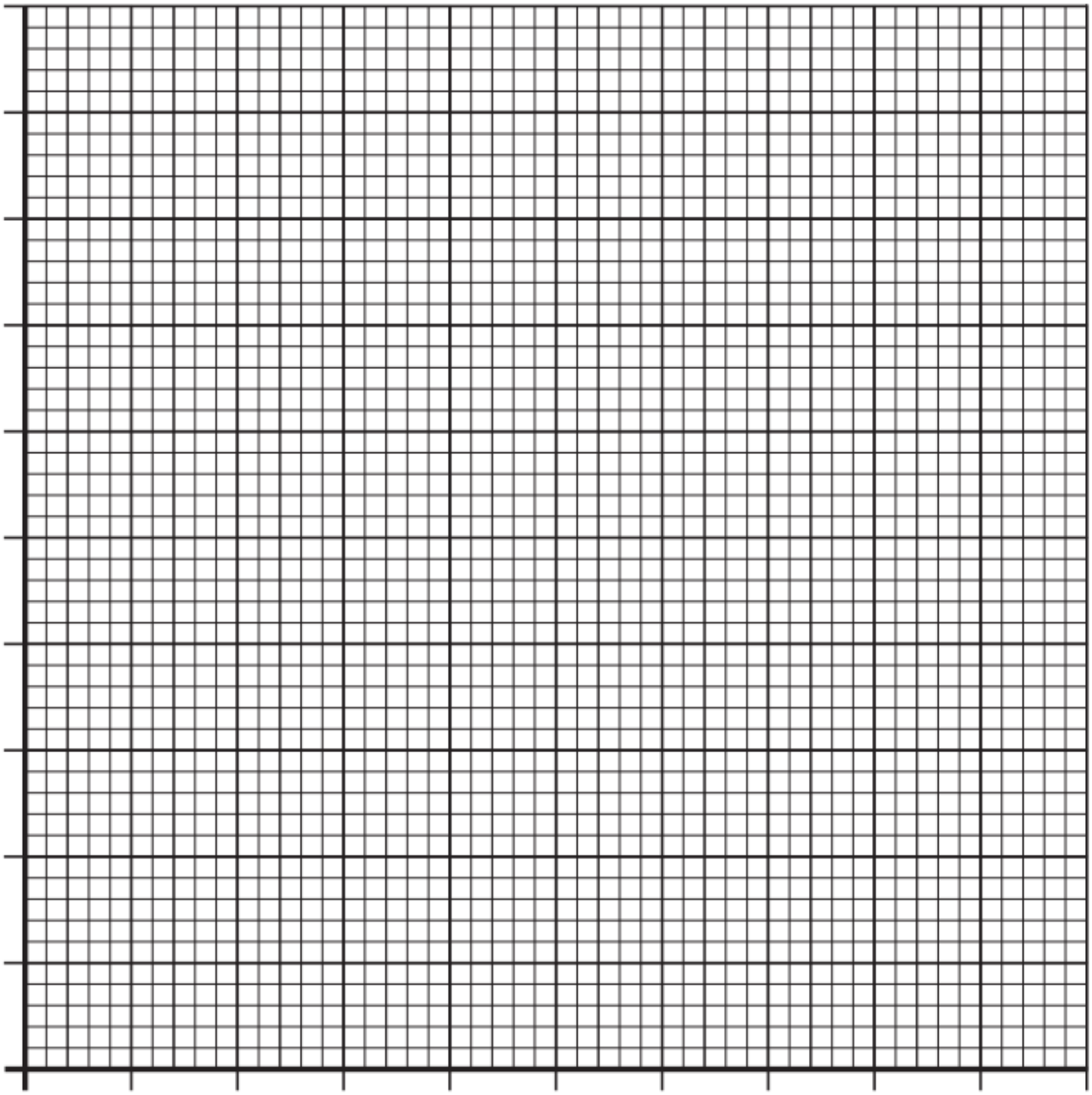
1. Carefully pour _____ of water into beaker 1
2. Carefully pour _____ of water into beaker 2
3. Place a _____ into each beaker, leave for a few seconds and take the temperature – write this in your results table
4. Use the s_____ _____ to record the temperature of the water in both beakers **every 2 minutes.**

Draw a diagram below.

Results:

Time (minutes)	Temperature (°C)	
	Beaker 1 (50 ml)	Beaker 2 (100 ml)
0		
2		
4		
6		
8		
10		
12		
14		
16		

Plot a scatter graph of your results *(REMEMBER: include a line of best fit).*

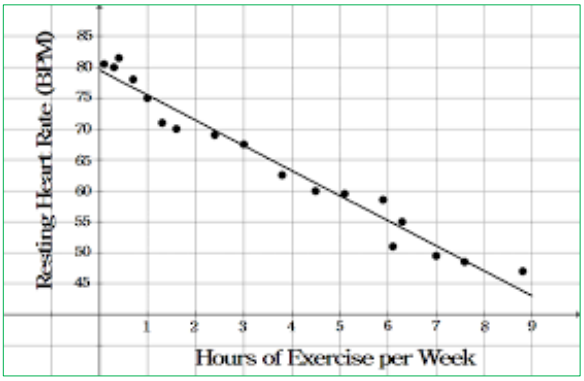


Conclusion:

The beaker with _____ml of water cooled down quicker than the beaker with _____ml of water.

Scatter Graphs

A graph of plotted points that show the relationship between two sets of data. A line of best fit is often added to identify trends in data.



Scatter Graph Practise (*graph paper is available at the end of booklet)*

1. Solar power is a renewable energy source of energy. The table below shows the voltages produced by a solar cell when the light of different intensities is shining on it.

Light intensity (units)	Voltage (mV)
0	0
20	7
40	14
60	21
80	28
100	35

Extension Tasks

Word Search

Introduction to Science

E	B	S	R	M	L	H	A	Z	A	R	D	S	N
I	C	H	A	E	U	S	C	A	U	T	I	O	N
N	S	A	P	F	U	I	B	E	M	U	L	O	V
U	F	U	S	A	E	H	S	U	E	E	M	O	T
G	L	Z	V	L	R	T	M	E	N	O	C	L	E
O	A	P	S	L	E	G	Y	I	N	S	T	C	M
G	M	S	E	A	N	S	B	E	M	G	E	B	P
G	M	C	C	A	E	U	N	I	T	S	A	N	E
L	A	R	E	X	P	L	O	S	I	V	E	M	R
E	B	R	E	T	T	A	C	S	I	A	A	H	A
S	L	H	T	T	V	A	R	I	A	B	L	E	T
S	E	O	M	B	U	E	N	I	L	N	F	O	U
U	T	A	S	L	A	C	I	M	E	H	C	L	R
C	H	M	E	E	E	R	E	L	A	C	S	A	E

GRAPH
UNITS
EXPLOSIVE
LINE
FLAMMABLE
MAGNESIUM
VOLUME
SAFETY
BAR
GOGGLES
SCATTER
TEMPERATURE
BUNSEN
HAZARD
CAUTION
VARIABLE
SCALE
CHEMICALS

Play this puzzle online at : https://thewordsearch.com/puzzle/5599362/

Riddles

1. Riddle: I am a tool in a lab, used to heat up things that are drab, with a flame that's hot and bright, I make experiments go just right. What am I?

   _____

2. I can be hot, I can be cold, I can run and I can be still, I can be hard and I can be soft. What am I?

   _____

3. I am something you need to live, and you can't see me or hold me. I'm in the air you breathe. What am I?

   _____

4. I'm the centre of the solar system, and I help plants grow. I give you warmth and light. What am I?

   _____

5. I am the only natural satellite of the Earth, and I control the ocean's tides. What am I?

   _____

6. I am a round object that rolls down a hill, and I can be made of rubber or metal. What am I?

   _____

7. I help you see in the dark, and I can be found in the sky, on streets, and in you home . What am I?

   _____

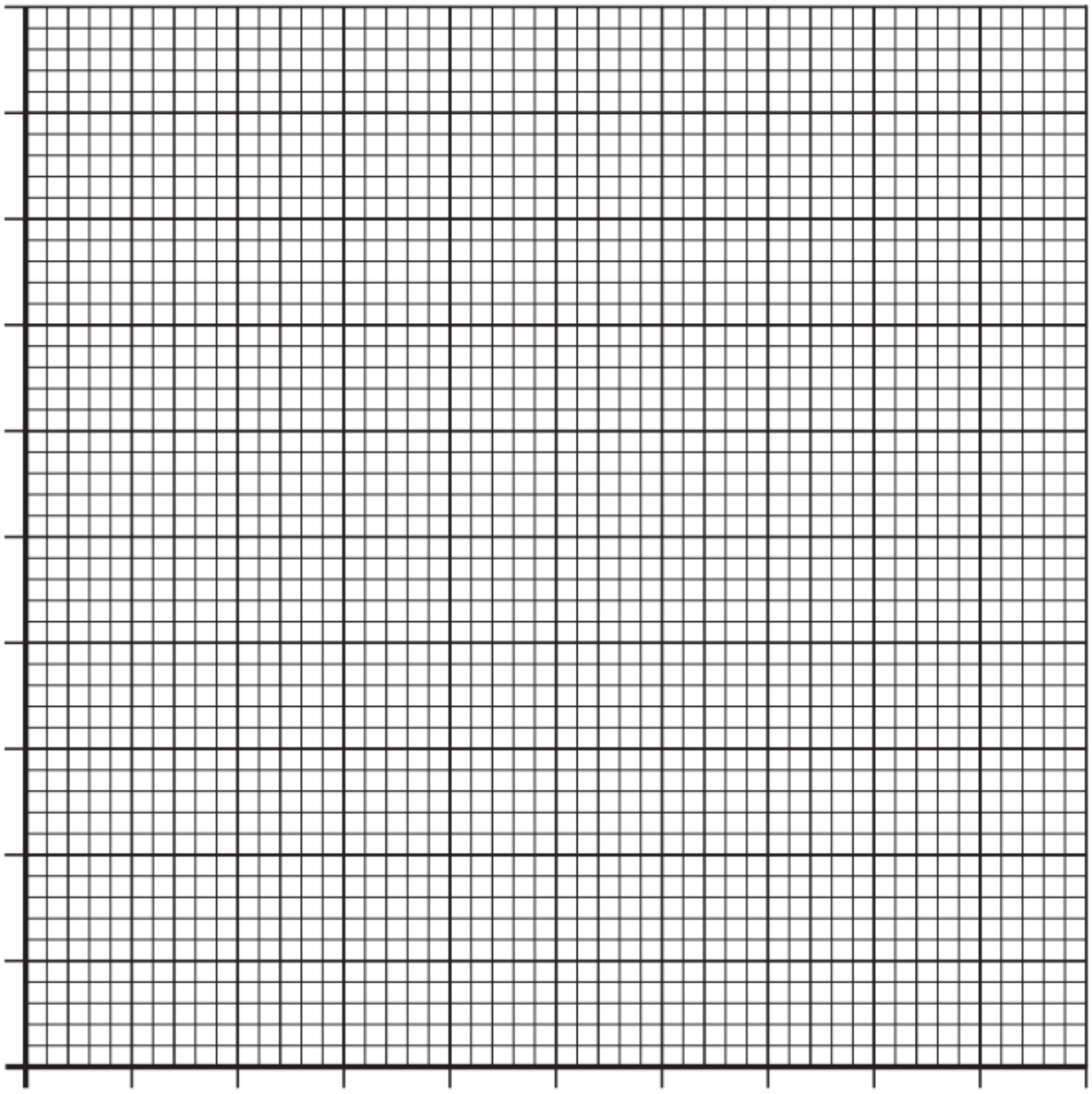
8. I can be black, white, or grey, and I am in the sky. I can bring rain, snow, or just a nice day. What am I?

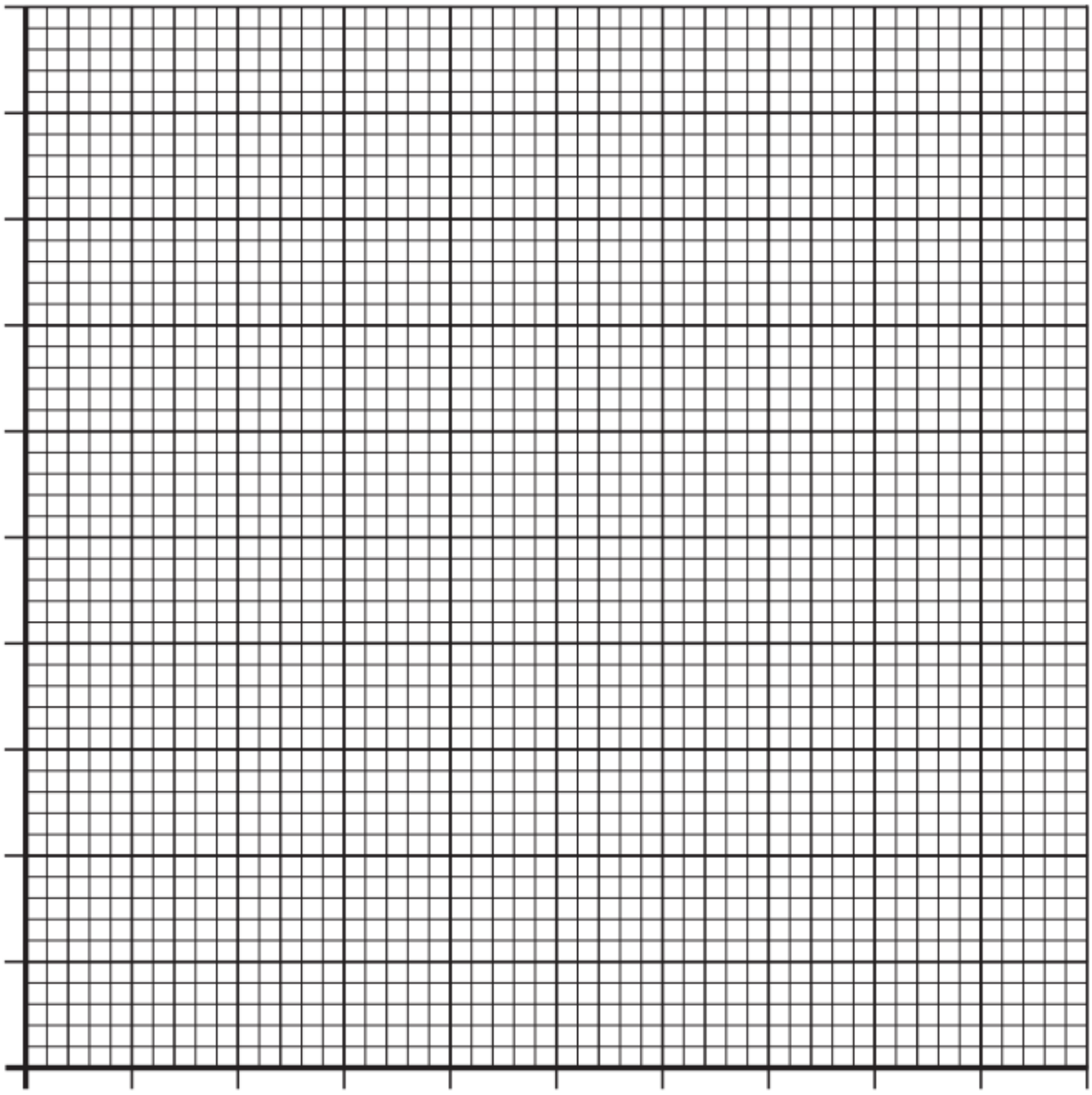
   _____

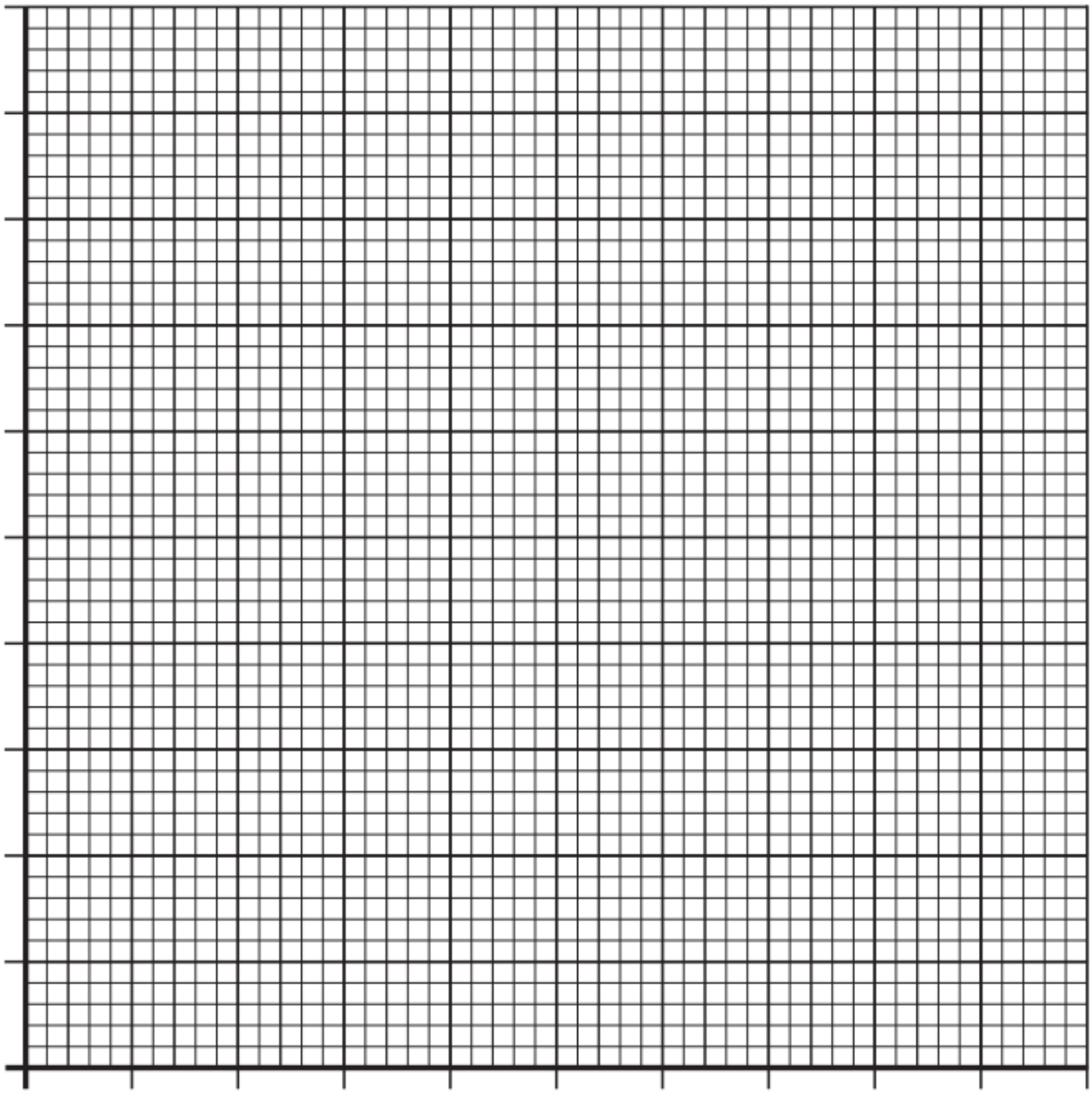
9. I come in many colours and shapes, and I grow from the ground. I cann be a flower, tree, or even grass. What am I?

   _____

Extra Graph Paper







Colouring page