Name:	Form:

MYP 1
Year 7
Super Skills

Statement of Inquiry:	Practical techniques and innovations allow us gather **evidence** of scientific **relationships** and construct **models** to help explain phenomena.
Key Concept:	Relationships
Related Concepts:	Models and Evidence

7SS MYP Command Terms

Term	Definition
Analyse	Break down in order to bring out the essential elements or structure. To identify parts and relationships, and to interpret information to reach conclusions.
Apply	Use knowledge and understanding in response to a given situation or real circumstances
Describe	Give a detailed account or picture of a situation, event, pattern or process
Design	Produce a plan, simulation or model
Discuss	Offer a considered and balanced review that includes a range of arguments, factors or hypotheses. Opinions or conclusions should be presented clearly and supported by appropriate evidence
Document	Credit sources of information used by referencing (or citing), following one recognized referencing system. References should be included in the text and also at the end of the piece of work in a reference list or bibliography
Evaluate	Make an appraisal by weighing up the strengths and limitations
Explain	Give a detailed account
Formulate	Express precisely and systematically the relevant concept(s) or argument(s)
Interpret	Use knowledge and understanding to recognize trends and draw conclusions from given information
Outline	Give a brief account
Present	Offer for display, observation, examination or consideration
Recall	Remember or recognize from prior learning experiences
Select	Choose from a list or group
Solve	Obtain the answer(s) using appropriate methods
State	Give a specific name, value or other brief answer without explanation or calculation
Suggest	Propose a solution, hypothesis or other possible answer
Summarize	Abstract a general theme or major point(s)

Glossary: Super Skills

Word	Meaning
Corrosive	A chemical that will attack your skin.
Flammable	A chemical that will catch fire easily
Toxic	A chemical that is poisonous.
Bunsen Burner	A piece of lab equipment used for heating by burning a gas.
diagram	A sketch or a picture of how you want to set up your equipment.
Beaker	Made out of glass. Used to investigate chemicals during practical work.
Filter Funnel	Used to remove a solid from a liquid.
Measuring cylinder	Used to measure out a liquid
Conical flask	A triangular shaped glass container.
Apparatus	Another name for the equipment that you use in the lab.
Thermometer or Temperature probe	Used to measure the temperature
Celsius	The unit for measuring temperature
Centimeter cubed (cm3)	The unit for measuring the volume.
Stopwatch	Used for measuring time (in seconds)
Electronic balance	Used for measuring the mass of an object.
Particle	A very small part of something, they are drawn as being round in shape.
Theory	Used to explain why something works the way it does.
Solid	When all the particles are packed close together in a regular pattern.
Liquid	When all the particles are packed together but can move about in a random way.
Gas	When all the particles are far away from each other and move very quickly.
Property	Something we can see that needs explaining. E.g. Gases can be squeezed easily.
Expand/contract	Get bigger or smaller
Lighter	Used to produce a small flame to help light the Bunsen
Heat proof mat	Put under the Bunsen to stop the bench getting burnt.
Air hole	Near the bottom of a Bunsen, this hole can be moved to allow more air into it.
Tripod	Made of metal and has 3 legs. Used when you want to heat things up with your Bunsen.
Gauze	Made of a type of metal mesh. This is put on the tripod and the thing you want to heat sits on this.
Research Question	What you are trying to find out in your experiment?
values	The amounts of things you want to use in your experiment
Variables	Things that you can change that will change your results in an experiment.
Method, plan or design	What you plan to do in your experiment
Results	What happened in your experiment
Conclusion	What did you find out and why did this happen?
errors	What went wrong or was not accurate in your experiment?
Evaluation	The ways you could make your experiment better

7SS 1a Laboratory Rules

Failure to adhere to these rules will result in immediate sanctions.

1. Do not enter a laboratory unless a teacher is present.
2. Place bags and coats under the table or out of the way.
3. Listen carefully to safety instructions and read safety warnings on worksheets.
4. Note the safety symbols on bottles and containers of chemicals.
5. Always wear safety glasses during practical work when there is a risk to the eyes.
6. No eating or drinking in the lab.
7. Act sensibly in the laboratory and during practical work. Never run.
8. When Bunsen burners are used, long hair should be tied back, safety glasses should be worn and ventilation fans should be used.
9. Do not leave an experiment unattended.
10. In cases of broken glassware or spilled chemicals, notify the teacher immediately.
11. Chemical waste should be disposed of in an appropriately labeled container, not in the sink. This should be emptied by a technician after every lesson.
12. Wash hands after using chemicals. At the end of an experiment, clear away and rinse glassware and leave in the wash trays. Tidy away other equipment as instructed and make sure your work space is left clean and neat.
13. Do not take anything out of the laboratory without permission.
14. Appropriate footwear must be worn. No flip flops or open toed sandals.
15. IB Chemists must wear white coats during practical work.

I have read and understand these rules:

Student Signature _____ Parent Signature_____

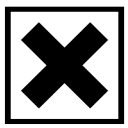
School Nurse: 2765 4633
Medical Room: G020 (G/F)

7SS 1b Safety Symbols

Many things around a lab have special signs on them warning you of danger.

Danger

This is a general warning sign. It may be placed in an area where there is some broken glass or a spilt chemical. Or it may just remind you to be particularly careful when doing something or using particular pieces of equipment or chemicals.



Harmful or Irritant

This symbol warns that a chemical may harm your health if you do not use it properly. The word 'irritant' means that the chemical may give you a rash if you get it on you or make you choke if you breathe it in.

Corrosive

This symbol tells you that a chemical will attack your skin if you get it on you.

Highly flammable

This symbol warns you that a chemical will catch fire easily.

Risk of electric shock

This symbol means that if used wrongly, the equipment may give you a dangerous electric shock.

Toxic

This symbol means that a chemical is poisonous. Poisons can kill.

Biohazard

This symbol means that there is some type of living thing in an area which may make you ill.

Eye protection must be worn

This symbol reminds you to wear safety glasses or goggles when working in a certain area or using particular pieces of equipment or chemicals.

Wash your hands

This symbol reminds you to wash your hands after you have done an experiment.

Activity: Test yourself or a partner to see how many you can remember?

7SS 1c Safety with Chemicals

There are many chemicals in a lab that can harm you. All the most dangerous chemicals will have safety symbols on them. You should check to see what the dangers of a chemical are before you use it. The dangers can be found on the container or on a Safety Card.

Find out what the following safety symbols mean.

Whenever you are using a chemical:

✖

- **DO NOT breathe it in.**
- **DO NOT let it get on your skin.**
- **DO NOT try to taste it.**
- **DO NOT have a lighted Bunsen burner anywhere near something that will catch fire.**

✔

- **DO make sure you understand any safety symbols on the container.**
- **DO wear safety glasses or goggles.**
- **DO wash your hands after using it.**
- **DO tell your teacher if any of it gets spilt.**

What safety symbols should be on containers of these chemicals?

1 Hydrochloric acid

2 Ethanol

3 Bromine

4 Copper sulphate

5 hydrogen

Extension:

Use the internet to find out what the safety symbol on a bottle of mercury should be?

Why is mercury thought to be dangerous?

What symbol should be on a truck containing petrol/gasoline? Why?

7SS 1d Safety Poster

You will usually find a set of ‘Lab Rules’ in a science lab. They are there for your safety!

The drawing below shows a lab where there are no safety rules.

1 Write down a list of all the things going wrong in this lab.

2 For each of your answers, write a safety rule.

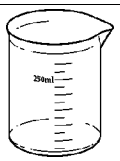
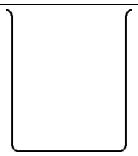
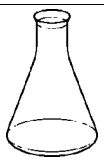
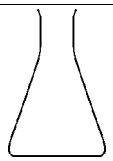
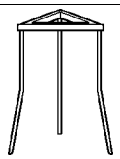
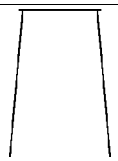
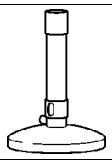
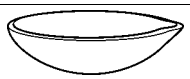
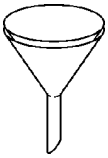
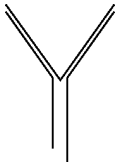
3 Design a poster for your lab, showing one safety rule and the reason for having it.

7SS 2a Drawing Apparatus

Usually in science we draw **diagrams** of apparatus rather than pictures. Diagrams are easier to draw and make it easier to see how the apparatus is joined together.

Imagine that you could cut the apparatus in half. You draw what you would see when you look at the edge – this is called a **cross-section** diagram.

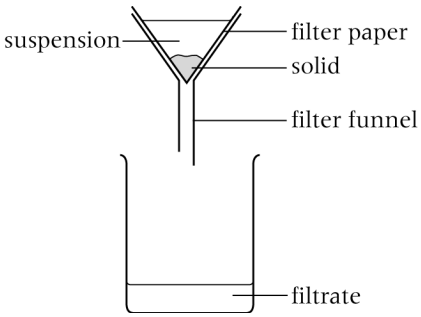
Here are some diagrams of apparatus that you might use.

Apparatus	Name	Diagram	What it is used for
	Test tube		Storing or mixing solids and liquids
	Boiling tube		Heating solids and liquids
	Beaker		Holding liquids or solids
	Conical flask (i.e. cone-shaped)		Holding and mixing liquids
	Tripod		Heating a beaker, flask or crucible over a Bunsen burner
	Gauze		Supporting a beaker or flask and spreading the heat from the flame
	Bunsen burner		Heating things
	Evaporating basin		Evaporating the water from a solution
	Filter funnel (with paper)		Separating an insoluble solid from a liquid
	Rubber bung		Keeping things in a tube or flask

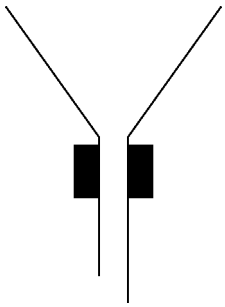
7SS 2b Drawing Assembled Apparatus

We use diagrams in science to show how pieces of apparatus are put together to do practical work.

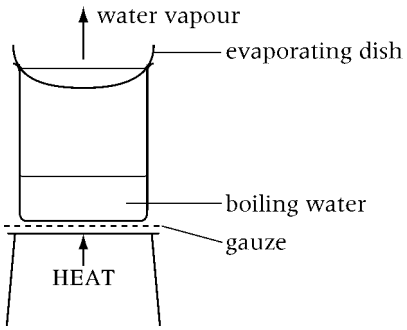
Example 1: Filtering



You don't usually need to show the clamps and stands. You know that the filter funnel is not really floating in mid-air. Clamps can be shown like this:

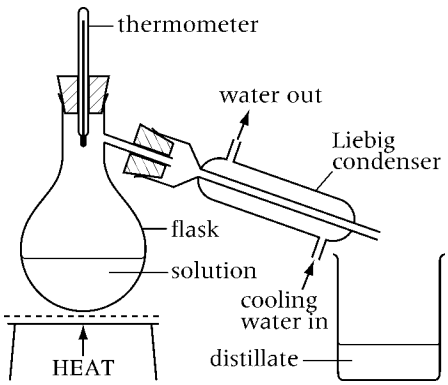


Example 2: Evaporating



Keep it simple! You can use an arrow to show heat instead of wasting time trying to draw a Bunsen burner.

Example 3: Distillation



This is a much more complicated diagram. Look carefully at the bungs. See how the diagram shows that the thermometer and tubes go *through* the middle of the bungs. Be careful that you don't 'block off' tubes that are really open. See how the 'water in' and 'water out' tubes are left open at the ends.

Make your own neat copies of one or more of the diagrams on this sheet. Don't forget to use a pencil and a ruler. Also make sure you label your diagram.

Extension: Find out and explain how you think distillation works. What sorts of mixtures can be separated using distillation?

7SS 2c Making Measurements

Aim: How to read scales and accurately take measurements and use experimental equipment.

Materials required

Thermometers, beakers and measuring cylinders of various sizes, kettle, 3 burettes set up as demo. Stopwatch, meter ruler, tennis ball, ice.

Safety.

Treat all chemicals as irritants.
Wear goggles.

Method.

A range of activities are set up on the side benches. You can do the activities in any order.

1. Taking temperatures readings.

There are three beakers filled with warm/cold liquids. Use the thermometers to accurately record the temperatures.

Temp A =_____ ^{0}C B = _____ ^{0}C C = _____ ^{0} C

2. Taking volumes readings.

There are 2 different sized measuring cylinders containing liquids. Take a reading of the volume of each.

Volume D = _____ cm^3 E = _____ cm^3

There is also a measuring cylinder inverted in a bowl of water, containing a gas (F) and a liquid set up in a burette (G). Read and record these volumes as well.

Volume F = _____ cm^3 G = _____ cm^3

3. Taking times and distance readings.

Use the meter rulers to measure 1m height and 2 m in height. Be careful if you need to stand on a stool to do this. Use a tennis ball to record the time taken for the ball to hit the ground at 1m (H) and 2m (I).

Time at 1m (H) = _____ secs Time at 2m (I) = _____ secs.

4. Measuring Mass.

Use an electronic balance to accurately record the mass of a small conical flask (J).

Mass of conical flask (J) = _____ g

Analysis/Conclusion:

1. Which piece of equipment is most precise for measuring volumes? Beakers, measuring cylinders or burettes? Why?

2. How can you make your measurements more accurate?

3. Why don't we use beakers to measure out volumes?

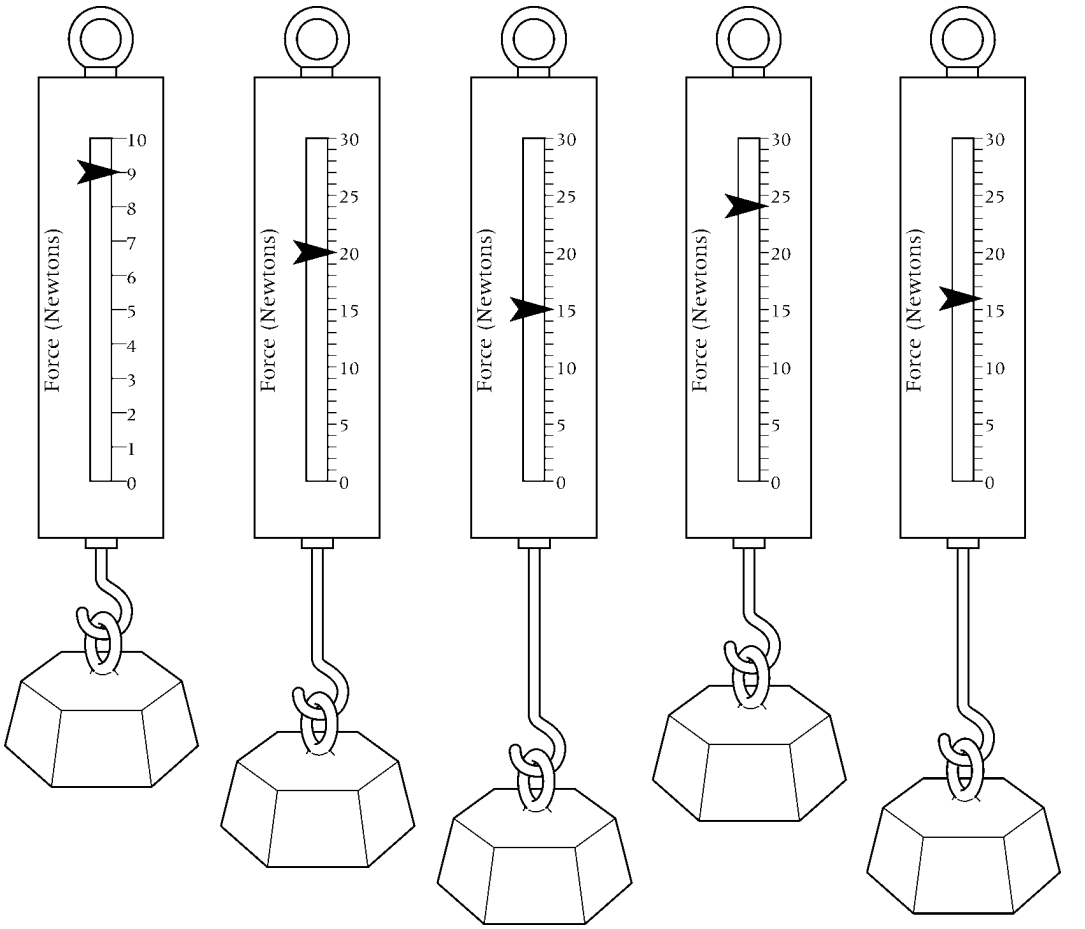
4. Which is most precise for measuring out 15cm^3 of acid? A 20 cm^3 measuring cylinder or a 50cm^3 measuring cylinder? Why?

Extension: Find out what a pipette is. What it is used for? How is it used?

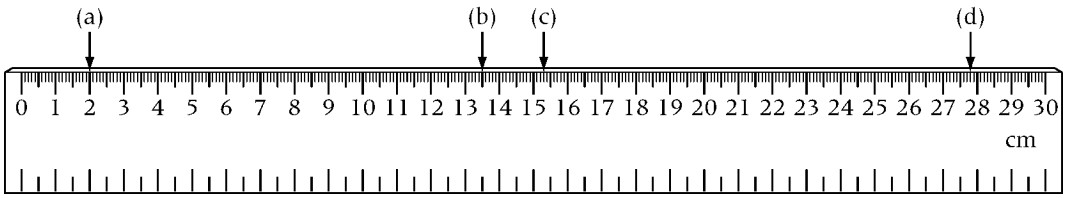
7SS 2d Reading Scales 1

When you investigate things in science, you usually need to measure something. Being able to read numbers from **scales** on **measuring instruments** is very important.

1 How much force are these force meters measuring? Remember the units.



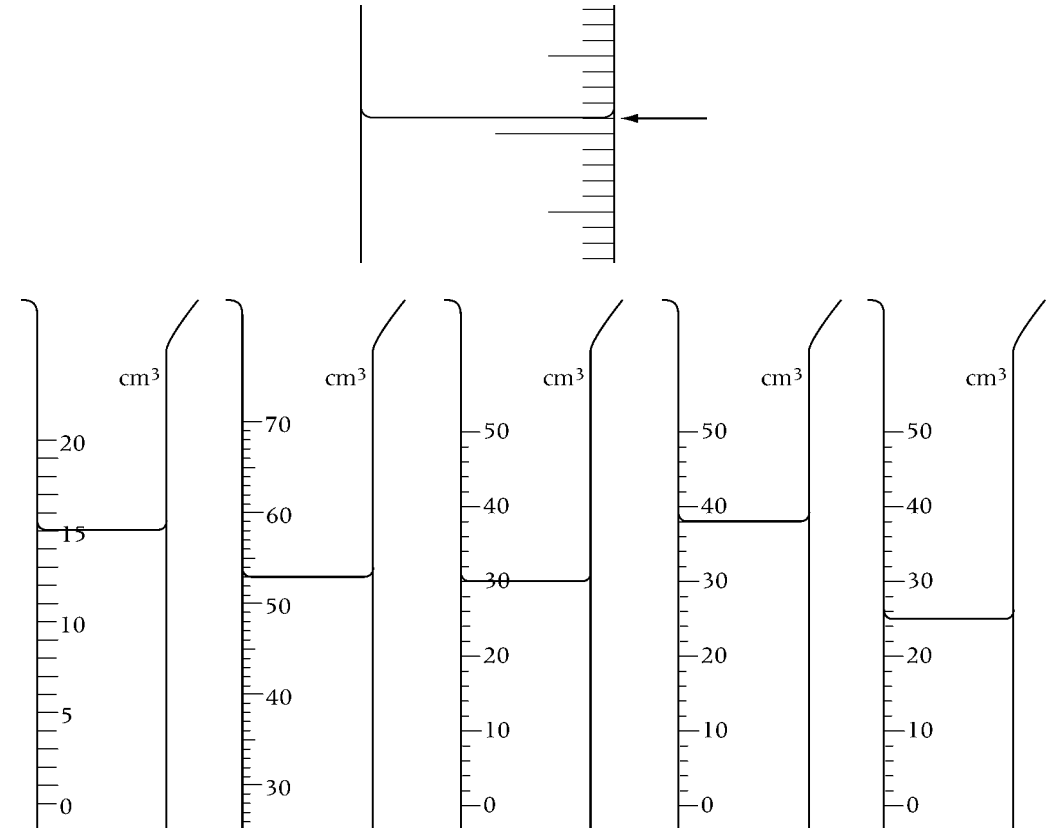
2 What are the readings shown by the arrows? Don't forget the units!



(a)	**(b)**	**(c)**	**(d)**

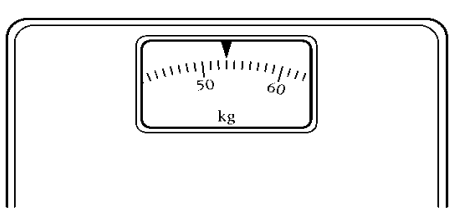
7SS 2e Reading Scales 2

3. How much liquid is in these measuring cylinders? Remember to read from the bottom of the meniscus, like this: The unit is cm^3 (This is the same as ml)



4 What are the following balances reading? Don't forget the units (kg).

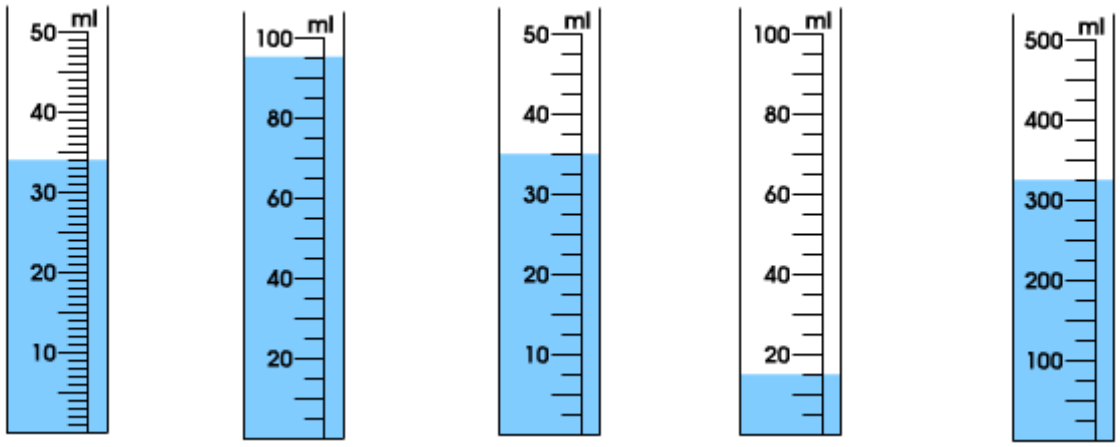
a



7SS 2f Reading Scales 3

Volume

a) b) c) d) e)



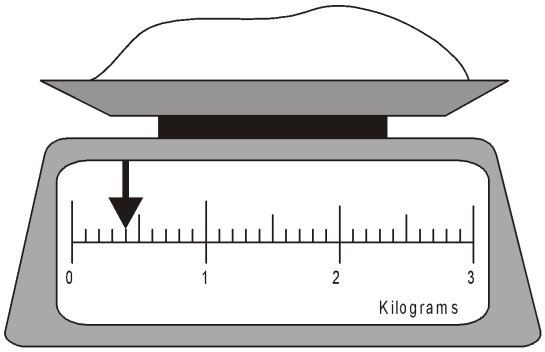
\

Which is the most accurate scale?

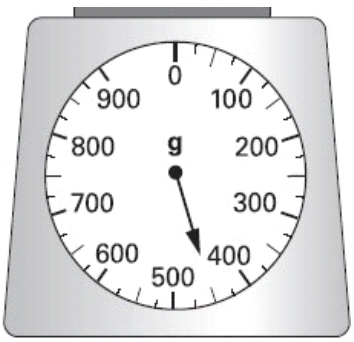
Mass

a)

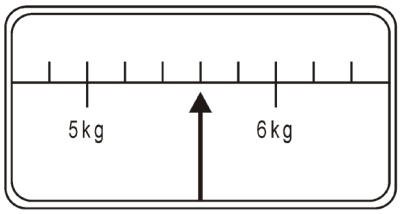
b)



c)

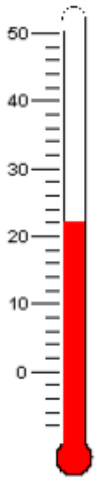


d)



Temperature

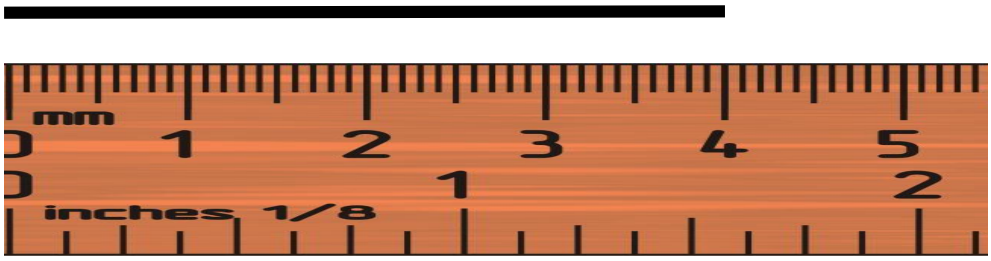
a)



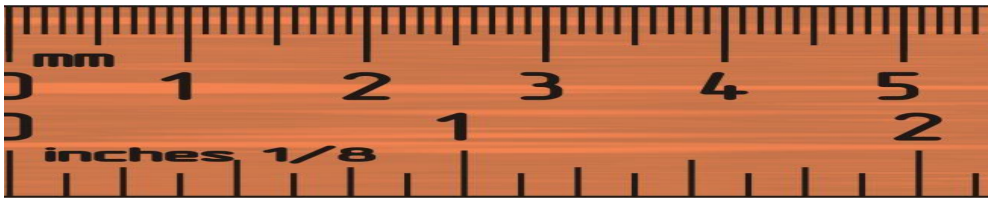
b)

Length

a)

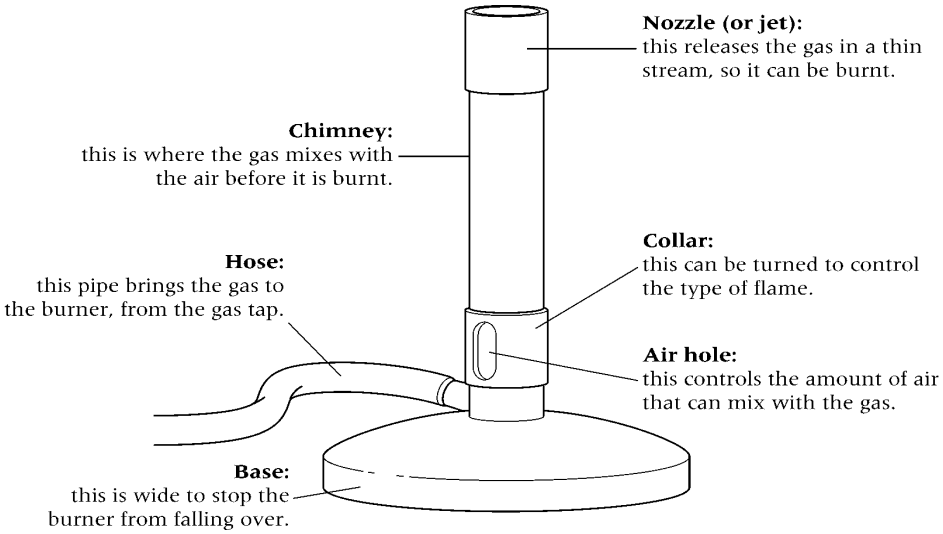


b)



7SS 3a The Bunsen Burner

The Bunsen burner is used to heat things in the laboratory. The diagram below shows the different parts of the Bunsen burner and explains what each part does.



Remember that a Bunsen burner will get hot when it is used, so never take one apart unless you are told to do so by your teacher. Always let a Bunsen burner cool down before you put it away.

Safety.
Wear Goggles. Tie long hair back.

How to light a Bunsen burner

Every time you use a Bunsen burner, you should follow these steps:

1 Check the hose for breaks and holes. DO NOT use the Bunsen burner if you find any breaks or holes. Give it to your teacher.

2 Connect the hose to the gas tap but do not turn it on yet.

3 Check that the air-hole in the collar of the Bunsen burner is **CLOSED**.

4 Light a match or use a safety lighter and hold it a little distance (about 2 cm) above the top of the chimney of the Bunsen burner.

5 Turn on the gas at the gas tap.

6 The Bunsen burner will now light and give you a purple flame.

7 Turn down the gas supply at the gas tap until you have the size of flame needed for your experiment.

8 IF YOUR BUNSEN BURNER GOES OUT, TURN OFF THE GAS AT THE GAS TAP STRAIGHT AWAY.

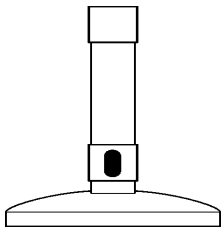
(If you wish, you can take a photo or use your phone to make a short video clip to remind you of how to light a Bunsen).

Types of Bunsen burner flames

The Bunsen burner will give **three** different types of flame:

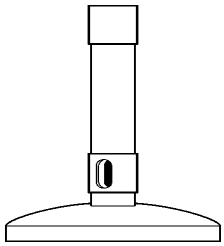
Roaring flame:

- air hole open, so lots of air mixes with the gas
- noisy, blue flame
- very hot flame
- used for heating things quickly



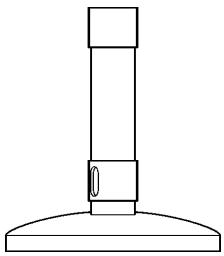
Medium flame:

- air hole half-open, so some air mixes with the gas
- light blue/purple flame, which is quieter than the roaring flame
- flame is quite hot
- used for heating liquids, especially if you are using a boiling tube



Safety flame:

- air hole closed, so hardly any air mixes with the gas
- quiet, purple, wavy flame
- Flame is not as hot as the medium flame
- not used for heating, because the flame leaves a layer of soot on things



When you have practiced lighting your Bunsen burner, complete the table below and draw the three flames you have seen. Use this sheet to help you.

Type of flame	**Safety**	**Medium**	**Roaring**
Type of air hole		HALF-OPEN	
Amount of air mixing with gas	None		
Amount of noise			
Main colour of flame			
Diagram, sketch or photo of flame			
Amount of heat	Least		

Extension: Explain why opening the air hole produces the hottest flame. Use the internet to help if needed.

7SS 3b Investigating which Bunsen Burner Flame is Hottest

Aim: How to safely use a Bunsen. How to plan and carry out investigations.

Materials required

Thermometers, beakers, measuring cylinders, tripods and gauzes, stop watches.

Safety. Wear goggles, tie long hair back, the equipment will get hot, let it cool before packing away.

Plan. (If appropriate)

1. Plan an experiment to try and find out which of the three possible Bunsen flames are the hottest. You may do this on your own or in a group, or your teacher may give you some instructions/help.
2. What things will you need to measure?
3. What things will you need to change?
4. What things will you need to keep the same?
5. How will you set up your equipment? Draw a diagram.
6. What will you need to do? Write a method as a numbered list like a recipe.

Carrying out

1. Carry out your plan safely.
2. If you haven't made a plan, your teacher will give you some instructions.
3. Record your results in a table. Your teacher will help you to draw this. Remember to include titles and units in the columns.

Analysis/Conclusion:

1. If you have time, draw a bar graph of your results. Your teacher will help you do this and there is some help on the extension sheets at the back of your booklet.
2. Which of the Bunsen flames was the hottest? How do you know?
3. Why was this a fair test?
4. How could you have improved this investigation or made the results more accurate?

Extension: Look closely at the hottest Bunsen flame, where is the flame the hottest? Sketch and label a Bunsen. Find out the chemical formula of the gas and the equation which shows it burning in the air.

Why should you not try to heat something that is put really close to where the gas comes out of the top of the Bunsen?

MYP Science

Practical Report Template

Name:	Form:

UNIT:	
Statement of Inquiry:	
Key Concept:	
Related Concepts:	
Investigation Title:	

Research Question

(What are you trying to find out?)

Background Scientific Information and Hypothesis

(What do you think will happen and why?)

Variables

Independent *(What will change and how will you change it?)*	
Dependent *(What will you measure to gather result?)*	
Control *(What variables will you keep the same to make it a fair test? How will you keep the variables constant?)*	

Apparatus Set-up

(Draw a labelled diagram of the assembled apparatus that you will use. Write the name of any equipment not shown in the diagram)

Method

(Write a step by step account of how you conduct your experiment – the method must be DETAILED)

1.

2.

3.

4.

5.

Safety

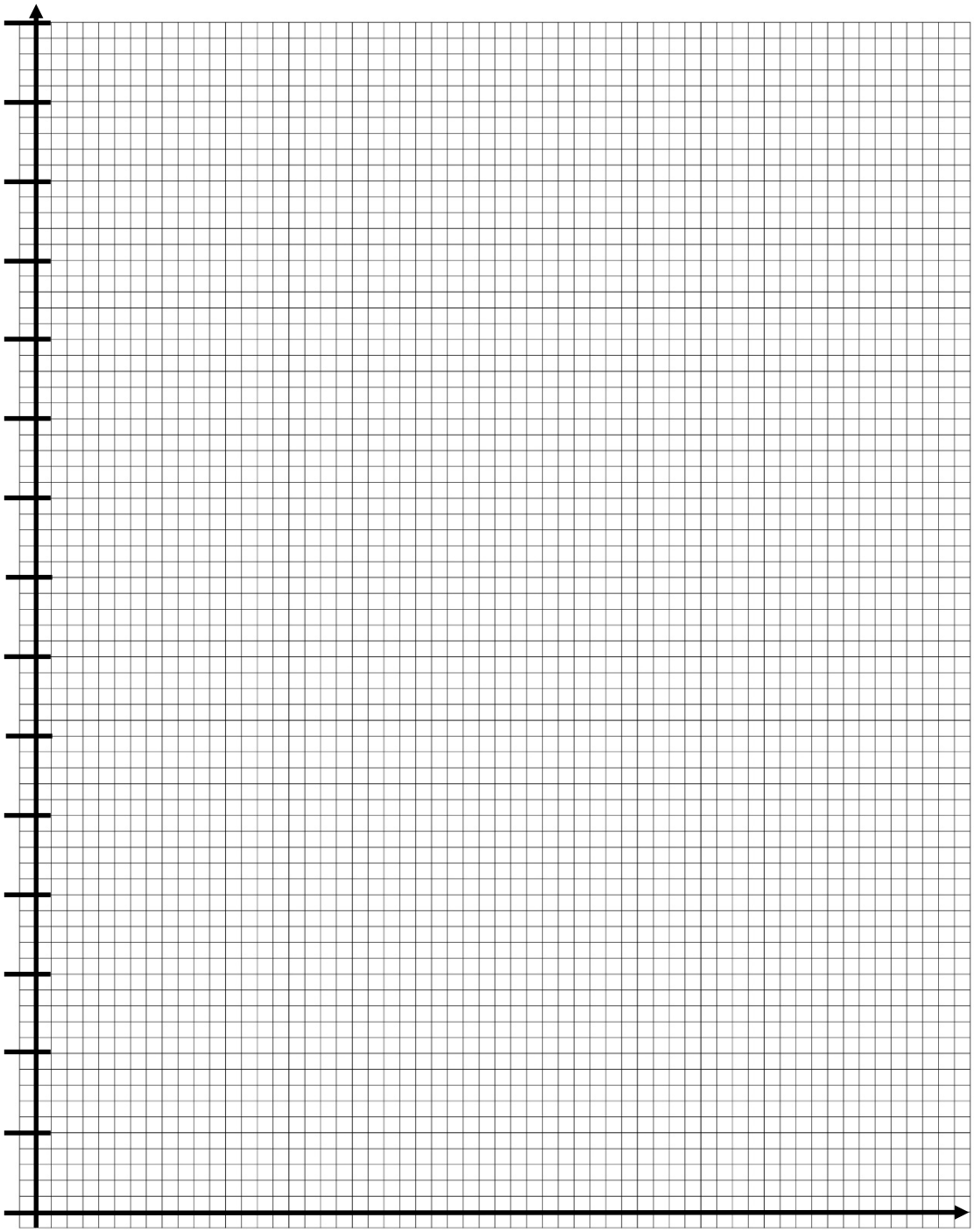
(How will you make sure your method is safe?)

Reliability

(What will you do to ensure your results are reliable?)

7SS 3c Results table and graph template

Type of Flame	Starting Temperature (°C)	Finishing Temperature (°C)	Temperature difference (°C)
Safety			
Medium			
Roaring			



Results

Raw Data

(A neat, organized table of results should be drawn, with headings, units, repeats and averages include)

Observations

(What changes did you notice as the experiment was conducted, e.g. colour change, bubbles, heat change?)

Graphing Results

You should draw a graph of your results and attach it to this report.

Analysis of Graph

(What did your results show? Are there any trends or patterns in your results? Can you give an example of a pattern or trend from your results?

Conclusion and Evaluation

Scientific Conclusion and Explanation of Results

(Summarize what your results show. Does this support your prediction? Can you explain your results using scientific knowledge?)

Evaluation of Scientific Method and Results

How reliable were your results? How well did your investigation answer the research question? What went well with your method?)

(Were there any problems or parts of your investigation that were not very accurate or could have been done better?)

Issue with justification	Suggested SCIENTIFIC Improvement

MYP Practical Report Checklist - Student

Before you submit your practical report to your teacher you must use the checklist below to ensure all parts of your report have been completed.

	Section	What you need to do	Completed Y/N
DESIGN **(MYP Criterion B: Inquiring and Designing)**	Title	Give a **name** to the experiment you are conducting	
	Research Question	The research question should be **clear, concise**, and include the independent variable and the dependent variable.	
	Background Information	You should give the **science theory** behind your investigation, and it should include scientific terminology. This should be presented as a **short scientific paragraph.**	
	Hypothesis	**What** do you predict will happen in your experiment and **why**?	
	Variables	**Independent** Variable - what will you change and how will you change it? **Dependent** Variable - what will you measure and how will you measure it? **Control** Variables - what are they? How and why are they controlled?	
	Apparatus	Have you completed a **diagram of assembled equipmen**t that shows how to successfully collect data? Have you used a **ruler and pencil** to do this? Have you **labeled** all the chemicals and equipment in your diagram?	
	Method	Have you written your method in the following format: - **Stepwise** - **Logical** order of steps in investigation - Used **correct names for chemical and equipment** - Provided detailed account of the steps in the method - Describe how you will **change the independent** variable - Describe how **control variables are monitored**	
	Safety	Discuss any **safety issues** with chemicals or equipment being used, and describe what **precautions** should be taken to ensure you conduct the investigation safely.	

RESULTS and CONCLUSION **(MYP Criterion C: Processing and Evaluating)**	Results Table	A **table of results must include**: - Headings - Units - Repeats - Averages	
	Observations	Record **detailed** observations: - At **start** of experiment - **During** experiment - At **end** of experiment Observations can include colour change, bubbles, heat etc.	
	Calculations	Calculate **averages** of repeats. Show **formula** for calculation Show **working out** for calculations Give final answer to calculation with **correct units**.	
	Graph	Draw a graph to include the following; - **Heading, labels with units** on each axis - **Suitable scales** that occupy minimum ¾ of each axis - **Plot** all points accurately - Draw a **curve or straight line of best fit** that ignores points that do not fit the pattern. - **Discuss trends or patterns** observed in graph.	
	Conclusion	**Summarize** what your results show. Does this support your **prediction/hypothesis**? Explain your results using **scientific knowledge**?	
	Evaluation	Discuss the **reliability** of your **results**. Discuss the **validity** of the **method** you used.	
	Improvements	Suggest improvements to the **scientific method** and describe how they can **reduce or eliminate errors**	

7SS 5a Constructing Table of Results

A table is a way of showing a lot of information in a way that is easy to read.

This …

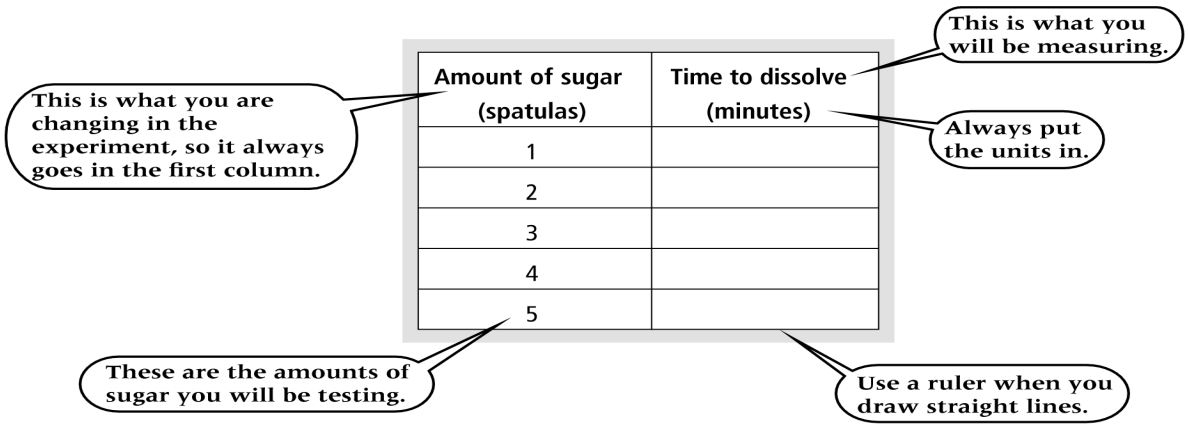
Bike	Number of pupils
Ordinary bike	16
Mountain bike	9
Racing bike	5
No bike	4

is easier to read than this …

> Out of all the children in the class, 16 of them have an ordinary bicycle. Four of the pupils did not have a bike at all. Racing bikes were owned by five pupils, and the other nine all had mountain bikes.

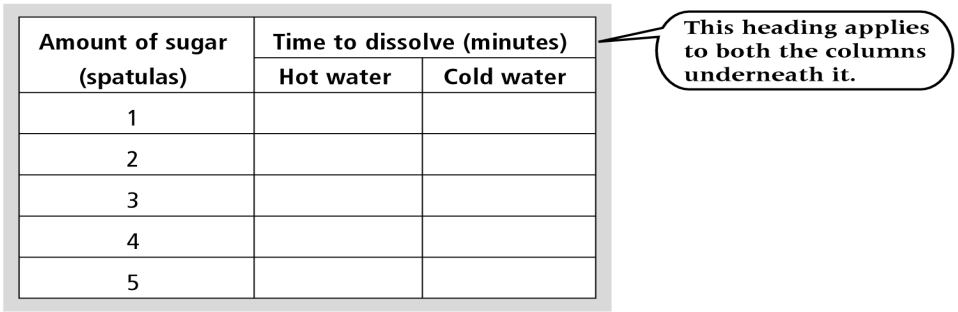
Scientific Results Tables

When you do a practical, you often need to write your results in a table. You need to draw your table before you start your experiment. This table is for an experiment to find out how long it takes to dissolve different amounts of sugar in some hot water.



Amount of sugar (spatulas)	Time to dissolve (minutes)
1	
2	
3	
4	
5	

Sometimes you investigate more than one thing. You might want to find out how long it takes the sugar to dissolve in hot water and in cold water. Your results table for this experiment should look like this:



Amount of sugar (spatulas)	Time to dissolve (minutes)	
	Hot water	Cold water
1		
2		
3		
4		
5		

Extension: Construct a neat results table to find out; what is the favourite flavour of chips/crisps in your class?
Try and organise this information to make it clear and easy to understand, just like the examples above.

7SS 6a Bar Charts

Do you need a bar chart or a line graph?

The easy way to decide which kind of graph to draw is:

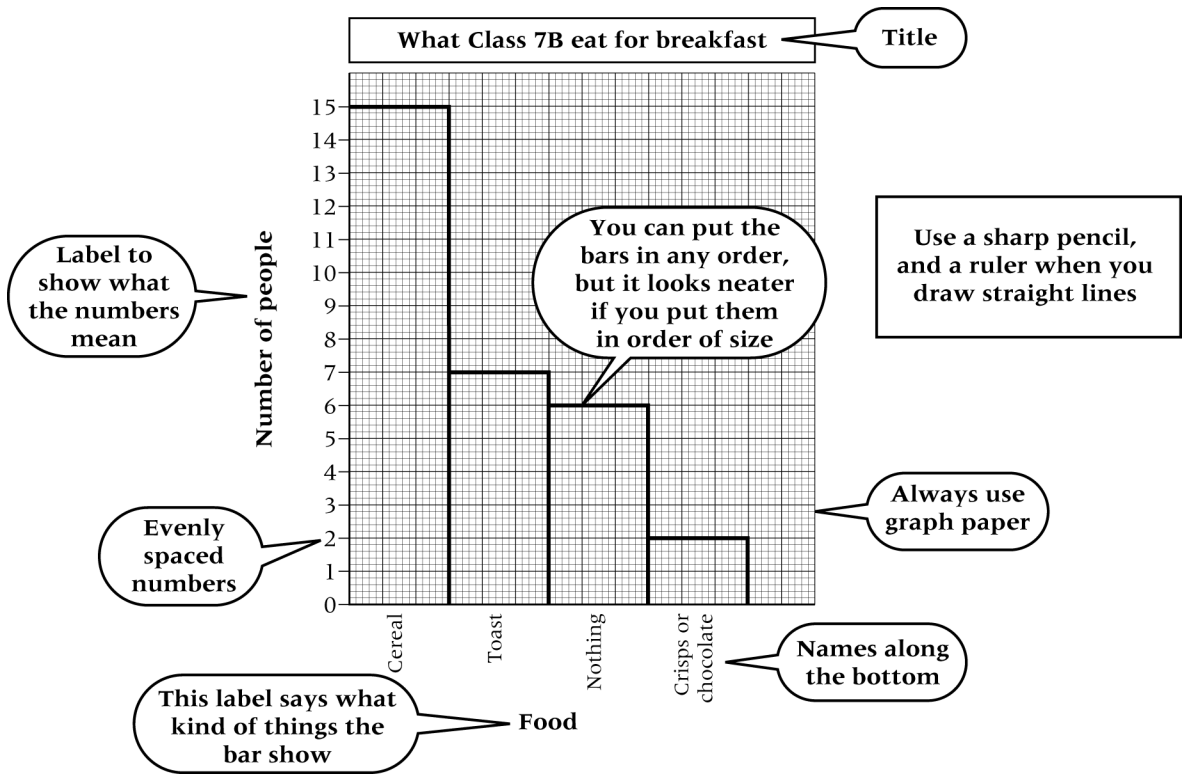
- If you have **measured two** things (e.g. time, length or temperature) you need a **line graph**.
- If you have counted something (e.g. how many insects live in different places) you need a **bar chart**.
- If one of the things you have studied can be described in words (e.g. different kind of food) you need a **bar chart**.

Breakfast

You have done a survey to show what the people in your class had for breakfast, and these are your results:

Food	Number of people
cereal	15
toast	7
crisps or chocolate	2
nothing	6

You would draw a bar chart like this one to show your results:



1 Draw a neat version of the bar chart above. Use graph paper and use a ruler when you draw straight lines. (graph paper on next page)

2 Draw bar charts to show the results of these surveys.

a Number of plants in a lawn

Plant	Number
Daisy	10
Buttercup	7
Clover	20
Thistle	2

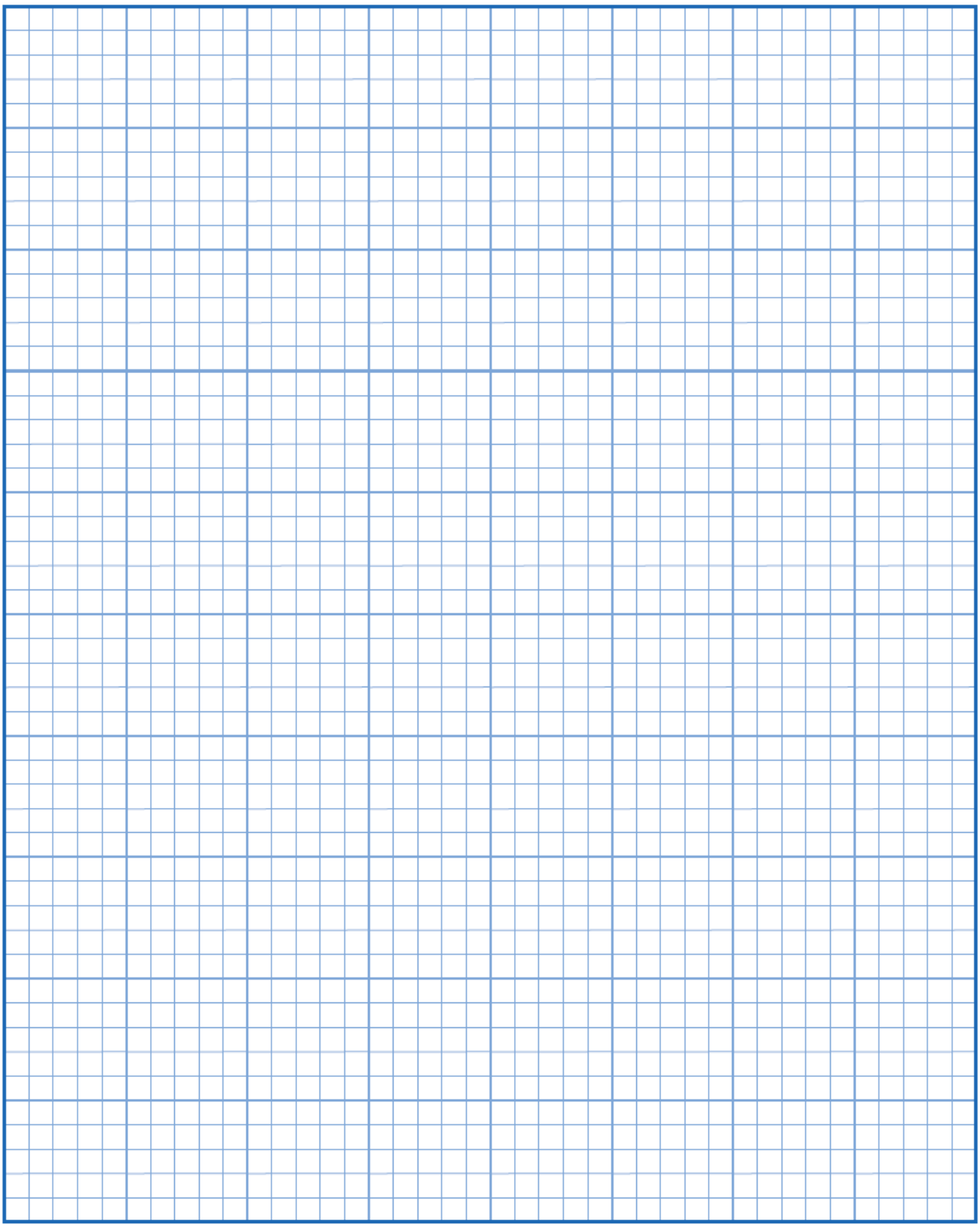
b Hair colour in a class

Colour	Number of people
Black	12
Brown	10
Blonde	8
Red	1

3 Carry out your own survey to find out the following information and draw bar charts to show your results.

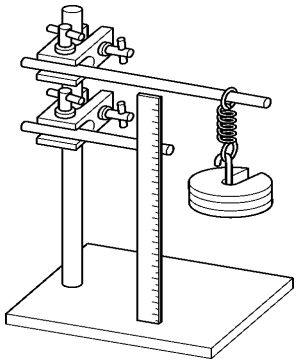
a How the pupils in your class get to school.

b How many brothers and sisters' pupils in your class have.

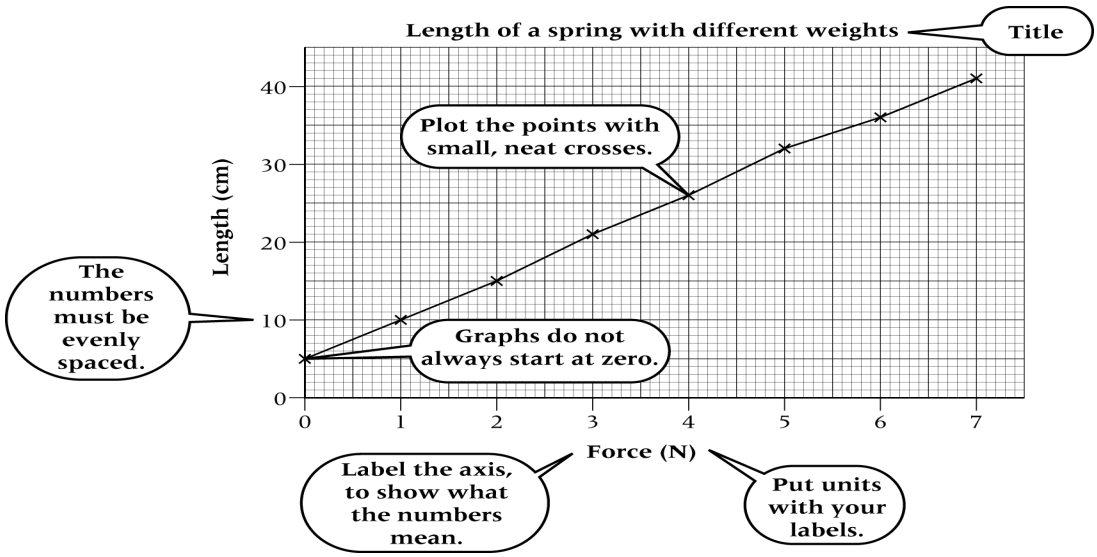


7SS 6b Line Graphs

Line graphs can be useful for showing the results of an experiment. You usually use a line graph when you have to show two sets of measurements.
Here are the results of an experiment to find out how long a spring is when it has different forces on it.



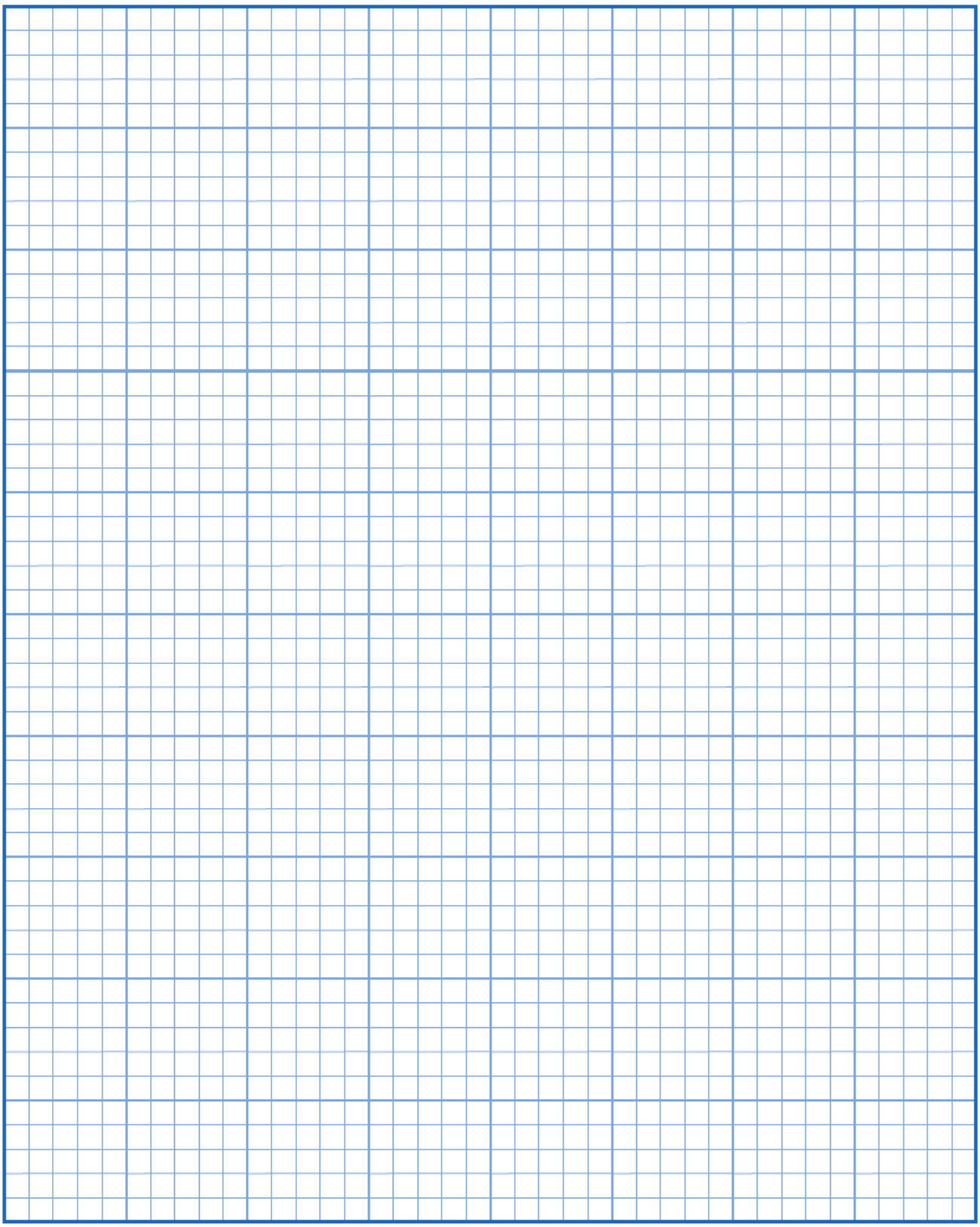
Force (N)	Length (cm)
0	5
1	10
2	15
3	21
4	26
5	32
6	36
7	41



Working out the scale

First, look at your table of results and work out the largest number that has to go on each axis.

Now count the squares on your graph paper. If there are not enough, try again, counting in 2s, or 5s, or 10s, until you find a scale that fits on the paper.



Extension Task: Try to plot the results from this spring experiment on graph paper.

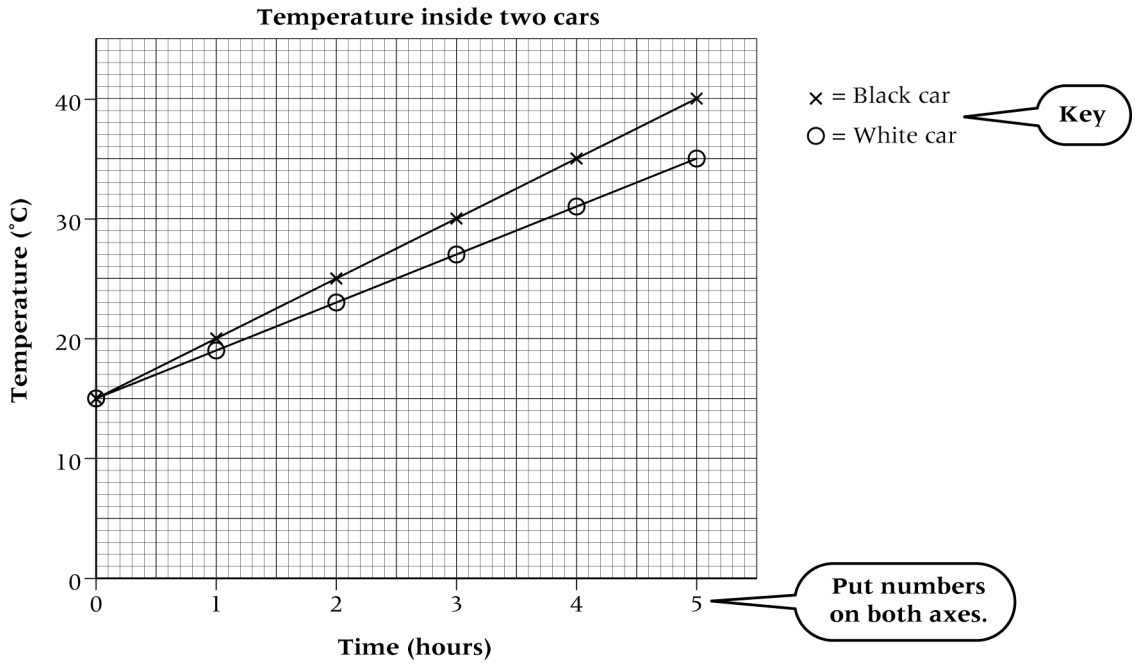
Two sets of results

Sometimes you might want to put two sets of results on your graph so that you can compare them.

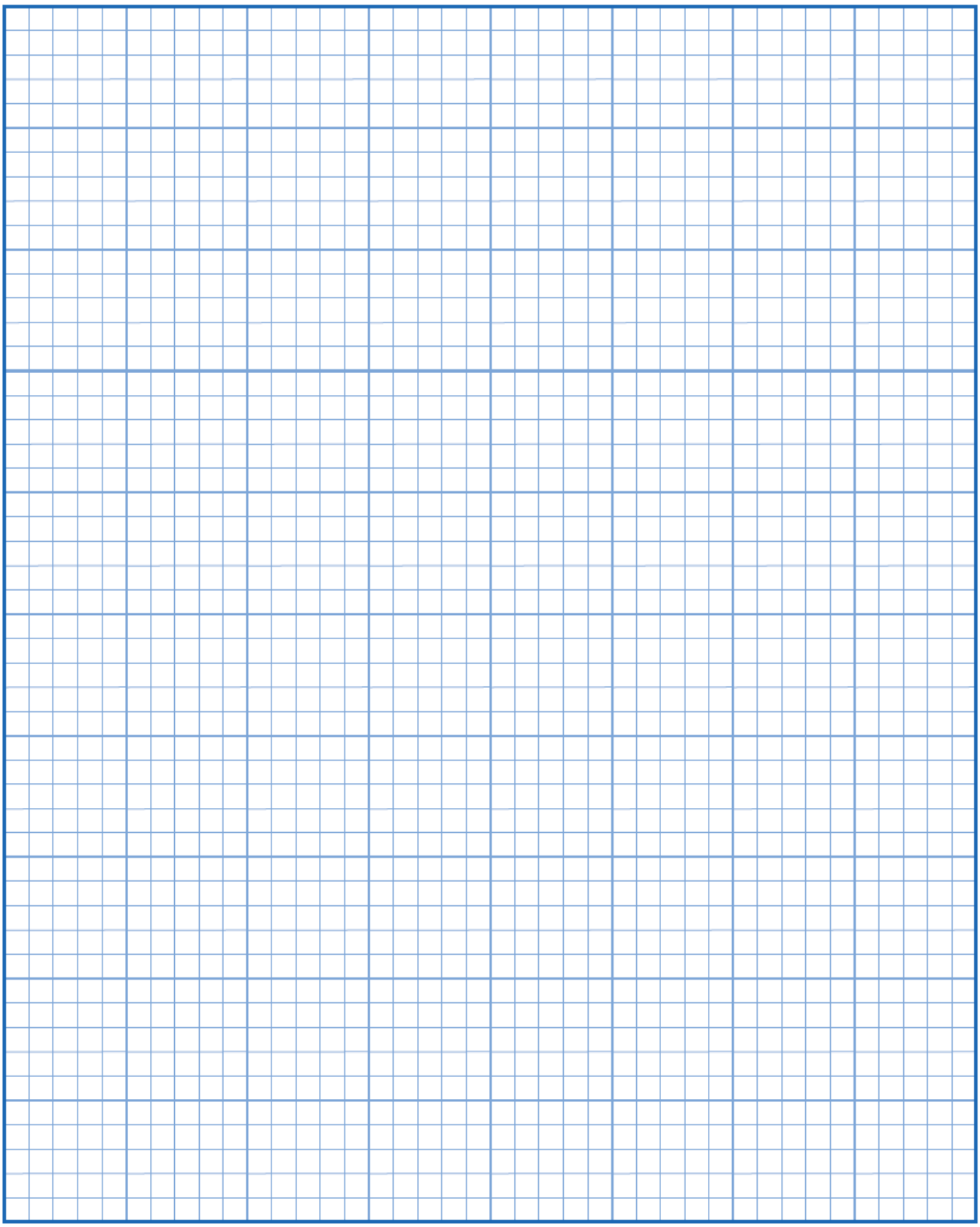
This table shows the temperature inside two cars that were parked in the sun.

Time (hours)	Temperature (ºC)	
	Black car	White car
0	15	15
1	20	19
2	25	23
3	30	27
4	35	31
5	40	35

You can draw the two lines in different colours, or use different symbols for the points. Put a key on your graph.



2 Plot a graph showing the temperatures inside the cars. Don't forget to put a title on your graph.



7SS 6c Experiment Analysis

Name: _____

VERSION B1

Ms. Ellis notices that students who talk and are off-task during instruction tend to earn lower grades. She wonders if the amount of time spent off-task is related to overall grades. She hypothesizes that students who are off-task get lower grades. In order to test her hypothesis, she conducts the following experiment:

a. Select 4 students who have the same I.Q.
b. Provide all students with the same learning experiences.
c. Provide all students with the same study materials.
d. Observe student behavior and track time spent off-task daily.
e. Compile overall grades and analyze the data.

The table shows the data gathered.

Student	Daily Time Off-task	Grade in class
1	0 minutes	95%
2	10 minutes	85%
3	20 minutes	70%
4	40 minutes	55%

1. In this experiment, what is the independent variable? _____
2. What is the dependent variable? _____
3. List 3 control variables. _____

   _____
4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis
5. The results show the independent and dependent variables have what type of relationship?

   Circle one answer: direct relationship inverse relationship no relationship
6. In a complete sentence, write a conclusion Ms. Ellis can draw after analyzing her results.

   _____

   _____
7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

   _____

   _____

Name: _____

VERSION B2

Ms. Ellis notices that students who talk and are off-task during instruction tend to earn lower grades. She wonders if the amount of time spent off-task is related to overall grades. She hypothesizes that students who are off-task get lower grades. In order to test her hypothesis, she conducts the following experiment:

a. Select 4 students who have the same I.Q.
b. Provide all students with the same learning experiences.
c. Provide all students with the same study materials.
d. Observe student behavior and track time spent off-task daily.
e. Compile overall grades and analyze the data.

The table shows the data gathered.

Student	Grade	Daily Time Off-task
1	90%	0 minutes
2	70%	10 minutes
3	80%	20 minutes
4	55%	35 minutes

1. In this experiment, what is the independent variable? _____
2. What is the dependent variable? _____
3. List 3 control variables. _____

   _____
4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis
5. The results show the independent and dependent variables have what type of relationship?

   Circle one answer: direct relationship inverse relationship no relationship
6. In a complete sentence, write a conclusion Ms. Ellis can draw after analyzing her results.

   _____

   _____
7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

   _____

   _____

7SS 6d Experiment Analysis

Name: _____

VERSION C1

Mr. Reagan notices that students who read often also tend to be good writers. He wonders if time spent reading is related to higher writing scores. He hypothesizes that more time spent reading gives students more experience with story structure, vocabulary, spelling, and other elements of writing, which would improve their own writing abilities. In order to test his hypothesis, he conducts the following experiment:

a. Conduct a reading/writing ability pretest and a reading habits survey with a 7th-grade class. Select 4 students with the same ability score, but different reading habits.
b. Provide all students with the same writing lessons throughout the year.
c. Provide all students with the same writing assignments and amount of teacher feedback.
d. Over the school year, keep track of student reading habits and scores on writing assessments.
e. Compile overall grades and analyze the data.

The table shows the data gathered.

Student	Daily Time Spent Reading	Overall Writing Grade
1	10 minutes	58%
2	20 minutes	75%
3	35 minutes	86%
4	50 minutes	96%

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Mr. Reagan can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

Name: _____

VERSION C2

Mr. Reagan notices that students who read often also tend to be good writers. He wonders if time spent reading is related to higher writing scores. He hypothesizes that more time spent reading gives students more experience with story structure, vocabulary, spelling, and other elements of writing, which would improve their own writing abilities. In order to test his hypothesis, he conducts the following experiment:

a. Conduct a reading/writing ability pretest and a reading habits survey with a 7th-grade class. Select 4 students with the same ability score, but different reading habits.
b. Provide all students with the same writing lessons throughout the year.
c. Provide all students with the same writing assignments and amount of teacher feedback.
d. Over the school year, keep track of student reading habits and scores on writing assessments.
e. Compile overall grades and analyze the data.

The table shows the data gathered.

Student	Overall Writing Grade	Daily Time Spent Reading
1	58%	10 minutes
2	90%	20 minutes
3	76%	35 minutes
4	86%	45 minutes

1. In this experiment, what is the independent variable? _____
2. What is the dependent variable? _____
3. List 3 control variables. _____

   _____
4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis
5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship
6. In a complete sentence, write a conclusion Mr. Reagan can draw after analyzing her results.

   _____

   _____
7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

   _____

   _____

7SS 6e Experiment Analysis

Name: _____

VERSION D1

Miguel notices his friends have skateboards of different lengths. He wonders if the length of the skateboard makes a difference in downhill speed. He hypothesizes that shorter boards will go faster than longer boards. In order to test his hypothesis, he conducts the following experiment:

a. Select 4 skateboards of different lengths, but same widths
b. Find a hill and mark a start and finish line.
c. Ride each board down the hill using a stopwatch to record how long it takes from start to finish. Before start line, use only one small push off. During the ride, both feet will stay on the board at all times.
d. Analyze the data.

The table shows the data gathered.

Trip #	Skateboard Length	Time on Hill
1	28 in.	10 sec.
2	32 in.	7 sec.
3	38 in.	5 sec.
4	44 in.	4 sec.

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Miguel can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

Name: _____

VERSION D2

Miguel notices his friends have skateboards of different lengths. He wonders if the length of the skateboard makes a difference in downhill speed. He hypothesizes that shorter boards will go faster than longer boards. In order to test his hypothesis, he conducts the following experiment:

a. Select 4 skateboards of different lengths, but same widths
b. Find a hill and mark a start and finish line.
c. Ride each board down the hill using a stopwatch to record how long it takes from start to finish. Before start line, use only one small push off. During the ride, both feet will stay on the board at all times.
d. Analyze the data.

The table shows the data gathered.

Trip #	Time on Hill	Skateboard Length
1	12 sec.	28 in.
2	10 sec.	32 in.
3	8 sec.	38 in.
4	10 sec.	44 in.

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Miguel can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

7SS 6f Experiment Analysis

Name: _____

VERSION E1

Sasha saw a You Tube video where Mentos candy caused Diet Coke to gush out of the bottle. She wonders if the number of Mentos used causes different kinds of "explosions". She hypothesizes that more Mentos will lead to bigger "explosions". In order to test her hypothesis, she conducts the following experiment:

a. Set up four bottles of Diet Coke against a wall with height measurements marked off.
b. One at a time, place a different amount of Mentos in each bottle.
c. Set up video camera to help record the highest height achieved for each bottle.
d. Analyze the data.

The table shows the data gathered.

Bottle	Height of explosion	# of Mentos
1	5 in.	1
2	10 in.	2
3	12 in.	3
4	17 in.	4

1. In this experiment, what is the independent variable? _____
2. What is the dependent variable? _____
3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis
5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship
6. In a complete sentence, write a conclusion Sasha can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

Name: _____

VERSION E2

Sasha saw a You Tube video where Mentos candy caused Diet Coke to gush out of the bottle. She wonders if the number of Mentos used causes different kinds of "explosions". She hypothesizes that more Mentos will lead to bigger "explosions". In order to test her hypothesis, she conducts the following experiment:

a. Set up four bottles of Diet Coke against a wall with height measurements marked off.
b. One at a time, place a different amount of Mentos in each bottle.
c. Set up video camera to help record the highest height achieved for each bottle.
d. Analyze the data.

The table shows the data gathered.

Bottle	# of Mentos	Height of explosion
1	2	10 in.
2	5	16 in.
3	10	8 in.
4	15	3 in.

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Sasha can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

7SS 6g Experiment Analysis

Name: _____

VERSION F1

Randy noticed that junk food nutrition labels have a lot of ingredients. He wonders if the number of ingredients is linked to healthfulness. He hypothesizes that foods with fewer ingredients are healthier. In order to test his hypothesis, he conducts the following experiment:

a. Select four ice creams with different numbers of ingredients.
b. Count the number of ingredients in each.
c. Use the food app "Fooducate" to find an overall healthfulness score for each ice cream.
d. Analyze the data.

The table shows the data gathered.

Ice-cream	# of ingredients	Healthfulness Score
1	5	80%
2	10	70%
3	12	65%
4	18	50%

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Randy can draw after analyzing her results.

_____

_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

Name: _____

VERSION F2

Randy noticed that junk food nutrition labels have a lot of ingredients. He wonders if the number of ingredients is linked to healthfulness. He hypothesizes that foods with fewer ingredients are healthier. In order to test his hypothesis, he conducts the following experiment:

a. Select four ice creams with different numbers of ingredients.
b. Count the number of ingredients in each.
c. Use the food app "Fooducate" to find an overall healthfulness score for each ice cream.
d. Analyze the data.

The table shows the data gathered.

Cereal	Healthfulness Score	% of ingredients
1	90%	5
2	80%	15
3	78%	25
4	70%	38

1. In this experiment, what is the independent variable? _____

2. What is the dependent variable? _____

3. List 3 control variables. _____

_____

4. Create a line graph displaying the results. Make sure to:
   - Create an appropriate title and axis labels
   - Place the independent variable on the x-axis and the dependent variable on the y-axis
   - Calculate a reasonable scale for each axis

5. The results show the independent and dependent variables have what type of relationship?
   Circle one answer: direct relationship inverse relationship no relationship

6. In a complete sentence, write a conclusion Randy can draw after analyzing her results.

_____

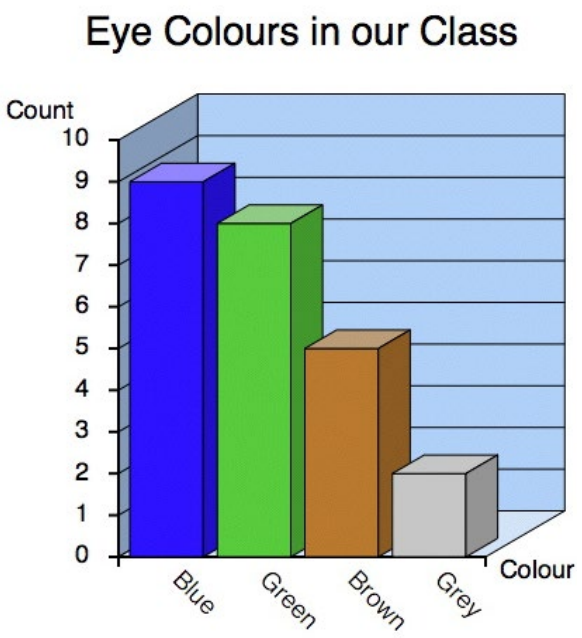
_____

7. Looking at the experiment design and results, list at least one "next step" related to the experiment.

_____

_____

7SS Conclusion



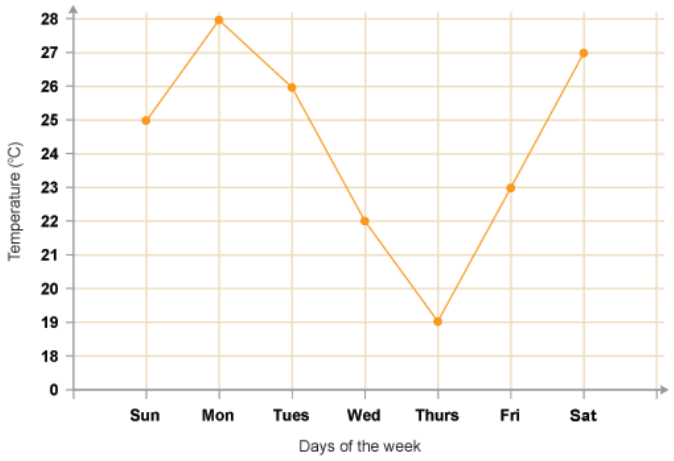
.....

.....

.....

.....

.....



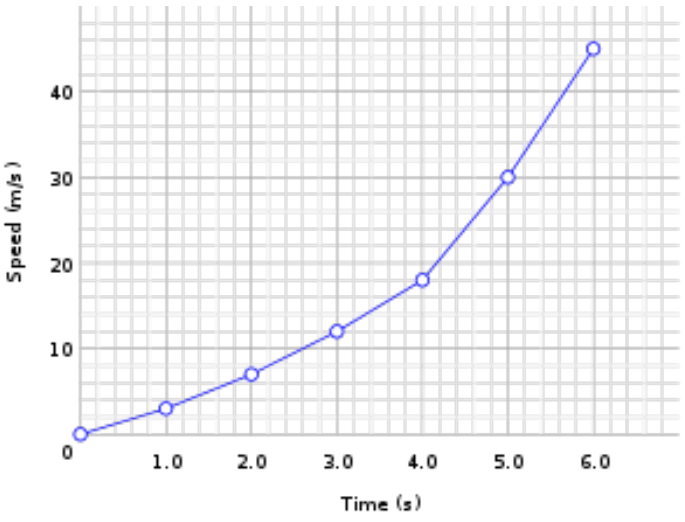
.....

.....

.....

.....

.....



.....

.....

.....

.....

.....

.....

.....

7SS 7a Growing Plants

Name: Date:

Student Exploration: Growing Plants

Directions: Follow the instructions to go through the simulation. Respond to the questions and prompts in the orange boxes.

Vocabulary: compost, fertilizer, mass, seed, soil, variable

Prior Knowledge Questions (Do these BEFORE using the Gizmo.)

1. What do you think plants need to grow and stay healthy?

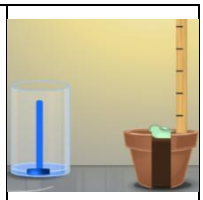
2. **Soil** is a combination of tiny rock fragments and decayed plant materials. How do you think soil helps a plant?

Gizmo Warm-up: Grow the Biggest Plant!

1. In the Gizmo set up the three pots however you like:
   - Choose a **seed** to drag into each pot.
   - Click on the light bulbs to turn them on or off.
   - Drag the **Water** slider up or down to set the amount of water each plant will get.
   - If you like, drag **fertilizer** or **compost** into a pot.
   - When the pots are ready, click **Play** ( ) and wait for the simulation to end.

2. How tall was your tallest plant?

3. Click **Reset** ( ) and **Clear pots**. Run a few more trials to grow the tallest plants you can. What conditions led to the tallest plant?

Activity A: **Wet and dry**	Get the Gizmo ready: • Click **Reset**. • Click **Clear pots**.	

Question: Do seeds need water to grow?

1. Form hypothesis: Do you think seeds need water to start growing? Explain why or why not.

2. Set up Gizmo: In the Gizmo, set up the three pots like this:

   - Pot A: Bean seed, two lights on, 0 mL water per day
   - Pot B: Bean seed, two lights on, 50 mL water per day
   - Pot C: Bean seed, two lights on, 100 mL water per day

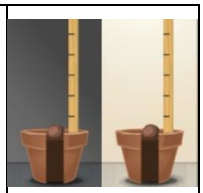
3. Experiment: Click **Play** to start. When the simulation is done, observe the plants.

4. Collect data: Fill in the data table below with the height and mass of each plant on day 50. (The **mass** of a plant is the amount of matter in the plant. It is related to how heavy it is.) In the last column describe what each plant looks like.

Pot	Water/day (mL)	Height (cm)	Mass (g)	Appearance
A				
B				
C				

5. Draw conclusions: Do seeds need water to grow? (Was your hypothesis correct?)

6. Revise and repeat: Is more water always better? Create your own experiments to find the ideal amount of water for each kind of plant. Explain your findings below.

Activity B: **Light and dark**	Get the Gizmo ready: • Click **Reset**. • Click **Clear pots**.	

Question: How does the amount of light affect how plants grow?

1. Form hypothesis: A **variable** is something that can be changed in an experiment, such as the amount of light. How do you think the amount of light affects how plants grow?

2. Experiment:

   - Set up the three pots with 50 mL of water per day, plain soil, and turnip seeds.
   - Turn on three lights over pot A, one light over pot B, and zero lights over pot C.
   - Click **Play**.
   - After 30 simulated days, click **Pause** ( ).

3. Collect data: In the table below, describe each plant after 30 days.

Pot	Number of lights	Height (cm) on day 30	Mass (g) on day 30	Appearance on day 30
A				
B				
C				

4. Draw conclusions: Select the DATA tab. Look at the graphs for **Plant height** and **Plant mass**. How did the amount of light affect the growth of plants?

5. Think and discuss: Click **Play** and let the simulation continue to 50 days. Based on what you have seen so far, what do seeds need to grow into healthy plants?

Activity C: **Design an experiment**	Get the Gizmo ready: • Click **Reset**. • Click **Clear pots**.	

Question: You come up with the question! (See below.)

1. Create question: Fill in the blanks below with the variable and the type of plant you would like to study in this activity. (Do not repeat an experiment you have already done.)

   How does _____ *affect a* _____ *plant?*

2. Form hypothesis: What is your hypothesis for the question above?

3. Set up Gizmo: Set up the pots to test the variable you are investigating. Describe how you set up each pot in the table below.

Pot	Type of seed	Water/day	Number of lights	Type of soil
A				
B				
C				

4. Experiment: Click **Play** to start. When the simulation is done, observe the plants.

5. Collect data: Examine your plant data on the DATA tab. Record your results here.

Pot	Height (cm)	Mass (g)	Appearance
A			
B			
C			

6. Draw conclusions: What did you discover? Why do you think it happened that way?