Science is about exploration.

What we discover changes the way we think and live.

Explore what is out there – think like an **astronomer**	Explore what you are standing on – think like a **geologist**	Explore very every small things – think like a **microscopist**
Explore living things – think like a **biologist**	Explore how your pet behaves – think like an animal **behaviourist**	Explore the past – think like a **palaeontologist**
Explore who you are - think like a **geneticist**	Explore how your brain works – think like a **neurobiologist**	Explore what makes you do things – think like a **psychologist**
Explore what keeps you healthy – think like a **medical researcher**	Explore matter and how it reacts - think like a **chemist**	Explore how things work – think like a **physicist**

Planning an Investigation

Some scientific discoveries happen by accident other follow a series of carefully planned steps - the **scientific method.**

THINK like a scientist …
DESCRIBE: What is happening? (describe an interesting observation) **HOT Describe Map and self assessment rubric.**
ASK QUESTIONS: What is causing it to happen? State an explanation of the interesting observation. **HOT Explain Map and self assessment rubric.**
FORM a HYPOTHESIS: To predict what is happening. Deduce a prediction from the explanation above. If you assume the explanation is true what consequences follow? **HOT Predict Map and self assessment rubric**

DESIGN a controlled experiment to test the reliability and validity of your hypothesis (prediction)

THE FAIR TEST

The item I will change.	**I will keep these items the same.**	**I will look for changes in this item.**
(Independent variable)	(Controlled variables)	(Dependent variable)

When evaluating whether an experiment is a **FAIR TEST** you will need to check that the variables are carefully controlled except for those being tested by the experiment. If the plan involves changing many variables at once, it cannot be considered a fair test. An example would be growing some kumara plants in the light and adding water, whilst growing other kumara plants in the dark with no water. Such an experiment would produce no fair test.

ASK a QUESTION:

When I change _____ what will happen to _____?

FORMING A HYPOTHESIS:

I think that ….

Note: A good hypothesis should be written as a definite statement/ be based on your observations and knowledge/ contain only 1 factor that is going to vary/ be testable with a straight forward experiment/ describe the anticipated results.

CARRY OUT EXPERIMENT.

Equipment required:

Method:

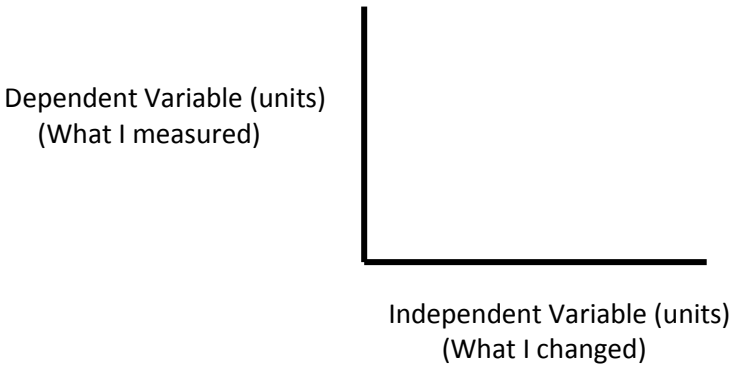
Step 1.
Step 2.
Step 3.
Step 4.
Step 5.
etc.

Results:
Record result data appropriately. (e.g. tables).

WHAT I CHANGED (units) Independent Variable	**WHAT I MEASURED (units)** Dependent Variable

Analyse and interpret results

Display data appropriately. (e.g. graphs).



What happened to _____ *(what I measured)* when I changed _____? *(what I changed)*

REPEAT EXPERIMENT. At least twice. (reliability)

Were my findings reliable?

CONTROL EXPERIMENT. (validity)
A control is included for comparison when necessary. This is an experiment which has all the conditions the same except for the one being investigated.

EVALUATE the prediction
Reject or accept the hypothesis (prediction)
HOT Evaluate Map and self assessment rubric

CONCLUSION
Making sense of the patterns in your results
What do your results mean?

When writing a conclusion to an experiment it is important to refer back to the aim. e.g. if the aim was to find out if kumara plants prefer light or dark, then the conclusion must be a statement that answers this statement.