The Scientific Method
Lesson 3 – How to Conduct a Fair Test

L.O. To conduct an investigation using the scientific method.

Quiz!

What question are we investigating using the scientific method?

_____

Direct Instruction:

When learning about plants at school, we have been taught that they need earth, water and sunlight in order to grow. But how do you explain potatoes starting to grow in the dark then? Following the scientific method, we are investigating the question:

How much sunlight do potatoes really need to grow?

To find the answer to our question, today we will be planting a potato seed in full sun, half sun and no sun to see which will grow the most/least?

What is a Fair Test?

When conducting an investigation, the most important thing to remember is to make it a **fair test**. To make a test 'fair' means that you change only **one** thing (called a variable), while keeping everything else the same. This ensures that we are testing what we actually intend to test, without other variables (things) changing our results.

Only changing one **variable** (thing) allows the person conducting the test to know that no other variable has affected the results of the test.

Types of Variables

There are three main types of variables: independent, dependent, and controlled.

independent variable: the **one** thing that is changed in an investigation.

dependent variable: what is being measured in the test. It's called 'dependent' because it depends on the independent variable.

controlled variables: all the other variables (things) that a scientist must keep the same throughout the entire experiment.

You have to control all of the variables in an experiment (except for the one independent variable). Only when you are certain that all variables are the same can you know that the results of your experiment are accurate.

To help remember how to conduct a fair test, we can use the following mnemonic to help us:

Cows - Change one thing (independent variable)

Moo - Measure something (dependent variable)

Softly - Keep everything else the same (controlled variable)

Watch the video clip for further information:
https://www.bbc.co.uk/bitesize/topics/z2ddmp3/articles/zpctrwx

Guided Practice:
Fill in the blanks using the following words:

accurate changed independent dependent controlled independent

Variables are things that can be c_____ in an experiment. There are three types of variables: i_____, d_____ and c_____. Controlling all of the variables in an experiment, except for the i_____ variable, is the only way to know that the results of an experiment are a_____.

Direct Instruction:
In our investigation into the amount of sunlight that potatoes require to grow, the variables are as follows:
independent variable (the **one** thing that we are changing): amount of sunlight

dependent variable (what we measure as a result of the independent variable): amount of plant growth

controlled variables (everything else that we keep the same in the experiment):

- seeds (all potato seeds)
- time of planting (so they have the same amount of growing time)
- pots all the same size
- amount of water
- pots all kept outdoors

Independent Practice:
Fill in the blanks using the following words:

fair **correct** **tests** **accurate** **one** **same**

When scientists want to find the answer to a question, they conduct _____.

When conducting a test, they must ensure it is a _____ test. This is very important if they want their findings to be _____ (or correct). When conducting a fair test everything needs to be kept the _____ except for the _____ thing you are testing.

In our investigation into the amount of sunlight that potatoes require to grow, what are the variables?

independent variable: _____

dependent variable: _____

controlled variables: _____
(try and name more than one!)