Forces

In this unit we will

- Investigate the force of Gravity – take force measurements
- Investigate force of buoyancy, or up-thrust
- Investigate how forces can create movement - plan and carry out a fair test
- Investigate the force of friction – plan & carry out a fair test
- Explore the effect of air resistance – taking repeat readings

Science Skills that we will develop:

Explaining Science

- I use complex science words correctly
- I use a science model to describe and explain
- I draw & annotate diagrams to help describe/explain

Designing Experiments

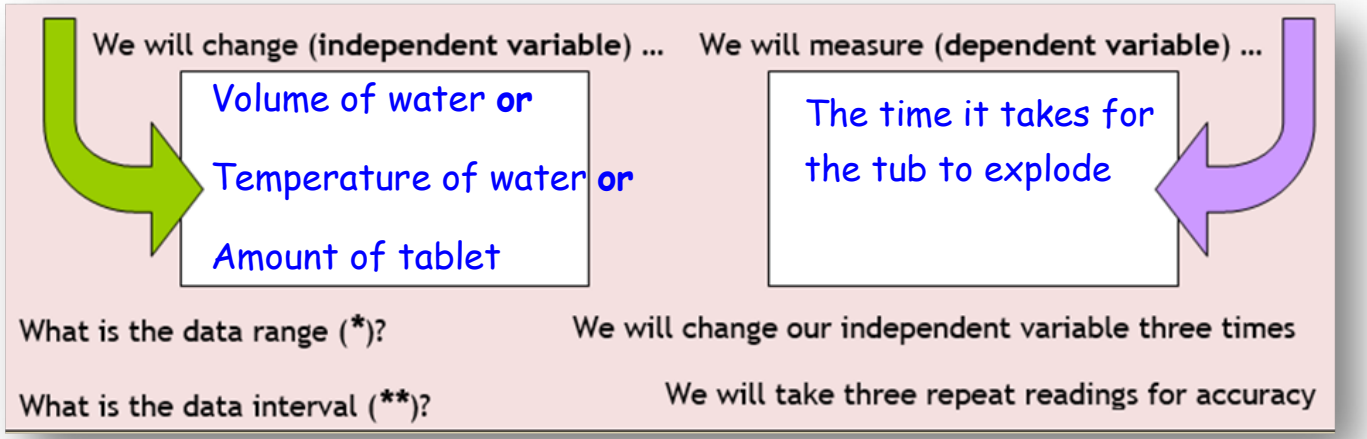
- I plan a fair test & ensure controlled variables stay the same

Data, Tables & Graphs

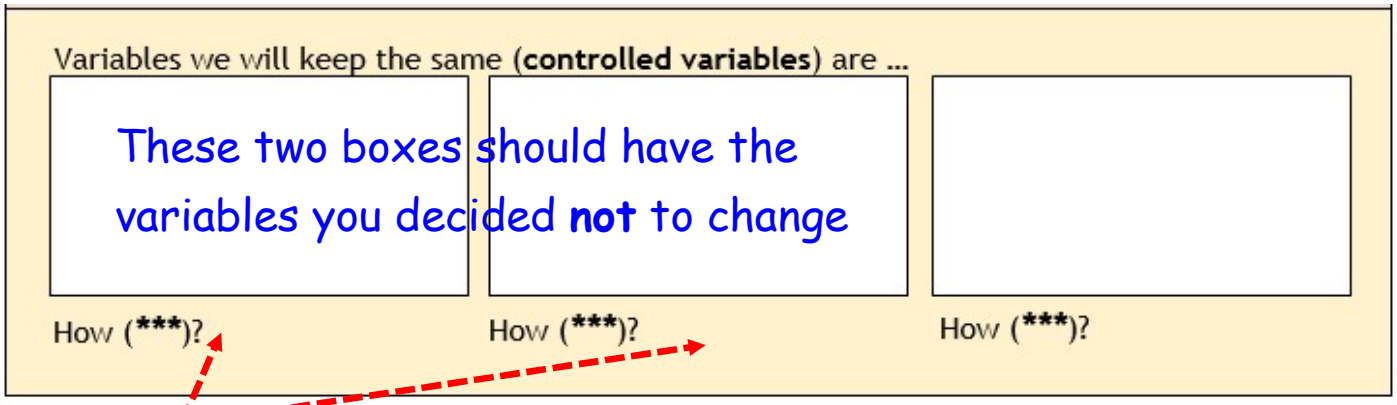
- I measure/calculate in standard units
- I construct a complex table to show repeated data
- I plot mean values and draw a trend line for line graphs

Let's recap on what we did last week:

Let's re-cap on what we did last week: each group chose just **one** of the independent variables below. We all realised that the only thing we can measure accurately in a classroom, is the time it takes for the tub to explode.



If we only change one variable (the independent one), then *all* the other variables must be kept the same for each test - these are called the **controlled variables**.

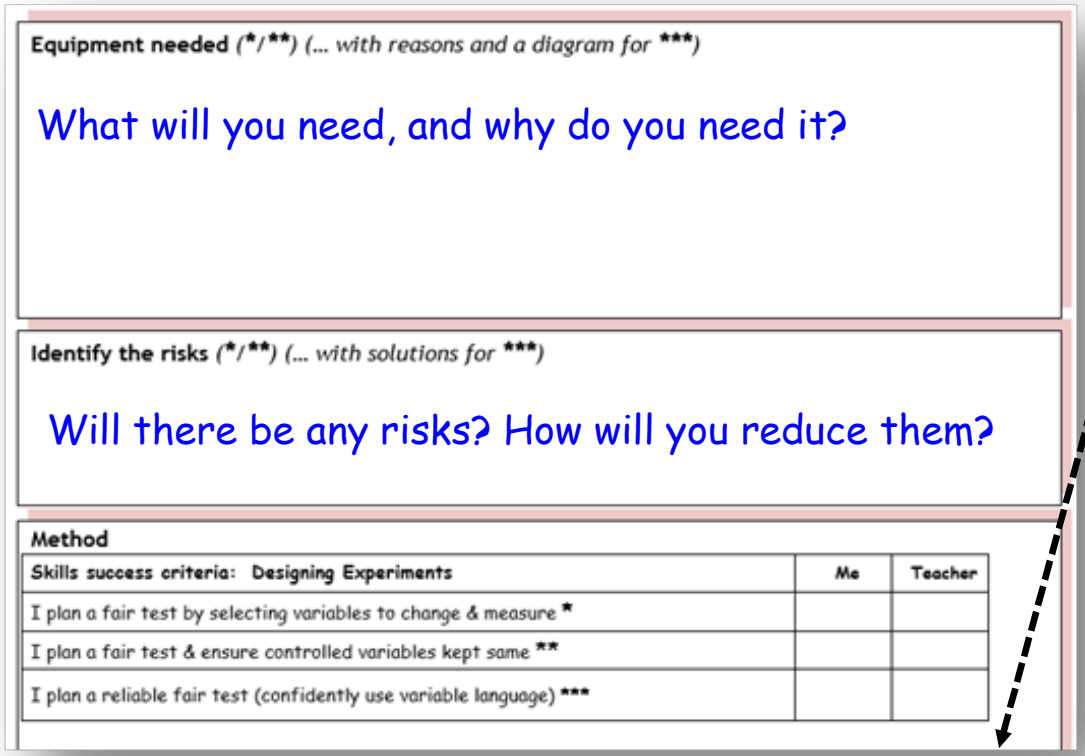


e.g. What temperature will you keep the water at?
How much tablet will you use each time?
What volume of water will you always use?

Decide these as a group

Check your prediction - does it explain your reasoning? If you think that changing your independent variable will make the tub explode more quickly, can you say why? If you can use the particle model to help explain, then you are well on the way to being a 3* scientist.

Prediction (... *remember to* ***explain*** *for* *** *- Hypothesis*)



Equipment needed *(*/**) (... with reasons and a diagram for ***)*

What will you need, and why do you need it?

Identify the risks *(*/**) (... with solutions for ***)*

Will there be any risks? How will you reduce them?

Method

Skills success criteria: Designing Experiments	**Me**	**Teacher**
I plan a fair test by selecting variables to change & measure *		
I plan a fair test & ensure controlled variables kept same **		
I plan a reliable fair test (confidently use variable language) ***		

The final 'method' section is the where you will write about how you plan to carry out your fair test. **You need to show if you understand how to keep it fair.** Look back at your planning notes to help you. See the next page for an example.

Method

Skills success criteria: Designing Experiments	Me	Teacher
I plan a fair test by choosing which variables to change *		
I plan a fair test & show how controlled variables will be kept same **		
I plan a reliable fair test, confidently using the language of variables ***		

We will change the amount of tablet, starting with 1/4 and increasing by a 1/4 each time, until we reach one whole tablet - this is our independent variable. To keep the test fair, we need to keep the other controlled variables the same each time. The volume of water will stay at 9ml, and the temperature will be 10 degrees Celsius each time (cold tap water).

L.O. Record multiple results from a fair test

Science skills success criteria: Data, tables & graphs / Designing experiments	Me	Teacher
I use a blank frame to construct a complex table of results that includes repeat readings and I calculate the mean average with **help** **		
I can construct my own complex table that includes repeat readings and I calculate the mean average ***		

Independent variable (what I changed)	Dependent variable – time taken for film tub to pop (seconds).			
	Repeat 1			

Fill in the headings on the recording sheet, ready for the experiment.

If you want a challenge, ask for a Success Criteria strip on its own, and draw your own table in your book.

Gather your equipment and decide who will be doing what.

1. Somebody needs to fill the tub with the correct amount of water
2. Someone else must put the correct amount of tablet in
3. One of you must make sure the lid is properly clicked shut **all around**
4. The timer needs to be started and stopped accurately

You have two options:



a) make sure everyone gets a go at everything

b) each person keeps the same job and becomes an 'expert'

Look back at your table of results (don't forget to calculate the mean average for each set of readings). Do your results support your original prediction? Can you explain why?

What do you suppose would happen, if over a thousand film canisters were set off at the same time?