Variables

Variables are things that vary and change

Variables

In any experiment there are 3 variables:

- an independent (or input) variable
- a dependent (or outcome) variable
- some control variables

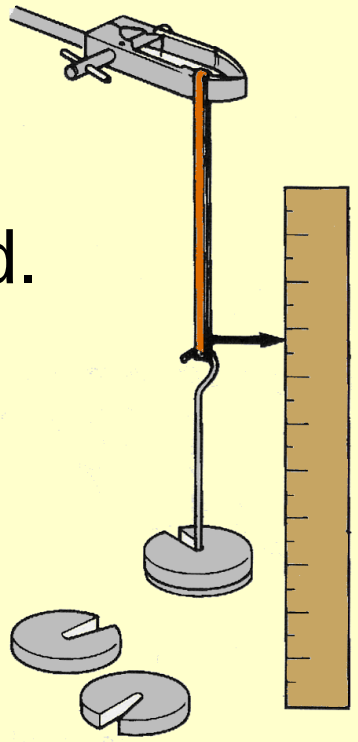
Let's look at each type….

Independent (input) variable

This is the thing that you decide to change.

Example 1

Investigating how a weight affects the length of an elastic band.



You decide the weight to apply, so:

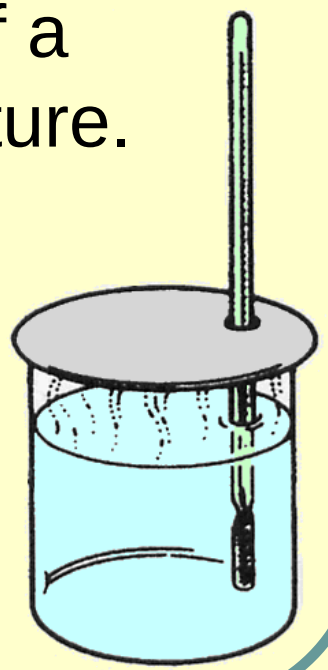
Weight is the independent variable.

Independent (input) variable

This is the thing that you decide to change.

Example 2

Investigating how the rate of cooling of a beaker depends on the initial temperature.



You decide the initial temperature, so:

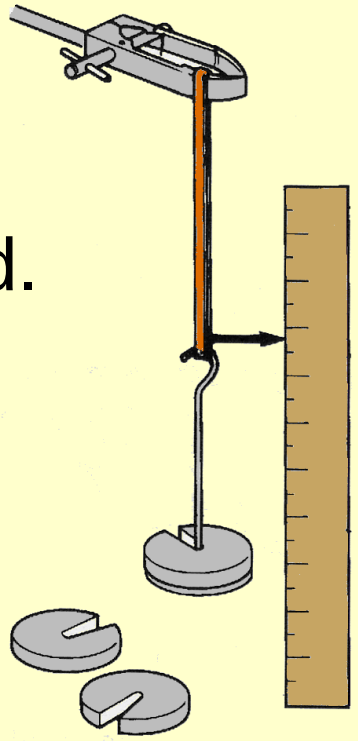
initial temperature is the independent variable.

Dependent (outcome) variable

This is the variable that changes as a result. It is the variable that you measure.

Example 1

Investigating how a weight affects the length of an elastic band.



You measure the resulting length of the elastic band, so:

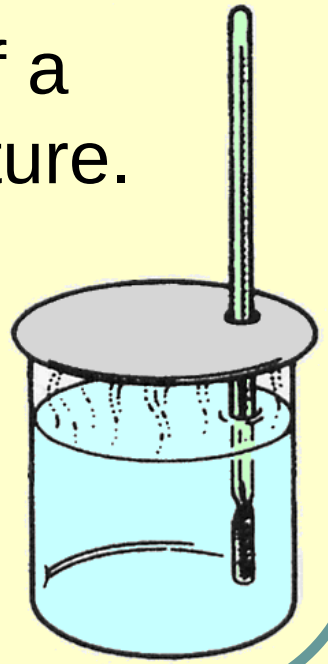
Length is the dependent variable.

Dependent (outcome) variable

This is the variable that changes as a result. It is the variable that you measure.

Example 2

Investigating how the rate of cooling of a beaker depends on the initial temperature.



You measure the temperature every minute as it cools, so:

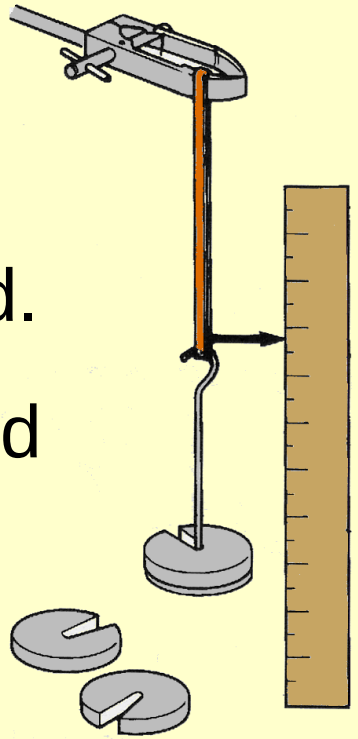
temperature is the dependent variable.

Control variables

These are all the variables that must not change, to make sure it is a fair test.

Example 1

Investigating how a weight affects the length of an elastic band.



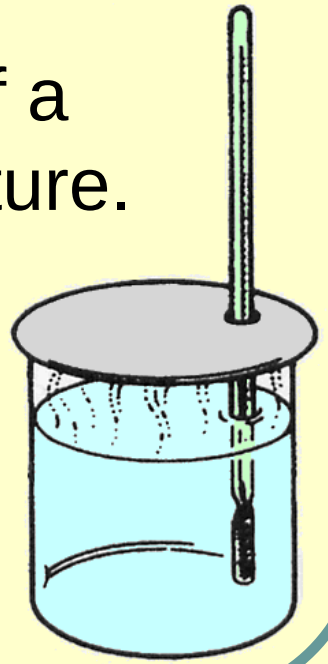
You must use the same elastic band all the time,
and the same scale etc,
so it is a fair test.

Control variables

These are all the variables that must not change, to make sure it is a fair test.

Example 2

Investigating how the rate of cooling of a beaker depends on the initial temperature.



You must use the same beaker,
with the same amount of water,
in the same position in the room,
at the same room temperature,
so it is a fair test.

In Summary

Example 1

The independent variable is

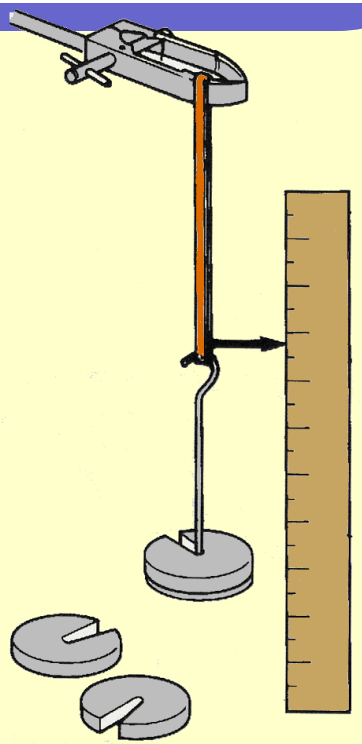
- weight

The dependent variable is

- length of the elastic

The control variables are

same elastic band,
same scale, etc,
so it is a fair test.



In Summary

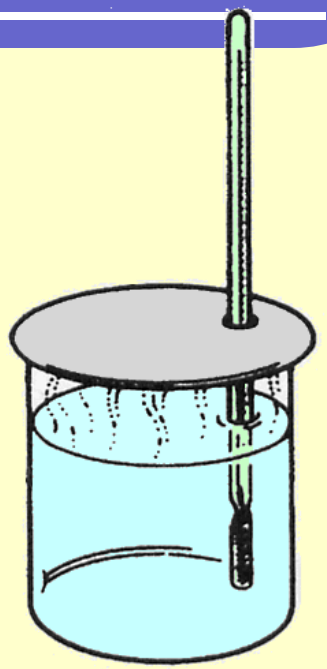
Example 2

The independent variable is

- initial temperature

The dependent variable is

- temperature as it cools



The control variables are

the same beaker,
with the same amount of water,
in the same position in the room,
at the same room temperature,
so it is a fair test.

Learning Outcomes

You should now:

- Understand the difference between
  - independent,
  - dependent, and
  - control variables
- Be able to identify these variables when doing your practical work.