



# Statistics & Statistical Tests



# Introduction – Some terminology

- Scientific investigations begin with collecting information about something.
  - These **observations** can be descriptive or numerical.
    - Descriptive
      - Involve carefully recording details of events.
    - Numerical
      - Involve counting or measuring things.



# Population

- The collection of things being investigated.
  - When testing the link between eye colour & short sightedness in humans the population is...
    - All humans.
  - When investigating the difference in size of leaves at the top of a tree with those at the bottom the populations are...
    - All leaves at the top & all leaves at the bottom.



# Samples

- Impossible to collect information on EVERY member of a population.
  - So we choose a **sample** from the population.
  - For example:
    - A sample of 200 humans.
    - 10 leaves from the top & 10 from the bottom.



# Sampling

- We must make sure that our sample is representative of the population.
  - Then we can generalise any findings about the sample to the population.
- **Random Sampling:**
  - Ensures that EVERY member of a population has an equal chance of being included in the sample.



# Variables

- Leaves in the Leaf Investigation will vary in length.
  - “Length of leaf” is a **variable** quantity.
  - The actual lengths of the leaves are called **values** of the variable.
  - Leaf lengths 4.6cm & 6.2cm are two possible values.



# Types of Variables

- Two types of variable:
  - **Quantitative**
    - When the values of a variable are numbers.
      - Eg. Length of leaf.
  - **Qualitative**
    - When the values of a variable are descriptions.
      - Eg. Eye colour.



# Quantitative Variables

- Two types:
  - **Continuous**
    - When the variable can be absolutely any value.
      - Eg. A leaf of 2.3472cm or one of 6.54972641cm.
  - **Discrete**
    - When the variable can only be certain values.
      - Eg. Shoe size, counts or rankings.



# Now you need to do some work

- You should know what each of the following are:
  - A frequency distribution graph
  - A scatter graph
  - Mean
  - Mode
  - Median
  - Standard deviation
  - Probability





# Hypothesis Testing

- Hypothesis = An explanation for an observation.
- Hypothesis Testing = A mathematical way of saying how well your data support your hypothesis.
  - Or how likely the data have simply occurred by chance.



# We can test...

- Whether there is a correlation (association) between two variables.
- Whether there is a difference between two variables.
- Investigate data which fall into discrete categories.



# Tests that you need to know:

