

# Genes

# 1. Variation

## CONCEPT 1

### VARIATION WITHIN A SPECIES

#### NOTES

Scientists have organised the known organisms on Earth into groups called **Species**. Each species has its own name. For example, the species humans belong to is called *Homo sapiens*. A species is a group of organisms with many characteristics in common. They can reproduce to produce fertile offspring. Characteristics within a species can vary. For example, natural hair colour within *Homo sapiens*. As a person can have only one type of natural hair colour, it is an example of **discontinuous variation**. Other examples of characteristics that show discontinuous variation are blood groups, gender and vein patterning in leaves. Characteristics showing discontinuous variation have only a limited number of values. Data on characteristics showing discontinuous variation will be best presented on **bar graphs**.

Human height is also an example of a characteristic that can vary in humans. As human height changes gradually over a range of values between the shortest and tallest person, human height is an example of **continuous variation**. Other examples of characteristics that show continuous variation are wing span, weight and hand span.

Data on characteristics showing continuous variation will be best presented on **histograms**. Histograms of data on continuous variation will show a bell-shaped graph which we call the '**normal distribution**'. The most frequently occurring value is called the **mode**.

It is possible to carry out **investigations** to find out if characteristics such as height and hand span are linked.

When investigating variation, a large **sample size** is needed so **reliable data** can be collected. **Random sampling** techniques should be used to avoid **bias**.

Data collected during this type of investigation is best presented on a **scatter graph**. The graph plotted might show a **positive correlation** – as one characteristic increases, so does the other. It could show **negative correlation** – as one characteristic increases the other decreases. Or it might show no correlation – meaning there is no clear link between the characteristics.