

# Inheritance

## Threshold Concept

Organisms pass on their DNA in order to survive.

## DNA



DNA is found in the nucleus of cells and contains all the genetic material to make the organism



## Keywords

- Cell**..... The smallest unit that can live on its own and makes up all living organisms
- Nucleus** ..... The organelle inside cells that contains the cells genetic material
- DNA**..... The molecule inside cells that contains all the genetic information responsible for the development and function of an organism
- Chromosomes**..... A structure made up of proteins and DNA organised into genes inside the nucleus of a cell
- Gene** ..... Genes carry information that determine what characteristics are inherited from an organism's parents
- Reproduction**..... The production of offspring

## Sexual and asexual reproduction

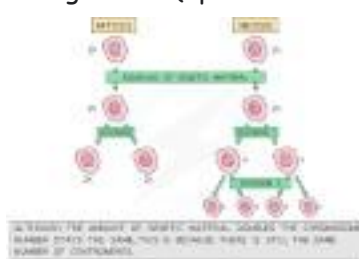


There are two main forms of reproduction: sexual and asexual reproduction. In sexual reproduction, an organism combines the genetic information from each of its parents and is genetically unique. In asexual reproduction, one parent copies itself to form a genetically identical offspring



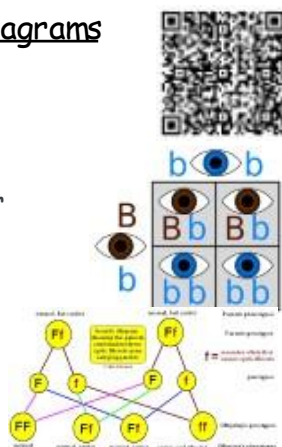
## Mitosis / Meiosis

Mitosis is a form of cell division which produces two identical, diploid body cells. Meiosis is a form of cell division which produces four non-identical, haploid sex cells or gametes (sperm and ova in humans)

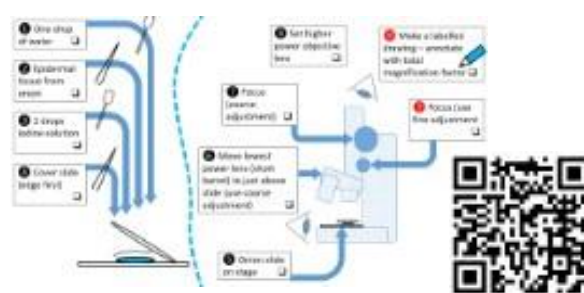


## Genetic cross diagrams

**Genetic crossing** describes breeding two selected individuals so their offspring can be studied to understand how a particular trait is inherited down the generations.



## Required Practical



## Equations for this topic

Image size = actual size x magnification

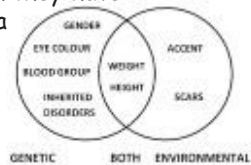
# Variation

## Threshold Concept

All living things need to change to live.

## Variation

Individuals in a population are usually similar to each other, but not identical. Some of the variation within a species is genetic, some is environmental - the conditions in which they have developed and some is a combination of both



## Keywords

**Variation**..... any difference between the individuals in a species or groups of organisms of any species

**Evolution** ..... the change in the characteristics of a species over several generations and relies on the process of natural selection

**Adaptation**..... the adjustment of organisms to their environment in order to improve their chances at survival in that environment

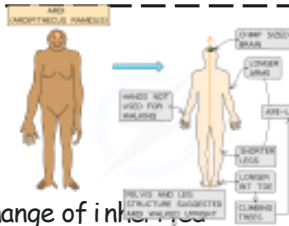
**Natural Selection** ..... the process through which populations of living organisms adapt and change

## Natural Selection

In any environment, the individuals that have the best adaptive features are the ones most likely to survive and reproduce



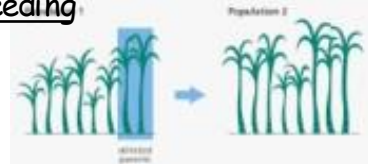
## Evolution



Evolution is the change of inherited characteristics within a population over time through natural selection, which may result in the formation of a new species. Five main processes that lead to evolution:

- mutation
- non-random mating
- gene flow
- finite population size (genetic drift)
- natural selection.

## Selective Breeding



Selective breeding or artificial selection is when humans breed plants and animals for particular genetic characteristics. Humans have bred food crops from wild plants and domesticated animals for thousands of years

## Fossils

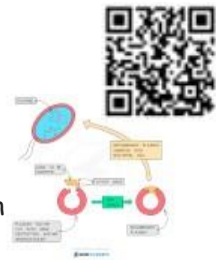


A fossil is the preserved remains of a dead organism from millions of years ago.

**Evidence for early forms of life comes from fossils.** By studying fossils, scientists can learn how much (or how little) organisms have changed as life developed on Earth

## Genetic Engineering

Genetic engineering involves modifying the genome of an organism by introducing a gene from another organism to result in a desired characteristic



## Required Practical

## Equations for this topic