

S2 Biology Topic 3a – The Power of Genetics - Need to Know sheet

- DNA is found in the nucleus of most cells and contains the instructions for the development and function of living things. This is called the genetic code.
- DNA can be extracted from living cells. Salt and heat is used to break down the cell membrane. Detergent is used to break down the nuclear membrane. Alcohol is used to precipitate the DNA, which makes it visible.
- Every individual has a unique combination of genes.
- A gene is a piece of DNA which controls a particular characteristic (e.g. eye colour) in an individual. An allele is a form of a gene (e.g. brown or blue).
- Dominant alleles (CAPITALS) are expressed with either one or two copies present. Recessive alleles (lower case) are only expressed if both copies are present.
- Fertilisation is a random process. Egg and sperm each have 23 chromosomes, selected randomly from the pairs of chromosomes in the parent cells.
- We can use a Punnett square to predict the possible outcomes for one gene during fertilisation.
- DNA profiling is a way of analysing DNA to see a unique pattern for an individual.
- DNA profiling can be used for paternity tests and forensics.
- Collection, processing, storage and ownership of genetic information can be controversial.
- Genetic engineering can be used to make useful proteins. A gene is transferred from one organism to another.
- When a cell divides, it makes an identical copy of itself. A unicellular organism performs cell division to make more individual organisms. A multicellular organism performs cell division for growth and repair of damage.
- Cancer is caused by uncontrolled cell division.
- Specialised cells, for example, nerve, root hair, red blood cell, sperm and egg cells, have particular structures which allow them to complete their functions.