

1 - DNA	
Chromosome	Found inside cell nucleus -> long molecules of tightly coiled DNA -> humans have 23 pairs (46 in total) .
Gene	Small section of DNA on a chromosome -> codes for a sequence of amino acids -> codes for a specific protein .
DNA	Polymer -> two long strands -> coiled into double helix.
Sex chromosomes	Female = XX. Male = XY.
Genome	Organism's entire set of genetic material.
2 - Reproduction	
Gametes	Sex cells -> sperm and egg cell in animals -> pollen and egg cell in flowering plants .
Sexual reproduction	Genetic information is mixed -> fusion of gametes -> two parents required -> offspring are genetically varied .
Asexual reproduction	No mixing of genetic information -> only one parent -> offspring identical to parent.
Mitosis	Cell divides -> produces 2 genetically identical cells -> full set of DNA -> used for growth , repair and asexual reproduction .
Meiosis	Cell divides twice -> produces 4 genetically varied cells -> half set of DNA -> produces gametes for sexual reproduction .
3 – Genetics	
Allele	A version of a gene .
Dominant	Allele always expressed -> only needs 1 copy e.g. Pp or PP
Recessive	Allele only expressed if 2 copies present e.g. pp only
Homozygous	2 alleles the same for a certain trait e.g. RR or rr
Heterozygous	2 different alleles for a certain trait e.g. Rr
Genotype	An organism's combination of alleles e.g. BB , Bb or bb
Phenotype	Characteristics an organism has e.g. brown or blue eyes .
4 – Inherited Disorders	
Polydactyly	Extra fingers or toes -> dominant allele.
Cystic fibrosis	Disorder of cell membranes -> recessive allele.
Embryonic Screening	For: prevents inherited disorders -> reduces suffering and treatment costs , laws can prevent it going too far.
	Against: ethical concerns with destroying embryos and choosing 'desirable' traits , expensive .

5 - Variation	
Variation	Differences in characteristics in a population.
Environmental variation	Differences caused by external factors and conditions , e.g. nutrients , weather , lifestyle choices .
Genetic variation	Differences caused by inherited genes .
Mutations	Changes in genes . Occur continuously -> most cause no change in phenotype , very few cause a new phenotype .
6 – Evolution and Evidence	
Evolution	Change in inherited characteristics of a population over time
Natural selection	Charles Darwin's theory of evolution -> all species evolved from simple life forms -> first developed 3 billion years ago .
Explaining natural selection	Variation due to genes -> organisms compete for resources -> those with most suitable characteristics more likely to survive and breed -> pass on genes for characteristics to offspring .
Species	2 populations of a species become different -> can no longer interbreed -> no longer produce fertile offspring -> 2 species .
Fossils	Remains of organisms from millions of years ago.
Fossil formation	Replacement by minerals , impressions/casts or perseveration .
Antibiotic resistance	Mutations lead to strains not killed by antibiotics -> survive , quickly reproduce and spread -> rapid evolution .
Extinction	No individuals of a species remain -> caused by new predators , new diseases , competition , environment change .
5 – Uses of Genetics	
Selective Breeding	Breed individuals with desired characteristics -> select offspring and repeat over generations .
Genetic Engineering	Gene for a desirable characteristic is transferred from one organism's genome to another, e.g. GM crops .
6 – Classification	
Linnaean System	Developed by Carl Linnaeus -> kingdom , phylum , class , order , family , genus , species .
Binomial names	First word = genus , second word = species , e.g. <i>Homo sapiens</i> .
3 domain system	Developed by Carl Woese -> bacteria , archaea and eukaryota .

GCSE Science

Biology B6 – Inheritance, Variation & Evolution

