B4: Natural Selection and Genetic Modification

1. Evidence for Human Evolution	
Homo sapiens	Our species. Evolved about 200,000 years ago. Skull volume 1450 $cm^{3.}$
Fossil evidence	Many fossils have been found showing a gradual transition from 'ape-like' to 'human-like'.
Stone tool evidence	Older stone tools are simpler requiring less intelligence to make, younger stone tools are more complex requiring more intelligence to make.

2. Darwin's Theory	
Charles Darwin	Develop the theory of evolution.
Evolution	The way that species develop by gradual changes over many generations due to natural selection.
Variation	Natural differences between members of a species that affect the chance of survival.
Mutations	Changes in DNA that cause variation.
Competition	The fight to eat, survive and breed.
Natural selection	Organisms with the best genes and characteristics are more likely to survive, breed and pass on their better genes.
Inheritance	Gaining your genes from your parents.
Well adapted	An organism has features that make it better able to survive and breed.
Resistance	The natural ability of some members of a species to survive poisons that would kill the other members.

3. Classification	
Kingdom	The largest groups Linnaeus divided organisms into.
Animals	Multicellular, cells have nuclei, no cell walls
Plants	Multicellular, chloroplasts for photosynthesis, cells have nuclei and cellulose cell walls
Fungi	Multicellular (apart from yeast), live on or in dead matter for feeding, cells have nuclei and chitin cell walls
Protists	Mostly unicellular, cells have nuclei and some have cell walls
Prokaryotes	Unicellular, cells do not have nuclei, flexible cell walls
Bacteria	Single-celled organisms with no nucleus and no unused sections of DNA.
Archaea	Single-celled organisms with no nucleus but with unused sections of DNA.
Eukarya	Often multi-cellular organisms with a nucleus and unused sections of DNA.

4. Breeds and Varieties	
Artificial selection	When humans select the animals/plants to breed with the best characteristics.
Selective breeding	Developing new breeds of plants or animals with better characteristics by selective breeding over many generations.
Breeds	New groups of animals produced within a species.
Varieties	New groups of plants produced within a species.
Genetic engineering	Changing the characteristics of organisms by giving them genes from another organism.
GMO	Genetically modified organism: an organism that has had its genes changed.
Golden Rice	Two genes inserted into genome that allow rice to produce beta-carotene in grains. This is needed to make vitamin A, a lack of which can cause blindness.