Types of Natural Selection

Stabilising

- Most common trend in natural populations
- Favours most common phenotype as the best adapted
- Stabilising selection reduces variation by selecting against the extremes at each end of the phenotypic range
- The resulting bell shaped curve is narrower, but has about the same mean

Directional

- Most common during periods of environmental change
- Favours the phenotypes at one extreme of the phenotypic range
- Directional selection reduces variation at one extreme of the range while favouring variants at another end
- The resulting bell shape curve shifts in the direction of selection

Disruptive

- May occur when environmental conditions are varied or when the environmental range of an organism is large
- Favours phenotypes at both extremes of a phenotypic range over intermediate variants
- This type of selection can lead to the formation of clines or ecotypes and polymorphism
- The resulting bell shaped curve acquires two peaks

III. EVIDENCE FOR EVOLUTION

Fossils – any parts or impressions of an organism that may survive after its death

Palaeontology – the study of fossils compared to present day species. The fossil record shows that the most primitive forms are in the oldest strata. The origins of, and steps towards, present-day structures can be followed through strata of different ages

Types of fossils

- Fossils form best when organisms are buried quickly in conditions that slow the process of decay
- Fossils are most commonly found in sedimentary rock
- Mineral-rich hard parts (bones, teeth, shells) may remain as fossils, or minerals dissolved in water may seep into tissues and replace the organic matter of the organism

Punctuated Equilibrium

Punctuated Equilibrium is a pattern of evolution in which long stable periods with very little evolutionary change (Stasis), is interrupted by brief periods of rapid change.

Reasons for rapid change includes:

- Sudden changes in the environment.
- Moving into a new habitat with the availability of new niches.
- Evolution of a new characteristic with a distinct advantage that allows one group to out-compete and thus replace another.

The species changes very rapidly over a few generations, then settles down to a period of little change. This little change could mean that stabilizing selection is acting here, and this would account for the lack of evolutionary change.

A species can evolve by just one of these or by both. As the fossil record does not contain all intermediates, it is hard to work out if one is more prevalent than the other.

Divergent evolution

Diversification from an ancestral group into one or more new species. This can result in the ancestral species ceasing to exist or both the ancestral species and the new species continue.

Adaptive radiation

Adaptive radiation is a form of divergent evolution. It involves the evolution of a large number of species from a common ancestor, to occupy a number of different niches. It is the result of a sudden availability of a diverse range of niches caused by…

- The evolution of some new feature that enables a group to occupy new niches.
- Because of geographic isolation with new selection pressures
- Removal of a large number of species in an area.

Typical steps in the process of adaptive radiation

- Members of an ancestral species move into new habitats. This may involve out-competing and displacing other