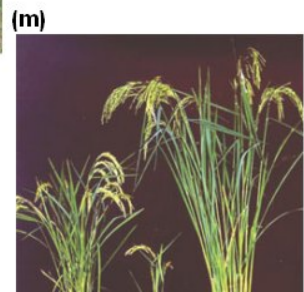
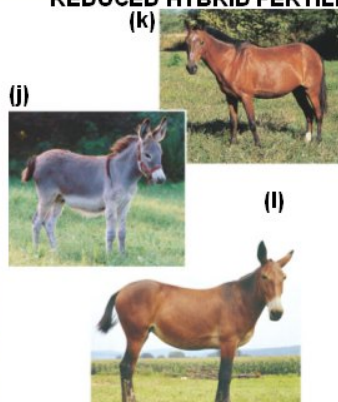
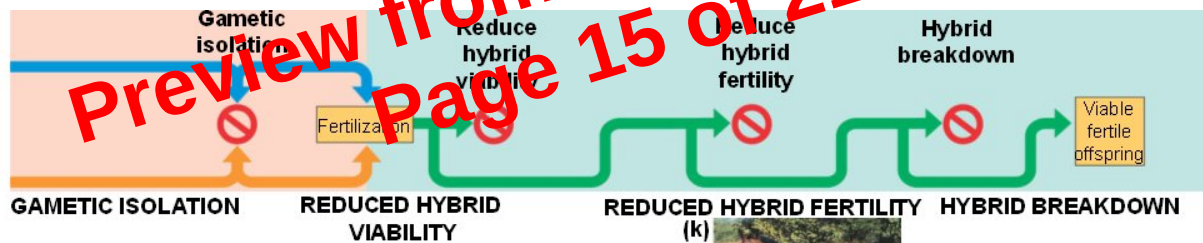
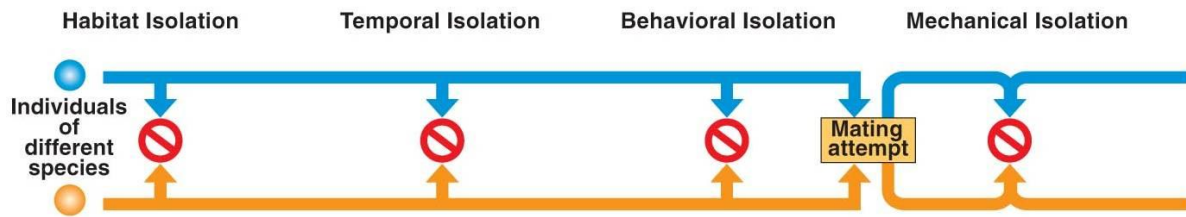
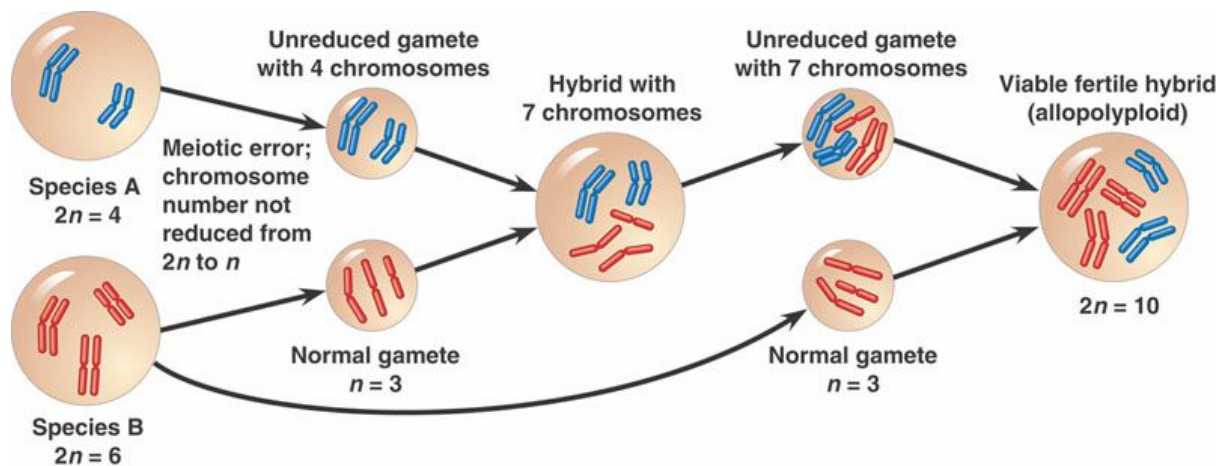


Prezygotic barriers



Limitations of the Biological Species Concept



These are only fertile with each other; they cannot breed with either parent species. They thus represent a new biological species.

Reproductive isolation can result when genetic factors cause individuals to exploit resources not used by the parent.

Summary of Allopatric and Sympatric Speciation

In allopatric speciation, a new species forms while geographically isolated from its parent population. As it accumulates genetic differences due to natural selection and genetic drift, reproductive isolation from the ancestral species may arise as a by-product of the genetic change. Such reproductive barriers prevent breeding with the parent even if the populations re-establish contact.

Sympatric speciation requires the emergence of some reproductive barrier that isolates a subset of the population without geographic separation from the parent population. In plants, hybridization between species or errors in cell division that lead to polyploid individuals occur. In animals, a subset of the population is reproductively isolated by a switch in food source or by sexual selection in a polymorphic population occurs.

Adaptive Radiation

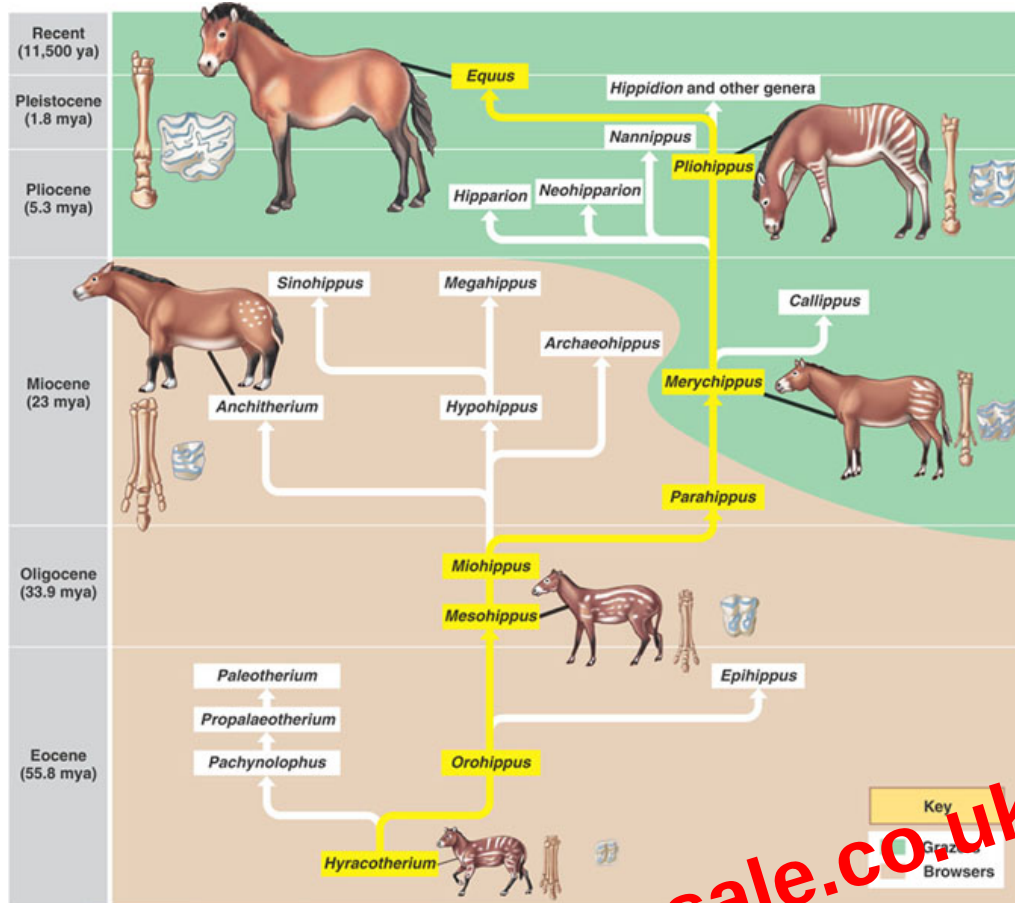
It is the evolution of many diversely adapted species from a common ancestor when new environmental opportunities arise. It occurs when a few organisms make their way into new areas or when extinction opens up ecological niches for survivors.

The Timing of Speciation

In the fossil record many species appear as new forms rather suddenly, persist essentially unchanged and then disappear from the fossil record.

This is **punctuated equilibrium** i.e. periods of apparent stasis punctuated by sudden change. For example, suppose that a species survived for 5 million years, but most of its morphological alterations occurred in the first 50,000 years which is only 1% of its total lifetime. Because time periods this short often cannot be distinguished in fossil strata, the species would seem to have appeared suddenly and then lingered with little or no change before becoming extinct.

During stasis all species continue to adapt but often by changes that do not leave a fossil record, such as small biochemical modifications, behaviour, internal anatomy and physiology.



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