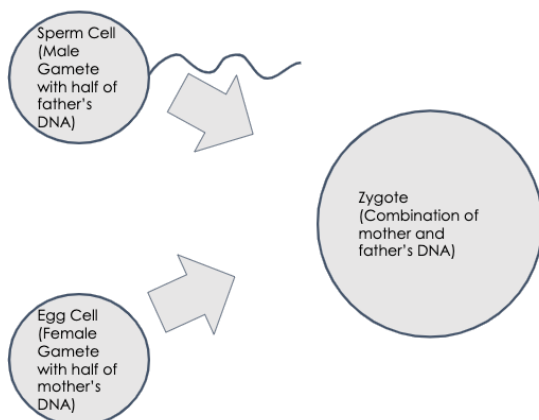
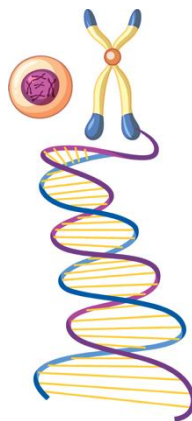


Variation

- Variation** is the different **characteristics** between individual organisms.
- There is variation between populations of different species.
- There is also variation within a species.
- Examples of variation within humans include hair colour, eye colour, height, weight, skin colour, nose shape and finger length.
- Variation can be caused by **inherited** (genetic) factors, **environmental** factors or a combination of the two.
- Characteristics** can be physical, behavioural, and physiological.
- Characteristics are **inherited** from parents through reproduction.
- Inherited variation is caused by the fusing of **gametes** in sexual reproduction and by **random mutations** in DNA.
- The DNA inherited that causes a characteristic is called the **genotype**.
- The **phenotype** is the physical characteristic resulting from the genotype.
- DNA that is passed to offspring can be randomly mutated and result in new phenotypes that were not present in previous generations.

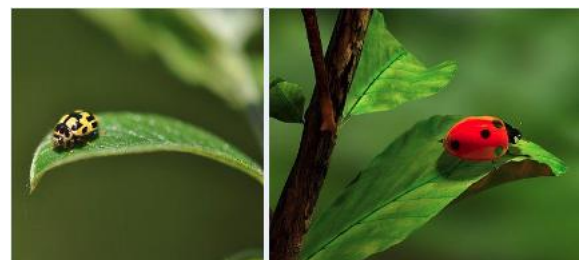


Artificial Selection

- Crops and domesticated animals are the result of artificial selection (selective breeding).
- Selective breeding** is when **humans choose** plants or animals with particular **characteristics** to breed.
- Selective breeding is continued over many generations until the desired characteristic in the offspring are present.
- These characteristics are chosen for appearance or for their usefulness to humans.
- Examples of selective breeding are pet dogs, crops resistance to disease, cows that make a lot of milk.
- Selective breeding can cause inbreeding if closely related individuals are used so that offspring have inherited disease.

Natural Selection

- Within a community, organisms compete for biotic and abiotic factors to survive and reproduce.
- Adaptations** are characteristics that allow an organism to survive and **reproduce** in its habitat.
- Adaptations can be physical structures, behavioural or functional.
- Natural selection** is when **variation** in the population makes some organisms **better suited** to live and reproduce in a particular environment.



Evolution

22. **Evolution** is a change in the inherited characteristics of a population **over time**, caused by natural selection.
23. Evolution can cause the formation of a new species.
24. If two populations cannot interbreed to form fertile offspring, then they are different species.
25. **The Theory of Evolution by Natural Selection** states that all life has evolved from simple organisms more than three billion years ago.

Extinction and Human Impact

26. **Extinction** is when there are no living individuals of a species left in the wild and in captivity.
27. Extinction can be caused by **changes** to **habitats**, new **predators** or **competitors**, or new **diseases**.
28. **Extremophiles** are organisms that live in extreme conditions of temperature, pH, salt or pressure.
29. This is an extreme example of how environmental pressures result in species specifically suited to thriving in that environment.
30. An **ecosystem** is made up of populations of different species interacting with each other and the abiotic environment.
31. Each species competes with other species for **natural resources**.
32. A variety of species helps to maintain the cycling of nutrients and population control.
33. The more species and the more variation in the ecosystem, the more **resilient** it can be to environmental disturbance.