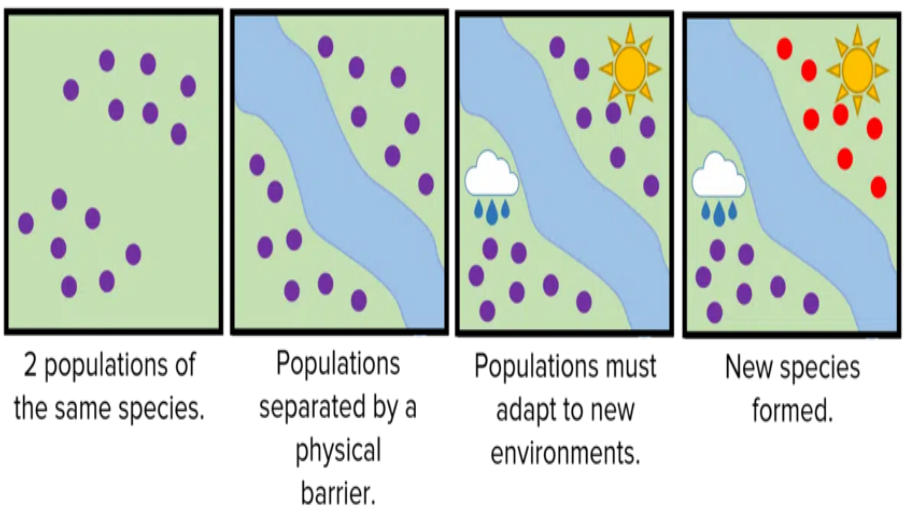
Speciation

- Members of the same **species** can interbreed to produce **fertile offspring**.
- New species can arise as a result of the following things:

  - **genetic variation** - each population has a wide range of alleles that can control their characteristics
  - natural selection - the alleles which help an organism to survive are selected in each population
  - **speciation** - the populations become extremely varied and successful interbreeding cannot happen anymore

- **Speciation** is the formation of new **species** and can happen as a result of **isolation** and **natural selection**.

  1. **Populations** of species are **separated** due to a **physical barrier** such as a river or mountain range.
  2. **Environmental conditions** differ between the two areas.
  3. Certain individuals in each population will be more **adapted** to the new **environment**.
  4. **Natural selection** will cause individuals with the **advantageous traits** to survive, reproduce and pass on the **advantageous genes**.
  5. This causes the **advantageous traits** to become more common in certain populations.
  6. Over time, the **isolated populations** will become so different that they will not be able to **interbreed** to produce **fertile offspring** and so will be two separate **species**.



Alfred Russel Wallace- Theory of Speciation

- Alfred Russel Wallace was a great admirer of Darwin and a fellow **naturalist**, who independently proposed the theory of evolution by natural selection.
- Wallace produced scientific journals with Darwin in **1858**, which prompted Darwin to publish On the Origin of Species the following year.
- Wallace worked around the world gathering evidence to support his evolutionary theory.
- He is best known for studying **warning colouration in animals,** and examples include the Golden Birdwing Butterfly *(Ornithoptera croesus)* and his theory of speciation. He realised that warning colour deter predator from eating them and this is the example of beneficial characteristics that evolved by natural selection.

- After a variety of zoological discoveries Wallace proposed a **theory of evolution,** which matched Darwin's unpublished ideas that he had kept secret for nearly 20 years. This encouraged Darwin to collect his scientific ideas and collaborate with Wallace. They published their scientific ideas jointly in **1858**.