

**Variation:** differences between individuals of a species.

There is variation in all living things.



Variation happens because of the environment, inheritance or both.

**Environmental variation** is caused by our lifestyles and surroundings, such as scars.



**Inherited variation** is caused by the genes inherited from parents, such as eye colour.



Some characteristics are affected by both the environment and inheritance, such as height and hair colour.

Living things produce offspring of the same kind but often appear different to the parents due to **variation**.



**Adaptation:** a characteristic that helps an organism to survive in its habitat.

Sometimes the inherited variation may help an individual to survive in its habitat.



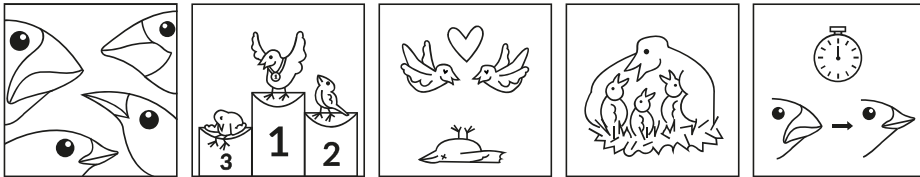
Penguins have a thick fat layer and waterproof feathers to survive the snow and icy ocean.



Some flowers produce sweet nectar to attract insects that help pollinate for plant reproduction.

If it survives and reproduces, the useful characteristic can be passed onto the offspring.

**Natural selection** (survival of the fittest): the process where living things that are better adapted to their habitat survive and produce more offspring with those characteristics.



1. Variation.
2. Struggle to survive: competition for resources and adaptations to the environment.
3. Survival of the fittest: the best adapted survive and reproduce.
4. Advantages inherited by offspring.
5. Gradual change.

If these characteristics continue to be useful for survival, the species may change over time. If a new species is significantly different from its **ancestors**, it is said to have **evolved**.

### Evidence for evolution



**Fossils:** the remains or traces of an animal or plant that lived long ago.

Fossils provide information about living things that inhabited the Earth millions of years ago. They can show how a species has changed over time.

<b>ancestor</b>	A relative of a living thing that lived a long time ago.
<b>extinct</b>	A living thing that no longer exists.
<b>offspring</b>	The young born to a living organism.
<b>scientific theory</b>	An explanation for something in the natural world backed by evidence.