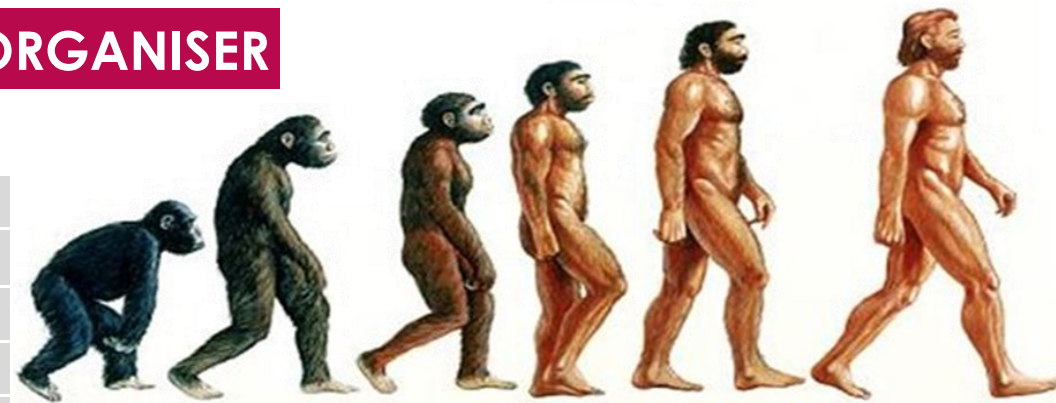


EVOLUTION AND INHERITANCE KNOWLEDGE ORGANISER

Key vocabulary and spellings

Term	Definition
Adaptation	How living things are specialised to suit their environment.
Evolution	The process by which living things can gradually change over time.
Inheritance	The process of passing on features from parents to offspring
Species	A group of living things with very similar characteristics. They can breed together to make more living things of the same type.
Variation	The differences between living things in a species.
Environment	The surroundings or conditions in which a person, animal, or plant lives
Offspring	A person's child or children/ an animal's young
Reproduction	The production of offspring by a sexual or asexual process
Breeding	The mating and production of offspring by animals
Selective breeding	The process by which humans use animal breeding and plant breeding to develop selective characteristics by choosing particular animals and plants



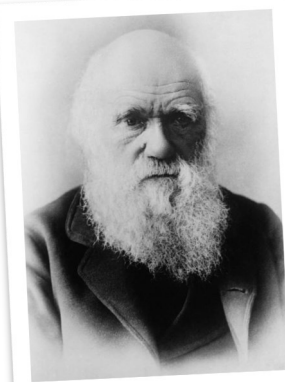
Theory of evolution

Charles Darwin observed that although individuals in a species shared similarities, they were not exact copies of each other; there were **small differences or variations** between them. He also noticed that **everything in the natural world was in competition** for scarce food and must adapt to secure food to survive and produce offspring.
















The winners were those that had characteristics which made them **better adapted for survival**. For example, they were stronger, faster, cleverer or more attractive than others in their species. These living things were **more likely to reproduce and pass on their useful characteristics to their offspring**.

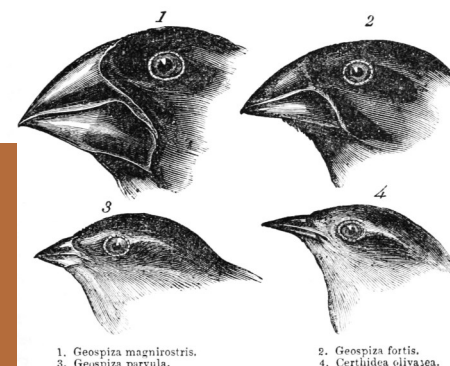
Individuals that were poorly adapted were less likely to survive and their characteristics were not as likely to be inherited. **Those that adapt best will survive, those that don't will become extinct.**

Over time, the **characteristics that help survival become more common** and a species gradually changes. Given enough time, these small changes can add up to the extent that a new species altogether can evolve.



This diagram shows how a horse has evolved. The adaptations mean the horse has evolved to survive the environment it lives in.

Equus	Pliohippus	Merychippus	Mesohippus	Hyracotherium
				
1 million years ago	10 million years ago	30 million years ago	40 million years ago	60 million years ago
1.6m	1.0m	1.0m	0.6m	0.4m
 Single hoof, runs quickly over hard ground	 Other toes lost as only middle hoof used	 Middle toe developed into a hoof, to run faster	 Toe lost for moving faster over dry ground	 4 toed hoof, well spread for walking on soft ground
				



1. Geospiza magnirostris.
3. Geospiza parvula.

2. Geospiza fortis.
4. Certhidea olivacea.

Charles Darwin's theory explained how every living thing is connected in a family tree that stretches back billions of years to the beginning of life on Earth. Charles Darwin concluded that species must evolve. For example in areas where nuts were surrounded by tough cases only the birds with strong beaks would be able to get to the food and therefore would be more likely to survive.

EVOLUTION AND INHERITANCE KNOWLEDGE ORGANISER

Adaptation

Fossils

Fossils = the remains of prehistoric life that have been preserved by natural processes. There are two types of fossil:

Evidence for evolution can be found in fossils and bones. The order that bones join up is the same in all mammals (only the proportions and sizes are different). These show that mammals all descended from a common ancestor.

Body fossil- Preserved remains of the body of the actual animal or plant itself



Trace fossil- Indirect evidence of life in the past such as the footprints, tracks, burrows, borings and waste left behind by animals



Living things are adapted to their habitats. This means that they have **special features** that help them to **survive**. An African elephant, for example, lives in a hot habitat and has very large ears that it flaps to keep cool. A polar bear, on the other hand, lives in a cold habitat and has thick fur to keep warm. A cactus is well adapted for survival in the desert. They have long roots to collect water from a large area and a stem that can store water for a long period of time.

The animals and plants in one habitat are **suited** to live there and may not be able to survive in other habitats. When a habitat changes, the animals and plants that live there are affected.



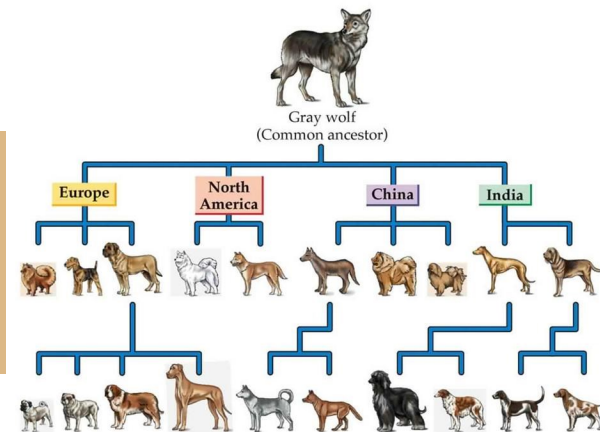
However, you don't inherit everything from your parents- for example things like hairstyle, scars and ear piercings. These characteristics come from choices we make and the way that we live, such as where we live, the food we eat or exercise we take.

Inheritance

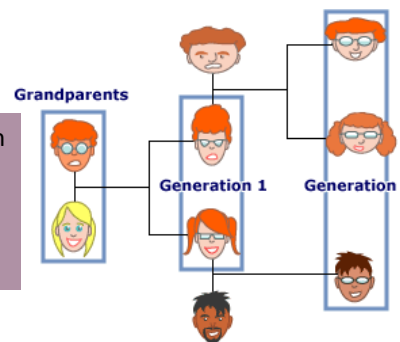
Inheritance is when living things reproduce they **pass on characteristics** to their offspring. You look like your parents because you **inherit** key characteristics from them, like your eye colour, skin colour and height. All living things produce offspring of the same kind, but normally offspring are not identical to their parents; there are variations that make them different.

Family trees can show how different characteristics have been passed from generation to generation. What can you spot from the one on the right?

For example, if you cross two different breeds of dog, you get a dog with a combination of characteristics. Some characteristics come from their mother and some from their father.



In a family tree, traits such as hair colour and poor eyesight are passed from generation to generation.



Man has managed in just a few centuries and in some cases decades to speed up the evolutionary process. This is called domestication. Man can deliberately select the traits he wishes to pass to the next generation. For example dogs have been bred over time to become tame and more attractive.

Inherited Characteristics

Environmental Characteristics

