SCIENCE · Y6

Evolution & Adaptation

Knowledge Organiser — Year 6 Science

Key vocabulary

1. **Evolution**
   The gradual change in a species over many generations. Driven by natural selection.

2. **Adaptation**
   A feature that helps a living thing survive in its environment. Can be structural (body), behavioural, or physiological.

3. **Natural selection**
   The process by which individuals with useful traits are more likely to survive and reproduce, passing those traits on.

4. **Inheritance**
   The passing of characteristics from parents to offspring through genes.

5. **Variation**
   Differences between individuals of the same species. Some variation is inherited; some is caused by environment.

6. **Species**
   A group of organisms that can breed with each other and produce fertile offspring.

7. **Fossil record**
   All known fossils, taken together. Provides evidence of organisms that lived millions of years ago.

8	**Extinction** When every member of a species has died. A species can go extinct because of habitat loss, disease, or competition.
9	**Offspring** The young produced by a living thing. Offspring inherit traits from both parents.
10	**Gene** A section of DNA that carries information about a trait. Passed from parents to offspring.

ural selection works

Darwin's key idea

■	1. VARIATION: individuals in a species are not identical — there are small differences.
●	2. STRUGGLE: resources (food, space, mates) are limited. Not all individuals survive.
■	3. SURVIVAL: individuals with traits that suit the environment are more likely to survive. ('Survival of the fittest' means 'best suited', not 'strongest'.)
●	4. REPRODUCTION: survivors pass their traits on to offspring.
■	5. CHANGE OVER TIME: useful traits become more common in the population over many generations.
●	Example: a population of moths. A darker moth survives better on dark tree bark (camouflage from predators). Dark moths reproduce more — over generations, most moths become dark.
■	This process, repeated over millions of years, can produce entirely new species.

tation examples

Traits that help animals and plan

■	POLAR BEAR — thick fur and fat for insulation; white coat for camouflage on snow; large feet to spread weight on ice.
●	CACTUS — spines instead of leaves (reduce water loss); thick stem stores water; roots spread wide to collect rain.

- ARCTIC FOX — white coat in winter, brown in summer (camouflage); small ears (reduce heat loss).
- DUCK — waterproof feathers; webbed feet for swimming; bill shaped to filter food from water.
- DEEP-SEA FISH — large eyes to see in near-darkness; bioluminescence to attract prey.
- Adaptations develop over many generations through natural selection — they are not chosen by the animal.

ey scientists

Who developed our understanding

- CHARLES DARWIN (1809–1882): British scientist. Travelled the world on HMS Beagle (1831–1836). Observed different species across the Galápagos Islands. Published ‘On the Origin of Species’ (1859) — the theory of evolution by natural selection.
- ALFRED RUSSEL WALLACE (1823–1913): British scientist. Independently developed the same theory as Darwin. The two presented their findings together in 1858.
- GREGOR MENDEL (1822–1884): Austrian monk. Grew peas in his garden and discovered patterns of inheritance. His work on genes was not widely recognised until after his death.
- FOSSIL EVIDENCE: Mary Anning’s fossil discoveries in the early 19th century provided physical evidence of creatures no longer alive — supporting the idea that species could die out.
- Modern DNA science has confirmed and extended Darwin’s theory. We can now trace evolutionary relationships using genetic evidence.