



The world around us never stays the same; it is constantly adapting and responding to feedback and changing conditions. Living in a changing world means that what worked yesterday might not work today or might not be suitable for future generations. Change could be considered a threat for some ecosystems and societies, but without change there would be no development.

Biological **evolution** is change by genetic modification between generations. Through this process life on Earth evolves. Evolution is the main theory explaining the origin and development of species and considers natural selection, genetic drift, mutation and migration as the main drivers of change.

Resilience is the capacity of a system, to absorb disturbance (such as flooding, fire, climate change, introduced species) and still retain its basic structure and function. The resilient system does not resist change but is able to respond flexibly, so the system could be changed for a while but is able to recover to a stable state which either replicates the pre-change state or adapt to a new stable

Variation means that something is similar to something else but different in some way. Small changes usually cause such variation. Genotypic variations are caused by differences in number or structure of chromosomes or by differences in the genes carried by the chromosomes. Eye colour, body form, and disease resistance are genotypic variations.

Phenotypic variations include stages in an organism's life cycle and seasonal variations in an individual. Occurrence of several forms of a butterfly of the same species, each coloured to blend with different vegetation, is examples of such variation.

Adaptation is a process that helps organisms change to be suited to their environment. These new emergent traits improve an organisms survival rate. Organisms can be adapted physiologically (how the body works), morphologically (how the body is structured) or behaviourally (how the organism behaves). Natural selection drives this process.

Energy transfer is the movement of energy between the elements of a system by biotic and abiotic means. Energy cannot be created or destroyed. Most of the energy originates from the Sun where nuclear energy is converted into a heat and light. The heat and light from the Sun is converted through photosynthesis into chemical energy, and through further ecological and geological processes into coal, oil and gas. Combustion changes chemical energy into heat. Steam energy and combustion engines convert heat energy into mechanical energy. Humans and other animals convert chemical energy from food into kinetic energy.

Change in **molecules** is an essential process for life on the Earth. Molecules change and rearrange their atoms in chemical reactions to form new molecules and new compounds. This takes place each time we breathe in oxygen which goes through a chemical change inside our body and forms a new compound, carbon dioxide, which we exhale. Or when trees use sunlight, water and carbon dioxide to produce chemical energy and emit oxygen.