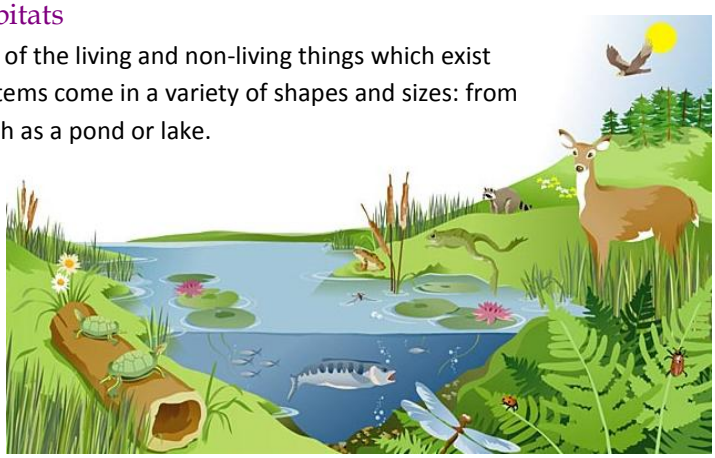
7.1 Ecosystems

An introduction to ecosystems

Ecosystems, communities, populations and habitats

An **ecosystem** is a biological environment comprising all of the living and non-living things which exist there, and the interrelationships between them. Ecosystems come in a variety of shapes and sizes: from the large savannah grassland, to smaller ecosystems such as a pond or lake.



There are a number of components to one ecosystem, including:

- the **habitat** – a place where organisms live
- **populations** – all of the organisms from within the same species who live within the same habitat at the same time, and can interbreed
- **communities** – all of the populations of different species which interact with each other

Each species in an ecosystem is considered to play a role within that ecosystem, and this is called its **niche**. Because each species interacts with both many living (**biotic**) and non-living (**abiotic**) things, it is very difficult to identify exactly what the niche of a species is on many occasions. A description of the niche of a species might include information about what it eats and how it feeds, what it excretes and how it reproduces. It is impossible for two different species to occupy the exact same niche within an ecosystem.

The living organisms in an ecosystem can affect each other: with biotic factors such as food supply, predation and disease. There are also the abiotic factors, which are the effects of non-living components within the ecosystem: such as pH, temperature and soil type.

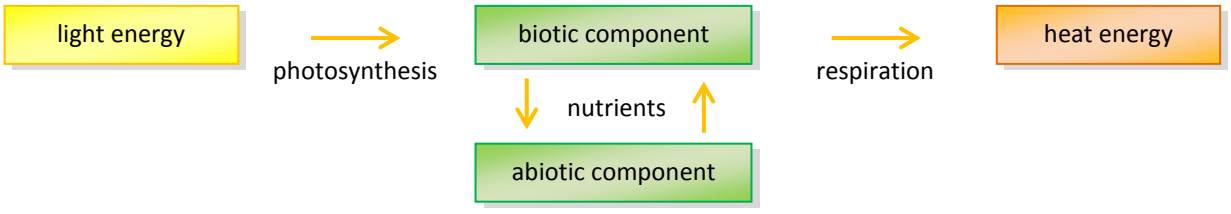
Ecosystems do not have clear edges – it is impossible to draw a clear line around a group of living things and say that they interact only with each other, rather than other organisms outside that ecosystem. However, thinking of ecosystems in a 'closed' sense makes them easier to comprehend.

Dynamic ecosystems

In most ecosystems, population sizes rise and fall, either very slightly or very noticeably. This is because the community of living things in an ecosystem interact with each other and with their physical environment. Any small changes in one can affect the other. Such relationships are discussed in more detail in the chapter 7.5 Populations.

Energy and ecosystems

Matter is constantly recycled within an ecosystem – nutrient cycles, such as the **nitrogen cycle** and **carbon cycle**, are good examples. Energy is not recycled – it flows through the ecosystem:



All living organisms need energy. Via respiration, they release energy from organic molecules, such as glucose, in their food. This energy originally came from sunlight. At the start of nearly all food chains is a plant, which captures light energy through **photosynthesis** and converts it to chemical energy stored in molecules like glucose.

- Because plants and other photosynthetic organisms, such as algae and some bacteria, supply chemical energy to all other organisms, they are known as **producers**
- Other organisms, like animals and fungi are called **consumers**
- Some living things called **decomposers** (bacteria, fungi and some animals) feed on waste material or dead organisms