Summary Sheets

Ecological relationships

Habitats and environments

A **habitat** is the area where an organism lives. Non-living factors in a habitat are called **physical environmental factors**. Examples include how light it is and what the temperature is. These make up the surroundings, or **environment**, of an organism.

Small areas in a habitat are called **microhabitats**. For example, the fur on a fox is a microhabitat.

The fox's fur is a microhabitat.

A woodland habitat.

All the plants and animals that live in a habitat make up a **community**. Within a community, the total number of one species is called a **population**. There will be a population of foxes in a wood.

In order to survive in a habitat, organisms need various **resources**. An animal needs food, water, oxygen, shelter and it needs to find a mate to reproduce. Plants need light, water and carbon dioxide in order to make food. They also need mineral salts (nutrients), oxygen and space to grow.
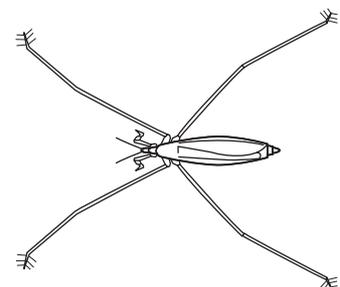
Adaptations

In any habitat, the organisms living there must be **adapted** to survive the environmental conditions within that habitat. Members of the same community may have similar **adaptations** to cope with the problems of their habitat. For example, many small animals and plants which live in fast-flowing rivers are adapted to stop them being swept away. In ponds, free-swimming animals and floating plants can survive because there is no current to wash them away.
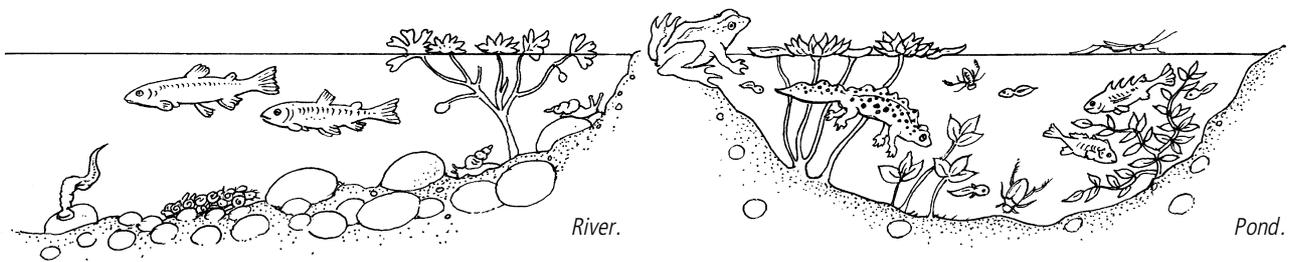
River.

Pond.

All the places in an environment where an organism is found is called its **distribution**. For example, in a pond habitat pond skaters are found on the surface of the water. They are adapted to living here because they have bristles on the ends of their legs, which prevent them from breaking the surface film of water. They feed on dead insects floating on the water.
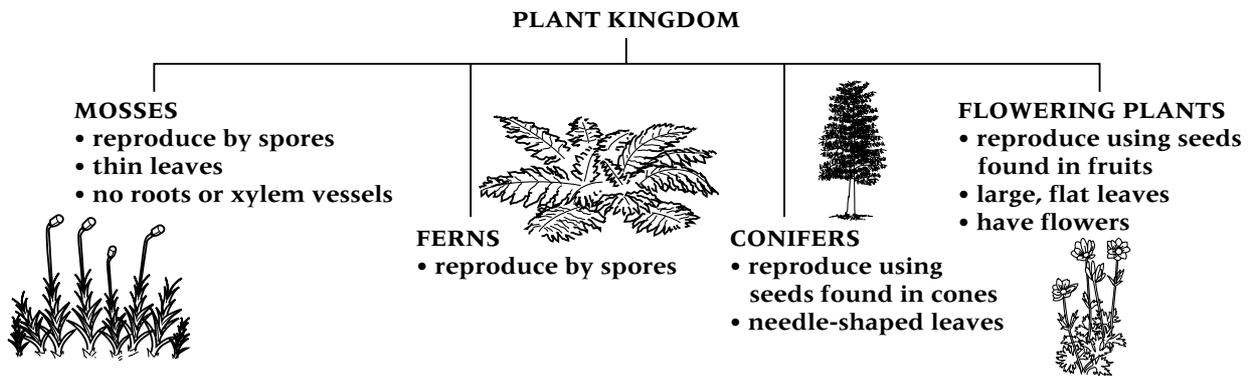
Organisms that are better adapted to survive in an area will have a better chance of survival.

A pond skater.

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Classifying living organisms

Each different type of organism is called a **species**. There are so many species that we need to put them into groups. This is called **classification**. The largest groups are called **kingdoms** and the biggest of these are the **plant kingdom** and the **animal kingdom**. The Summary Sheets for Unit 7D *Variation and classification* show how animals are classified into groups.

The main difference between plants and animals is that plants can make their own food by **photosynthesis**.

There are four main plant groups.

PLANT KINGDOM

MOSSES
• reproduce by spores
• thin leaves
• no roots or xylem vessels

FERNS
• reproduce by spores

CONIFERS
• reproduce using seeds found in cones
• needle-shaped leaves

FLOWERING PLANTS
• reproduce using seeds found in fruits
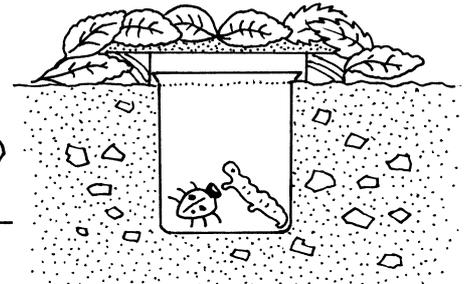• large, flat leaves
• have flowers

Sampling methods

Ecologists are scientists who study habitats. They catch organisms using various **sampling techniques,** then use **keys** and field guides to identify them.
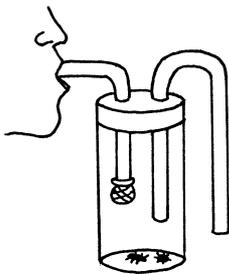
A pooter is used to collect small invertebrates.

A Tullgren funnel is used to collect invertebrates from leaf litter.

A pitfall trap traps small animals that crawl along the ground.

Tree beating is used to collect animals that live in trees or bushes.
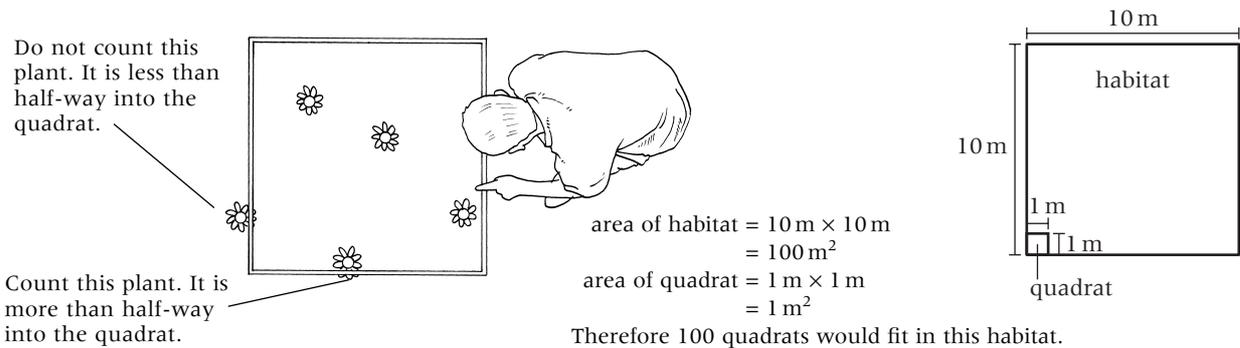
Pond dipping is used to collect organisms from different parts of a pond.

A sweepnet is used to collect organisms from long grass.

Ecologists often need to know the size of a population. It would be impossible to count all the organisms in a habitat, so they take **samples** and then **estimate** the total number of organisms.

A **quadrat** is a sampling square used to estimate plant populations. The quadrat is placed randomly on the ground in different parts of the habitat and the number of plants inside it is counted each time.

Do not count this plant. It is less than half-way into the quadrat.

Count this plant. It is more than half-way into the quadrat.

area of habitat = 10 m × 10 m
= 100 m^2
area of quadrat = 1 m × 1 m
= 1 m^2
Therefore 100 quadrats would fit in this habitat.

10 m

habitat

10 m

1 m

1 m

quadrat

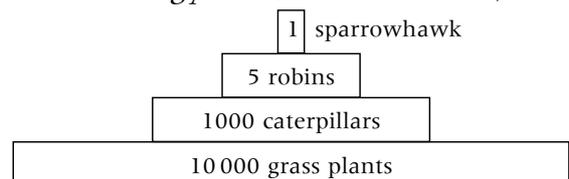The more samples that are taken, the more reliable an estimate will be.

Ecologists also measure the physical environmental factors, like how warm it is and how much oxygen is dissolved in pond water, using sensors and dataloggers. They then look to see if there are any links between the factors, such as, the warmer the water the lower the oxygen level is.
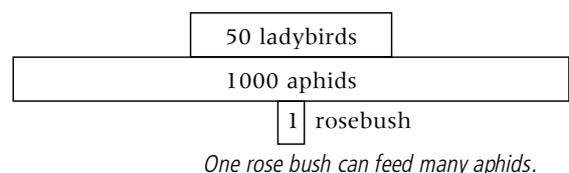
Feeding relationships

Food chains and **food webs** show the feeding relationships between different organisms in a habitat. (See Summary Sheets for Unit 7C *Environment and feeding relationships*).

The numbers of organisms at each level in a food chain can be shown as a **pyramid of numbers**. The size of the bars shows the number of organisms. Usually there are fewer organisms as you go along a food chain because energy is lost at each level, for example, for movement. Sometimes the pyramid has an unusual shape if the organisms are very different in size.

grass → caterpillar → robin → sparrowhawk

rose bush → aphids → ladybirds

1 sparrowhawk
5 robins
1000 caterpillars
10 000 grass plants

50 ladybirds
1000 aphids
1 rosebush

One rose bush can feed many aphids.

Populations

The size of a population is affected by several factors.

- Animals **compete** with each other for resources such as food, water and shelter.
- Plants compete for light, water, nutrients (mineral salts) and space.
- If there are not enough resources the population will decrease.
- Disease can kill organisms.
- The populations of predators and prey are linked. When there are a lot of prey organisms, the number of predators increases because they have plenty of food. This decreases the number of prey, which then leads to a decrease in the number of predators.
- Harsh weather conditions can reduce populations.

Living organisms depend on others for their survival. For example, plants depend on insects for pollination.

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