National 5 Biology

Unit 3 Life on Earth

3.1 Ecosystems

Name _____

Class _____

Teacher _____

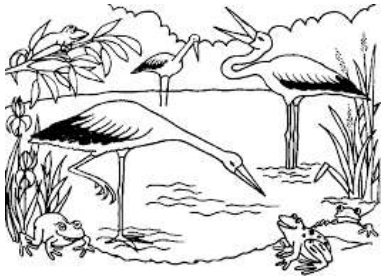
Ecosystems

Ecology is the study of living organisms in their natural environment. It involves examining how organisms interact with one another and how they interact with their non-living environment.

Learning intention

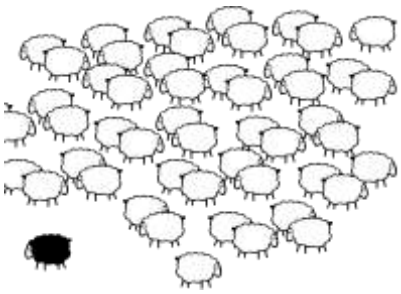
- To find out about the main parts of an ecosystem.

A species is a group of organisms that can interbreed to produce _____ offspring.



The place where an organism lives is called its _____.

e.g. pond, rock pool, soil and leaf litter.



The total number of organisms of the same species that live in a particular habitat is called a _____e.g. red deer on a piece of moorland.

All of the different populations of organisms (animals and plants) living together in a particular habitat is called the _____. e.g. a rock-pool community might be made up of the populations of seaweed, crabs, shrimps, blennies and sea anemones.

The habitat, populations and communities are the components that make up the _____**.** An ecosystem is a natural biological unit in which organisms interact with their environment.

An ecosystem consists of all the organisms (the _____) living in a particular _____ and the non-living _____ with which the organisms interact.

Hint: Learn this definition of an ecosystem.

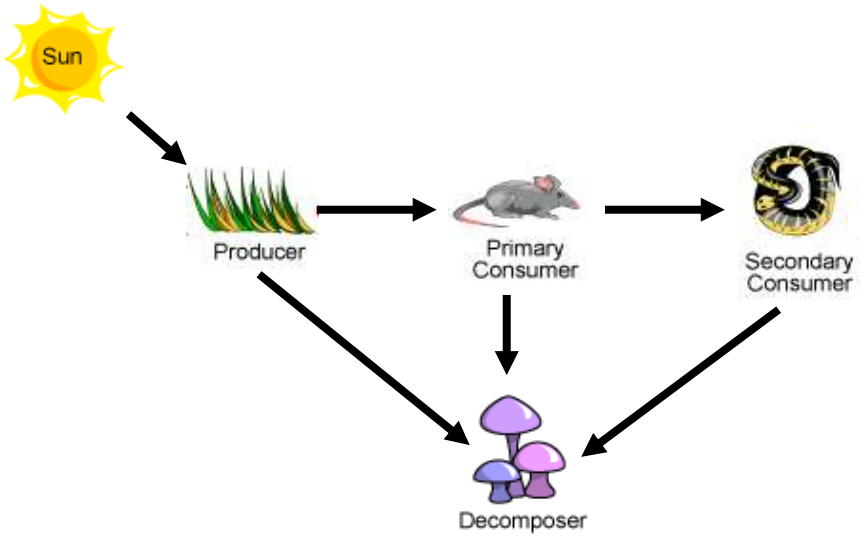
Biodiversity describes the _____ and relative abundance of species present in an ecosystem.

Learning intention

- To find out about food chains and food webs.

Food chains

A food chain is a diagram that represents how energy flows from one organism to another during feeding. A food chain shows the feeding relationships of organisms living together in a particular ecosystem. A food chain always starts with a green plant, the _____. This is followed by the _____ consumer, which is then eaten by the _____ consumer. All living organisms eventually die and their remains are broken down by _____.



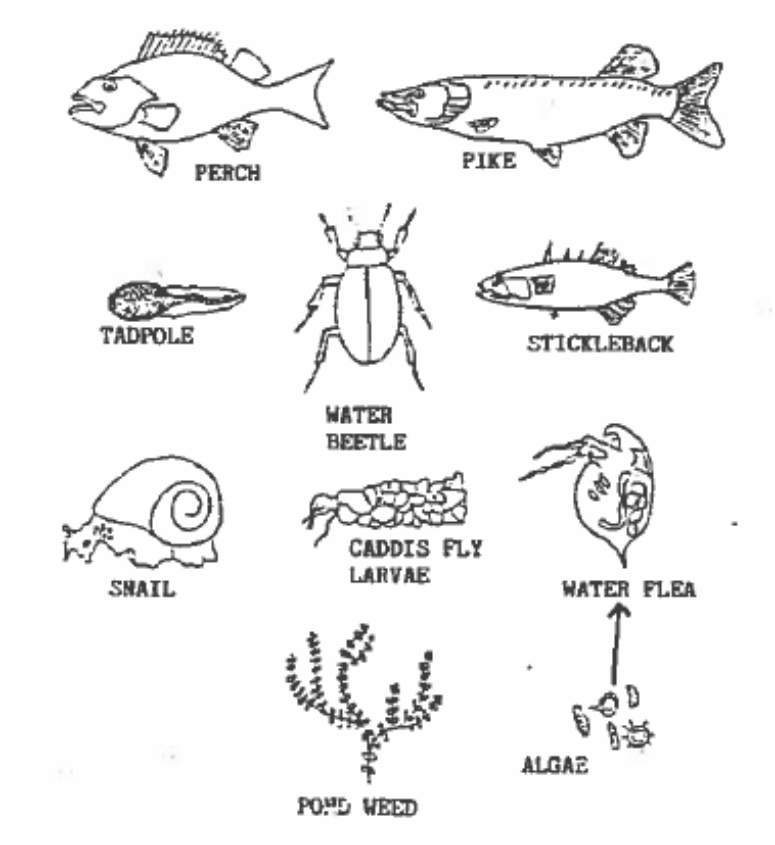
Various consumer levels are shown connected by arrows which show the _____ energy flow. Many interconnecting food chains make up a food web.

Identifying organisms from food webs

A food web diagram shows the feeding relationships between members of a community.

Use the information from the table to complete the food web below, by adding arrows.

Consumer	Food source (what they eat)
Water Flea	Algae
Caddis Fly Larvae	Pondweed, Algae
Snail	Pondweed, Algae
Stickleback	Water flea
Water Beetle	Water flea, Caddis fly larvae, Tadpole
Tadpole	Pondweed
Perch	Tadpole, water beetle
Pike	Perch, Water beetle, Stickleback, Tadpole



Use the information from the diagram to complete the table below.

Consumer levels	Fresh water loch organisms
All the producers	
All the primary consumers	
All the secondary consumers	

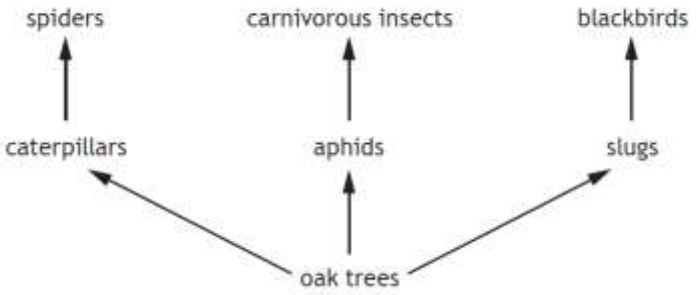
Learning intention

- To find out about the effects of removing an organism from food webs.

Removing an organism from food webs

Read the information about each of the food webs and complete the questions.

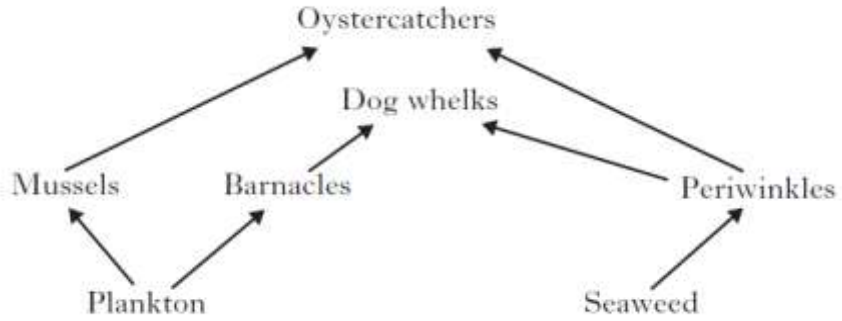
1. The diagram shows part of a food web in an oak woodland.



The use of pesticides in a nearby field resulted in the death of most aphids and caterpillars.
What effect would this have on the numbers of slugs and carnivorous insects?
Read each sentence and select one option for each.

- The number of slugs would increase/decrease/stay the same
- The number of carnivorous insects would increase/decrease/stay the same

2. Part of the food web from the shore is shown below. (2012 C)



The numbers of mussels and periwinkles may be affected if the barnacles were removed from the food web.

Select one answer in the brackets and give an explanation for it.

- The mussel population would (increase/decrease/stay the same)

Explanation _____

_____

Select one answer in the brackets and give an explanation for it.

- The periwinkle population would (increase/decrease/stay the same)

Explanation _____

_____

Learning intention

- To find out the definitions of commonly used ecological terms.

Complete the table below by adding the correct ecological term from the list below:

Species, biodiversity, population, producer, consumer, herbivore, carnivore, omnivore, predator, prey, food chain, food web.

Term	Definition	Example
	The total number of organisms of the same species that live in a particular habitat.	
	A group of organisms that can interbreed to produce fertile offspring.	
	Green plants that produce their own food by photosynthesis.	
	An animal that obtains energy by eating other organisms	
	A consumer that eats plants only	
	A consumer that eats other animals only	
	A consumer that eats both plants and animals	
	The term used to describe the variety and relative abundance of species present in an ecosystem.	
	An animal that obtains food by hunting and killing prey organisms	
	An animal that is hunted and eaten by a predator	
	A diagram that represents how energy flows from one organism to another during feeding.	

	A diagram that shows the feeding relationships between members of a community.	

Learning intention

- To find out about a niche.

Ecological niche

A niche is the role that an organism plays within a _____.

A niche includes the use that an organism makes of the resources in its ecosystem, including

light, availability of _____ and its interactions with other

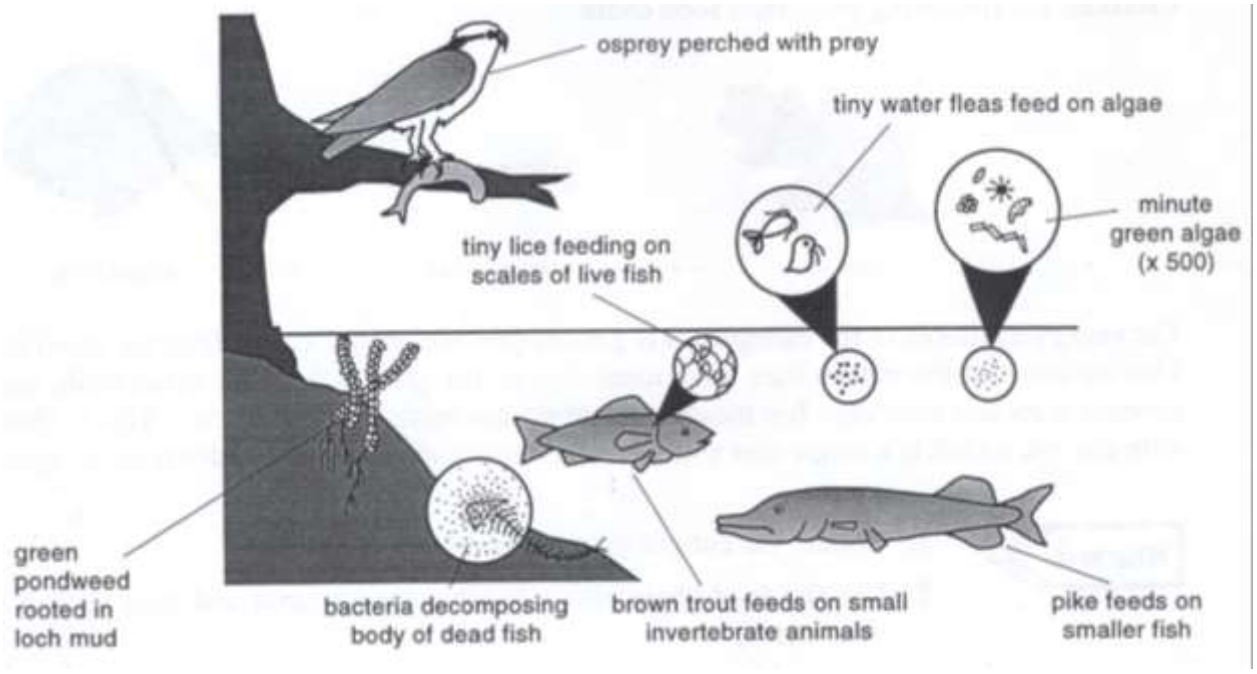
_____ in the community. It involves:

- _____- two species competing for the same resources. E.g food, light, space.
- _____- the pursuit, capture, and killing of animals for food.

and

- the conditions it can tolerate such as _____.

Examine the diagram below and complete the table to show which organism occupies each niche.



Organism	Description of niche
	Microscopic floating producer
	Decomposer
	Parasite feeding on fish scales
	Small swimming herbivore
	Fish-eating bird of prey
	Medium-sized swimming carnivore
	Rooted underwater producer
	Large predatory swimming top carnivore

Learning intention

- To find out about competition in ecosystems.

Competition

When organisms have the same needs they will _____ for resources that are in _____ supply.

Plants compete for:

L_____

W_____

M_____

S_____

Animals compete for:

F_____ and W_____

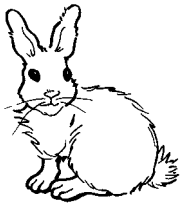
S_____ (territories)

M_____

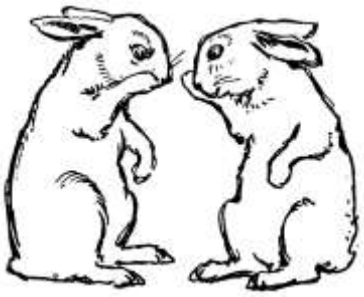
There are two main types of competition between organisms:

Interspecific competition

This type of competition occurs amongst individuals of _____ species for _____ or a few of the resources they require.



Intraspecific competition



This type of competition occurs amongst individuals of the _____ species and is for _____ of the resources they require. Therefore intraspecific competition is _____ intense than interspecific competition.

I can:	
State that an ecosystem consists of all the organisms (the community) living in a particular habitat and the non-living components with which the organisms interact.	○○○
Describe the interactions of organisms in food webs following the removal of an organism(s) from the food web.	○○○
Define the ecological terms: species, biodiversity, population, producer, consumer, herbivore, carnivore, omnivore, predator, prey, food chain, food web.	○○○
State that a niche is the role that an organism plays within a community.	○○○
Explain that a niche relates to the resources that an organism requires in its ecosystem, such as light and nutrient availability and its interactions with other organisms in the community. It involves competition and predation and the conditions it can tolerate such as temperature.	○○○
State that competition in ecosystems occurs when resources are in short supply.	○○○
State that interspecific competition occurs amongst individuals of different species for one or a few of the resources they require.	○○○
State that intraspecific competition occurs amongst individuals of the same species and is for all resources required.	○○○
State that intraspecific competition is therefore more intense than interspecific competition.	○○○