

Adaptations, interdependence and competition

What is an ecosystem?

Adaptations, interdependence and competition

Put in order from smallest: ecosystem, population, organism, community.

Adaptations, interdependence and competition

What do plants often compete for?

Adaptations, interdependence and competition

What do animals often compete for?

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What is interdependence?

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What is a stable community?

Adaptations, interdependence and competition

Give four abiotic factors.

Adaptations, interdependence and competition

Which abiotic factor is needed by aquatic animals for respiration?

Organism, population, community, ecosystem.

The interaction of a community of living organisms (biotic) with the non-living (abiotic) parts of their environment.

Food, mates and territory.

Light, space, water and mineral ions from the soil.

One where all the species and environmental factors are in balance so that population sizes remain fairly constant.

Each species in a community depends on other species for food, shelter, pollination, seed dispersal and so on. Removing one can affect the whole community.

Oxygen levels in the water.

Any four of: light intensity, temperature, moisture levels, soil pH and mineral content, wind intensity and direction, carbon dioxide levels for plants, oxygen levels for aquatic animals.

Adaptations, interdependence and competition

Give the four biotic factors.

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What is a biotic factor?

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What is an adaptation?

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What three types of adaptation are there?

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What is an extremophile?

Adaptations, interdependence and competition

Give an example of an extremophile.

Organisation of an ecosystem

What are producers?

Organisation of an ecosystem

Why are photosynthetic organisms important?

A living factor that can affect a community.

Availability of food, new predators arriving, new pathogens, and one species outcompeting another so the numbers are no longer sufficient to breed.

Structural, behavioural and functional.

A feature that enables an organism to survive in the conditions in which it normally lives.

Bacteria living in deep sea vents.

An organism that lives in very extreme conditions such as high temperature, pressure or salt concentration.

They are the producers of biomass for life on Earth.

Organisms that make their own glucose by photosynthesis, usually green plants or algae. All food chains begin with one.

Organisation of an ecosystem

What is a predator? What is prey?

Organisation of an ecosystem

What do primary consumers eat?

Organisation of an ecosystem

What are quadrats and transects used for?

Organisation of an ecosystem

How do you estimate a population size using quadrats?

Organisation of an ecosystem

Why place quadrats at random?

Organisation of an ecosystem

How do you investigate the effect of a factor on distribution?

Organisation of an ecosystem

What are the mean, mode and median?

Organisation of an ecosystem

In predator-prey cycles, which peak comes first?

Producers. Secondary consumers eat primary consumers, and tertiary consumers eat secondary consumers.

A predator is a consumer that kills and eats other animals. Prey are the animals that are eaten.

Place quadrats at random, count the organisms, find the mean per square metre and multiply by the total area.

To find the distribution and abundance of species in an ecosystem.

Lay a transect across the change in the factor, place quadrats at regular intervals, count the species and measure the factor.

To avoid bias, so the sample represents the whole area.

The prey peak. The predator peak follows a short time later.

Mean: total divided by number of values.
Mode: most common value. Median: middle value when in order.

Organisation of an ecosystem

Why do predator numbers fall after prey numbers fall?

Organisation of an ecosystem

What does the carbon cycle return to the atmosphere?

Organisation of an ecosystem

Which process takes carbon dioxide out of the atmosphere?

Organisation of an ecosystem

Which process puts carbon dioxide into the atmosphere from organisms?

Organisation of an ecosystem

What does the water cycle provide?

Organisation of an ecosystem

Name the two main processes in the water cycle.

Organisation of an ecosystem

What is the role of microorganisms in cycling materials?

Organisation of an ecosystem

Which cycle are you not expected to study?

Carbon, as carbon dioxide, to be used by plants in photosynthesis.

There is less food available for the predators.

Respiration, by plants, animals and decomposing microorganisms.

Photosynthesis.

Evaporation and precipitation (water is continuously evaporated and precipitated).

Fresh water for plants and animals on land before it drains into the seas.

The nitrogen cycle.

They return carbon to the atmosphere as carbon dioxide and mineral ions to the soil.

Organisation of an ecosystem **Triple only**

How does temperature affect the rate of decay?

Organisation of an ecosystem **Triple only**

How do water and oxygen affect the rate of decay?

Organisation of an ecosystem **Triple only**

What is compost used for?

Organisation of an ecosystem **Triple only**

What does anaerobic decay produce?

Organisation of an ecosystem **Triple only**

How do you calculate the rate of decay?

Organisation of an ecosystem **Triple only**

Required practical 10: what is investigated?

Organisation of an ecosystem **Triple only** **Higher tier**

Name three environmental changes that affect the distribution of species.

Organisation of an ecosystem **Triple only** **Higher tier**

What three types of environmental change are there?

More water and more oxygen increase the rate of decay, because decomposers need them.

Warmer conditions speed up decay until an optimum. Too hot and enzymes denature; cold slows decay.

Methane gas. Biogas generators use it as a fuel.

A natural fertiliser for growing garden plants or crops.

The effect of temperature on the rate of decay of fresh milk, by measuring pH change.

Change in amount of material divided by time.

Seasonal, geographic, or caused by human interaction.

Temperature, availability of water and composition of atmospheric gases.

Biodiversity and the effect of human interaction on ecosystems

What is biodiversity?

Biodiversity and the effect of human interaction on ecosystems

Why does great biodiversity make an ecosystem more stable?

Biodiversity and the effect of human interaction on ecosystems

Give three causes of pollution in water.

Biodiversity and the effect of human interaction on ecosystems

Give two causes of pollution in air.

Biodiversity and the effect of human interaction on ecosystems

Give two causes of pollution on land.

Biodiversity and the effect of human interaction on ecosystems

Why is more waste being produced?

Biodiversity and the effect of human interaction on ecosystems

How do humans reduce the land available for other organisms?

Biodiversity and the effect of human interaction on ecosystems

Why is destroying peat bogs a problem?

It reduces the dependence of one species on another for food, shelter and maintenance of the physical environment.

The variety of all the different species of organisms on Earth, or within an ecosystem.

Smoke and acidic gases.

Sewage, fertiliser and toxic chemicals.

Rapid population growth and a higher standard of living mean more resources are used and more waste is produced.

Landfill and toxic chemicals.

It reduces biodiversity of the habitat and the decay or burning of peat releases carbon dioxide.

By building, quarrying, farming and dumping waste.

Biodiversity and the effect of human interaction on ecosystems

Why has large-scale tropical deforestation occurred?

Biodiversity and the effect of human interaction on ecosystems

Give an environmental implication of deforestation.

Biodiversity and the effect of human interaction on ecosystems

Which gases in the atmosphere contribute to global warming?

Biodiversity and the effect of human interaction on ecosystems

Give a biological consequence of global warming.

Biodiversity and the effect of human interaction on ecosystems

What is the scientific consensus on global warming based on?

Biodiversity and the effect of human interaction on ecosystems

Give five programmes to reduce negative effects on biodiversity.

Biodiversity and the effect of human interaction on ecosystems

Why are field margins and hedgerows reintroduced?

Trophic levels in an ecosystem **Triple only**

What are trophic levels?

Less biodiversity, less photosynthesis, and more carbon dioxide from burning and decay.

To provide land for cattle and rice fields and to grow crops for biofuels.

Loss of habitat, changes in the distribution of species, or changes in migration patterns.

Carbon dioxide and methane, whose levels are increasing.

Breeding programmes, protecting rare habitats, hedgerows and field margins, reducing deforestation and emissions, recycling instead of landfill.

Systematic reviews of thousands of peer reviewed publications.

Levels in a food chain, numbered from 1 (plants and algae) according to how far along the chain the organism is.

They provide habitats and food for wildlife where farmers grow only one type of crop.

Trophic levels in an ecosystem **Triple only**

What is trophic level 1?

Trophic levels in an ecosystem **Triple only**

What are primary consumers?

Trophic levels in an ecosystem **Triple only**

What are secondary and tertiary consumers?

Trophic levels in an ecosystem **Triple only**

What is an apex predator?

Trophic levels in an ecosystem **Triple only**

How do decomposers feed?

Trophic levels in an ecosystem **Triple only**

What does a pyramid of biomass show?

Trophic levels in an ecosystem **Triple only**

What percentage of incident light energy do producers transfer?

Trophic levels in an ecosystem **Triple only**

What percentage of biomass passes to the next trophic level?

Level 2: herbivores that eat plants or algae.

Producers: plants and algae, which make their own food.

A carnivore with no predators.

Secondary (level 3): carnivores that eat herbivores. Tertiary (level 4): carnivores that eat other carnivores.

The relative amount of biomass in each level of a food chain, with trophic level 1 at the bottom.

They secrete enzymes into the environment. Small soluble food molecules then diffuse into the microorganism.

Approximately 10%.

About 1%.

Trophic levels in an ecosystem **Triple only**

How is biomass lost between trophic levels?

Trophic levels in an ecosystem **Triple only**

How do you calculate efficiency of biomass transfer?

Trophic levels in an ecosystem **Triple only**

How does biomass loss affect the number of organisms?

Food production **Triple only**

What is food security?

Food production **Triple only**

Give three biological factors threatening food security.

Food production **Triple only**

How can the efficiency of animal food production be improved?

Food production **Triple only**

Why are some farm animals fed high protein foods?

Food production **Triple only**

What objection do some people have to intensive farming?

Biomass transferred to the next level divided by biomass at the previous level, multiplied by 100.

Egested as faeces; lost as carbon dioxide and water in respiration; water and urea lost in urine.

Having enough food to feed a population.

Less biomass is available at each higher level, so fewer organisms can be supported at each higher trophic level.

Restrict energy transfer to the environment by limiting movement and controlling temperature.

Any three of: increasing birth rate, new pests and pathogens, environmental changes such as failing rains, cost of agricultural inputs, conflicts, changing diets in developed countries.

Ethical objections to the methods and the conditions in which the animals are kept.

To increase growth.

Food production **Triple only**

Why is the decline in fish stocks a problem?

Food production **Triple only**

How do net size and quotas help conserve fish?

Food production **Triple only**

What is mycoprotein?

Food production **Triple only**

How is mycoprotein produced?

Food production **Triple only**

What does a genetically modified bacterium produce for diabetics?

Food production **Triple only**

What is golden rice?

A larger mesh lets young fish escape to grow and breed. Quotas limit the catch, so enough fish are left to breed and stocks stay sustainable.

Stocks must be kept at a level where breeding continues, or certain species may disappear altogether in some areas.

Fusarium is grown on glucose syrup in aerobic conditions, and the biomass is harvested and purified.

A protein-rich food suitable for vegetarians, made from the fungus *Fusarium*.

A GM crop with improved nutritional value.

Human insulin, which is harvested and purified.