

Communities and interdependence Put in order from smallest to largest: community, organism, ecosystem, population.	Communities and interdependence What is a population?
Communities and interdependence What is a community?	Communities and interdependence What is an ecosystem?
Communities and interdependence What is an abiotic factor? Give examples.	Communities and interdependence What is a biotic factor? Give examples.
Communities and interdependence What is competition?	Communities and interdependence How do predator and prey numbers change together?

All the organisms of one species living in the same area.

Organism, population, community, ecosystem.

A community together with the non-living (abiotic) parts of its environment, interacting with each other.

All the populations of different species living in the same area.

A living factor that affects a community, for example competition or predation.

A non-living factor that affects a community, for example temperature, light, water or pollutants.

More prey means more predators. More predators then reduce the prey, so predator numbers fall too. The cycle repeats.

Organisms needing the same limited resources, such as food, water, light or space.

Communities and interdependence

How can pollutants affect a community?

Communities and interdependence

What is interdependence?

Communities and interdependence

What is parasitism?

Communities and interdependence

What is mutualism? Give an example.

Fieldwork and sampling

What is a quadrat?

Fieldwork and sampling

How do you place quadrats randomly?

Fieldwork and sampling

What is a belt transect?

Fieldwork and sampling

Why use a belt transect?

Species in a community depend on each other for food, shelter, pollination and seed dispersal, so a change in one affects others.

They can kill sensitive species, so the number of species and organisms falls.

Both organisms benefit. For example, nitrogen-fixing bacteria in the root nodules of legumes.

A parasite lives on or in a host and takes food from it. The parasite benefits and the host is harmed.

Lay two tape measures at right angles and use random numbers as coordinates for each quadrat.

A square frame used to sample the organisms in a small, known area.

To see how the distribution of organisms changes along an environmental gradient, such as light or moisture.

A line across a habitat with quadrats placed at regular intervals along it.

Fieldwork and sampling

Equation for estimating a population using quadrats.

Fieldwork and sampling

What is percentage cover?

Fieldwork and sampling

Why take many quadrat samples?

Energy transfer in ecosystems **Triple only**

Why do food chains have a limited length?

Energy transfer in ecosystems **Triple only**

Give ways energy is lost between trophic levels.

Energy transfer in ecosystems **Triple only**

What is a pyramid of biomass?

Energy transfer in ecosystems **Triple only**

Why are there fewer organisms at higher trophic levels?

Energy transfer in ecosystems **Triple only**

How do you calculate the efficiency of energy transfer?

The percentage of a quadrat covered by a species. It is used when individuals are hard to count.

Mean number per quadrat $\times$ (total area $\div$ area of one quadrat).

Energy is lost at each trophic level, so too little energy is left to support more levels.

It gives a more representative, reliable sample and reduces the effect of anomalies.

A diagram showing the biomass at each trophic level, with producers at the bottom. It gets narrower going up.

Heat from respiration, movement, waste (faeces, urine), and parts of the organism not eaten.

Energy transferred to next level $\div$ energy available at previous level $\times 100$.

Less energy and biomass is available at each level, because energy is transferred to less useful forms.

Energy transfer in ecosystems **Triple only**

How do you calculate a percentage of biomass transferred?

Human impacts, biodiversity and food security

Give a positive and a negative effect of fish farming.

Human impacts, biodiversity and food security

What is a non-indigenous species?

Human impacts, biodiversity and food security

How can a non-indigenous species reduce biodiversity?

Human impacts, biodiversity and food security

What is eutrophication?

Human impacts, biodiversity and food security

Give the order of events in eutrophication.

Human impacts, biodiversity and food security

Give a benefit of maintaining biodiversity.

Human impacts, biodiversity and food security

How can animal species be conserved?

Positive: reduces overfishing. Negative: waste can cause eutrophication, or disease can spread to wild fish.

$\text{Biomass gained} \div \text{biomass available at the previous level} \times 100.$

It can out-compete, eat or infect native species, so their numbers fall.

A species that has been introduced to an area where it does not naturally live.

Nitrates in, algal bloom, light blocked, plants die, bacteria increase and use up oxygen, fish die.

Too many nutrients, such as nitrates, entering water, causing algal growth and then lack of oxygen.

Protecting habitats, captive breeding programmes and laws against hunting.

More stable ecosystems, and a source of food, materials and medicines.

Human impacts, biodiversity and food security

What is reforestation and how does it help?

Human impacts, biodiversity and food security

Triple only

What is food security?

Human impacts, biodiversity and food security

Triple only

List the biological factors affecting food security.

Human impacts, biodiversity and food security

Triple only

Why does eating more meat reduce food security?

Human impacts, biodiversity and food security

Triple only

Give two sustainability issues for food production.

Material cycles

Why must materials be cycled in an ecosystem?

Material cycles

What are the abiotic and biotic components of an ecosystem?

Material cycles

Which process removes carbon dioxide from the air?

Having enough food to feed a population.

Replanting trees. It restores habitats, absorbs carbon dioxide and reduces soil erosion.

Energy is lost between trophic levels, so more land and crops are needed to produce meat than plant food.

Population growth, more animal farming and meat and fish eating, new pests and pathogens, human-caused environmental change, sustainability issues.

The supply is limited, so materials are returned to the environment for new organisms to use.

Land used for biofuels instead of food, and the cost of agricultural inputs such as fertiliser and feed.

Photosynthesis.

Abiotic: air, water, soil. Biotic: the living organisms.

Material cycles

Which processes return carbon dioxide to the air?

Material cycles

What do decomposers do?

Material cycles

Name the main processes in the water cycle.

Material cycles

What is potable water?

Material cycles

What is desalination and what is its disadvantage?

Material cycles

Why do plants need nitrates?

Material cycles

What do nitrogen-fixing bacteria do?

Material cycles

What do nitrifying bacteria do?

Microorganisms (bacteria and fungi) that break down dead material and waste and release carbon dioxide by respiration.

Respiration, decay by decomposers, and combustion.

Water that is safe to drink.

Evaporation, transpiration, condensation and precipitation.

To make amino acids and proteins.

Removing salt from sea water to make potable water. It needs a lot of energy so is expensive.

Convert ammonium ions in the soil into nitrates.

Convert nitrogen gas from the air into nitrogen compounds, which become nitrates. Some live in legume root nodules.

Material cycles

What do denitrifying bacteria do?

Material cycles

How do fertilisers and crop rotation help plants get nitrates?

Indicator species and decomposition

Triple only

Higher tier

Which indicator species show polluted water?

Indicator species and decomposition

Triple only

Higher tier

Which indicator species show clean water?

Indicator species and decomposition

Triple only

Higher tier

How do lichens and blackspot fungus on roses indicate air quality?

Indicator species and decomposition

Triple only

Higher tier

Give a limitation of using indicator species.

Indicator species and decomposition

Triple only

Which factors affect the rate of decomposition?

Indicator species and decomposition

Triple only

How do freezing, drying and vacuum packing preserve food?

Fertilisers add nitrates. In crop rotation, a legume crop adds nitrates through nitrogen-fixing bacteria.

Convert nitrates in the soil into nitrogen gas, reducing soil fertility.

Freshwater shrimps and stonefly nymphs.

Bloodworms and sludgeworms.

Only a rough guide: other factors may affect the species, and it does not give an accurate measurement of the pollutant.

They are sensitive to sulfur dioxide. Different lichen species tolerate different levels; blackspot is more common in cleaner air.

They slow decomposition by microorganisms: low temperature slows their enzymes, and they have less water and less oxygen.

Temperature, water content and oxygen availability.

Indicator species and decomposition **Triple only**

What conditions give fast decomposition in composting?

Indicator species and decomposition **Triple only**

How do you calculate the rate of decay?

Indicator species and decomposition **Triple only**

How do you calculate percentage loss in mass?

Change in mass $\div$ time.

Warm, moist and plenty of oxygen.

Change in mass $\div$ original mass $\times$ 100.