Communities

4.7.1.1 · Ecology · revision notes

The key words ecologists use (population, community, habitat, ecosystem), what plants and animals compete for, and how the species in a community depend on each other. Expect 1-mark definitions, 'suggest what they compete for' questions and 2 to 4 mark questions on how a change to one species in a food web affects the others.

Key facts

- Population = all the organisms of one species in a habitat
- Habitat = the place where an organism lives
- Plants compete for light, space, water and mineral ions
- Interdependence = species depend on each other for food, shelter, pollination and seed dispersal
- Community = all the populations of different species in a habitat
- Ecosystem = a community interacting with the abiotic (non-living) parts of its environment
- Animals compete for food, mates and territory
- Stable community = species and environmental factors in balance, so population sizes stay fairly constant

Notes

Key words

- **Individual**: a single organism.
- **Population**: all the organisms of **one species** living in a habitat.
- **Community**: all the populations of **different species** living in a habitat.
- **Habitat**: the place where an organism lives.
- **Ecosystem**: the interaction of a community of living organisms (the **biotic** part) with the non-living (**abiotic**) parts of their environment.
- Levels of organisation, from smallest to largest: individual → population → community → ecosystem.

Competition

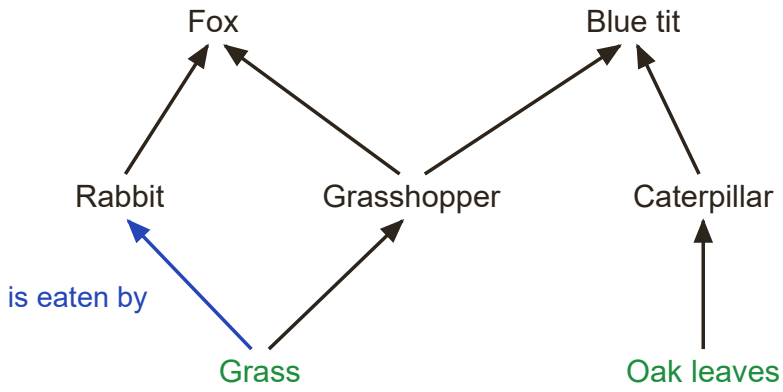
- Every organism needs resources from its surroundings, and from other organisms, in order to survive and reproduce. When a resource is in short supply, organisms compete for it.
- Plants compete for **light** and **space**, and for **water** and **mineral ions** from the soil.
- Animals compete for **food**, **mates** and **territory**.
- Competition can be between members of the same species or between different species.
- The organisms that are best at getting a scarce resource are the most likely to survive and reproduce.

Interdependence and stable communities

- In a community, species rely on one another for food, shelter, pollination and seed dispersal. This is **interdependence**.
- Because species are linked, removing or adding one species can affect the whole community, not just the organisms it eats or is eaten by.
- Example: if the bees that pollinate a plant decline, the plant makes fewer seeds, so the animals that eat those seeds have less food.
- A **stable community** is one where all the species and environmental factors are in balance, so population sizes remain fairly constant.

Reading food webs

- Arrows point from the organism that is eaten to the organism that eats it.



A food web: each arrow points from the food to the animal that eats it. Plants (green) are at the bottom.

- If an animal's food decreases, its population may fall, but only a little if it has other food sources.
- If a predator is removed, its prey may increase at first, then fall again if they run out of food.

How to answer each type of question

Recall: define an ecological term 1 to 2 marks **Grade 3**

1. Learn the definitions exactly: 'one species' for a population, 'different species' for a community.
2. For an ecosystem, mention the living community, the non-living environment and that they interact.

Example. (a) What is meant by a **population**? (1 mark)
(b) What is meant by an **ecosystem**? (2 marks)

Model answer.

(a) All the organisms of one species living in a habitat (1)

(b) The interaction of a community of living organisms (1) with the non-living parts of their environment (1)

Suggest what organisms are competing for 1 to 2 marks **Grade 4**

1. Plants: choose from light, space, water and mineral ions.
2. Animals: choose from food, mates and territory.
3. Use the context: plants packed closely together are likely to compete for light and space.
4. Never write 'food' or 'nutrients' for plants.

Example. (a) A farmer plants sunflowers very close together. Suggest **two** resources the sunflowers compete for. (2 marks)
(b) In autumn, male red deer fight each other. Suggest what they are competing for. (1 mark)

Model answer.

(a) Any two from: light (1); space (1); water (1); mineral ions (1)
(b) Mates (1)

Explain interdependence using an example 2 marks **Grade 5**

1. Say what each species depends on the other for (food, shelter, pollination or seed dispersal).
2. Use the organisms named in the question for both directions of the relationship.

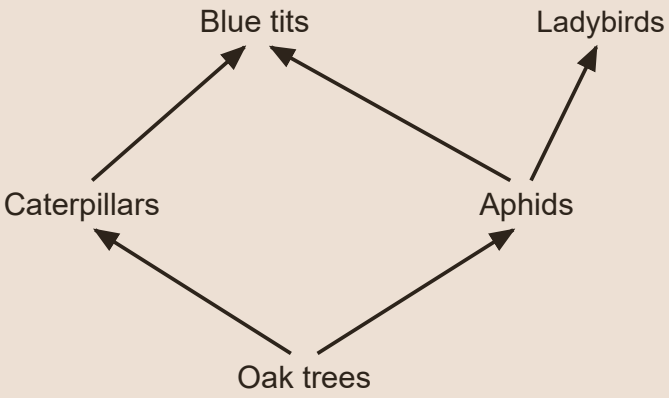
Example. Squirrels eat hazelnuts. They also bury some hazelnuts to eat later, and some of the buried nuts grow into new hazel trees.
Explain why squirrels and hazel trees are interdependent.

Model answer. Squirrels depend on hazel trees for food (1). Hazel trees depend on squirrels to disperse their seeds, because buried nuts that are not eaten can grow into new trees (1).

Explain how a change to one species affects others in a food web 2 to 4 marks **Grade 5**

1. Find the species that changed and follow the arrows to what it eats and what eats it.
2. State the effect on numbers (increase or decrease).
3. Give the reason for each effect, e.g. 'less food' or 'fewer predators'.
4. Check for other food sources, which make an effect smaller or pass it on to another species.

Example. In a woodland, caterpillars and aphids feed on oak trees. Blue tits eat caterpillars and aphids. Ladybirds eat aphids.



A disease kills most of the caterpillars. Explain how this could affect the number of ladybirds. (3 marks)

Model answer. Blue tits have fewer caterpillars to eat (1), so they eat more aphids (1). There are fewer aphids for the ladybirds to eat, so the number of ladybirds may decrease (1).

Don't lose marks

- Saying plants compete for 'food' or 'nutrients'. Plants make their own food; write light, space, water or mineral ions.
- Mixing up a population (one species) and a community (all the species).
- Defining an ecosystem as 'where organisms live'. That is a habitat; an ecosystem includes the non-living environment and the interactions.
- Giving an effect without a reason ('the ladybirds decrease'), or ignoring that an animal has other food sources.
- Reading food web arrows the wrong way round.

More tips

Memory tricks

- Size ladder: individual → population → community → ecosystem. One organism, then one species, then many species, then many species plus the non-living world.
- Plants compete for 'Lovely Sunflowers Want Minerals': Light, Space, Water, Mineral ions. Animals compete for Food, Mates and Territory.
- Food web arrows mean 'is eaten by': they always point towards the eater.

Exam technique

- In 'suggest' questions, use the organisms and resources in the question. Answers linked to the context score best.
- For knock-on effects, write a chain linked by 'so': fewer X, so less food for Y, so Y decreases.
- When a question says 'give two', give exactly two. A wrong extra answer can cancel a correct one.
- Use the terms interdependence and stable community exactly as defined.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3 — **Define population, community, habitat and ecosystem**
A population is one species in a habitat, a community is all the populations there, and an ecosystem is the community interacting with the non-living environment.

Grade 4 — **List what plants compete for**
Light and space, and water and mineral ions from the soil.

Grade 4 — **List what animals compete for**
Food, mates and territory.

Grade 5 — **Explain what interdependence means**
Each species depends on others for food, shelter, pollination or seed dispersal, so removing one species can affect the whole community.

Grade 5 — **Define a stable community**
All the species and environmental factors are in balance, so population sizes stay fairly constant.

Grade 7 — **Predict knock-on effects of changes in food webs**
Follow every arrow into and out of the changed species, give a reason for each effect and allow for other food sources.

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