



Ecosystems

BIOLOGY • ECOSYSTEMS • ECOSYSTEMS

Section 1: What Is An Ecosystem?

• What is ecology?

Ecology is a branch of biology which studies how organisms interact with one another and with their environment. Ecologists study the feeding relationships within habitats, the flow of energy through and the cycling of nutrients within ecosystems, how ecosystems change over time and much more. A full understanding of ecosystems is very important so that we can appreciate how they might change over time, how we can manage them, and how we can conserve the resources within them.

Extension Question

Q1. What is a habitat?

A habitat is simply the place where an organism lives. For example, a frog's habitat might be a pond.

• What is an ecosystem?

An ecosystem is a self-sustaining system of living organisms, which interact with each other and with the non-living components of the environment. A tropical rainforest can be described as an ecosystem. The living components of an ecosystem are called 'biotic' factors and include all the plants and animals, and the relationships between them. The non-living components, such as the air, soil, rocks and water are the 'abiotic' factors.

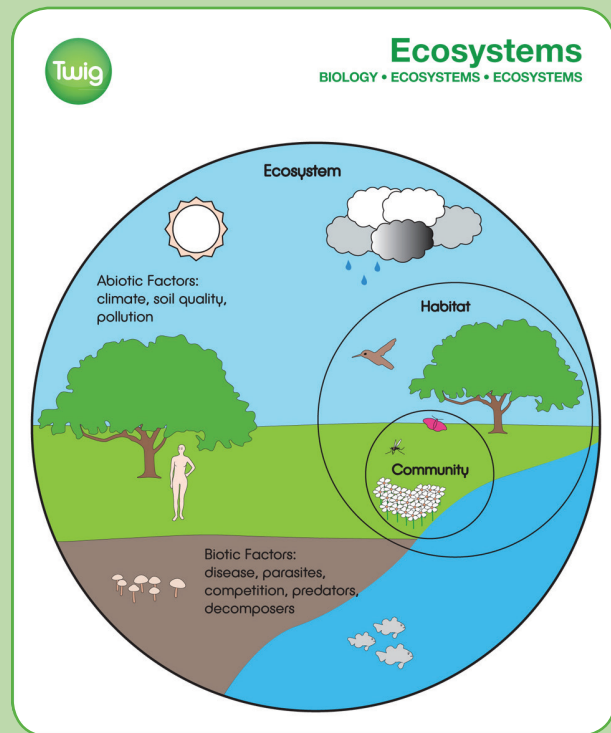
• Suggested Film

- What Is An Ecosystem?



Biotic factors are the living organisms within an ecosystem

DIAGRAM 01:



Extension Question

Q2. What does the term 'community' mean in ecological terms?

A community is simply all the living organisms in an ecosystem. If we consider a pond as an ecosystem, then the community would include all the living organisms, such as the pondweed, tadpoles, insects and fish.

• What is a niche?

A niche is the role that an organism has within an ecosystem. It refers to every aspect of an organism's involvement within an ecosystem, both in terms of its physical position and its interactions with other organisms, such as what it feeds on and what feeds on it. Members of the same species occupy the same niche in an ecosystem because they play the same role when they interact with both the biotic and abiotic components.

• Suggested Film

- Oceans: Coral Seas

Extension Question

Q3. Can different species occupy the same niche?

No, different species always occupy different niches. For example, the role that an eagle plays in a given ecosystem is similar but different to that which a hawk plays. We say they occupy different niches.

Section 2: Earth's Biomes

• What is a biome?

DIAGRAM 02:



Savannahs cover 20% of Earth's land

Biomes are large areas of the Earth which are dominated by specific types of vegetation and are therefore home to certain types of ecosystem. Specific biomes have similar climatic conditions and therefore support similar communities of plants, animals and other organisms. Major biomes on Earth include tropical rainforests, savannah, desert, tundra, deciduous forests and coniferous forests, including the Taiga.

• Suggested Films

- Oceans: Sunlight Zone

- Savannah

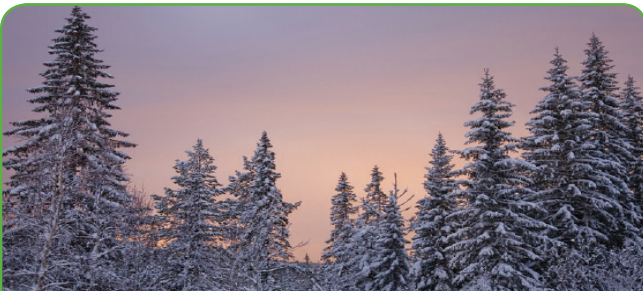
- Tundra

- Temperate Grassland

Extension Question**Q4. Why do specific biomes support similar ecosystems?**

Biomes are largely determined by the climatic conditions present, including temperature, rainfall and day length. When these climatic conditions are similar the same sorts of vegetation tend to grow and these in turn support similar types of animals and other fauna. As a result, the ecosystems found within a biome are often similar in many respects.

- What is the Taiga biome?



The Taiga forest is dominated by conifer trees which endure the Arctic conditions

The Taiga biome is the largest biome on Earth, covering much of Canada, Alaska, Russia and Scandinavia. Temperatures are usually very low for extended parts of the year, rainfall is also low, and the growing season is therefore short. The predominant vegetation is coniferous forest and this is why the Taiga biome is also often called the Boreal forest.

- Suggested Films

- The Taiga Forest
- Redwoods
- Oceans: Frozen Seas

Extension Question**Q5. Why don't the conifers of the Taiga biome shed their leaves?**

In the freezing conditions of the Taiga, the growing season is so short that plants cannot afford to shed their leaves every year.

- Where do we find the deciduous forests?

The deciduous forests are typically found at lower latitudes than the coniferous forests. At lower latitudes the average temperature is usually higher, the rainfall greater and the growing season longer. However, there is often significant variability in the climatic conditions throughout the year. This tends to favour deciduous plant species, such as beech, ash and oak, which can grow leaves quickly in the spring and then shed them before winter in order to conserve water and better survive low temperatures.

- Suggested Film

- Deciduous Forests

Extension Question**Q6. Why are there evergreens in warmer parts of the world?**

In the warm, wet conditions of a tropical rainforest there is no need to shed leaves to conserve water or survive the winter. Plants can photosynthesise all year round and so they tend to grow very quickly.

Section 3: Biodiversity

• What is biodiversity?

Biodiversity refers to both the number of organisms and the number of different types of organisms in an ecosystem. Ecosystems that sustain both lots of organisms and lots of different species are said to have high biodiversity. Biodiversity is vital to humans as it provides us with food, materials and medicines. It also has important implications for our atmosphere, soil and water. Furthermore, genetic variations within species can prove to be important in future breeding programmes. As a result it is crucial we maintain this biodiversity.

• Suggested Films

- What Is Biodiversity?
- Oceans: The Intertidal Zone

Extension Question

Q7. What is causing biodiversity to decline?

Various factors seem to be causing a rapid loss of biodiversity on Earth at the moment. Some people believe we are living through a period of mass extinction! Many human activities are causing habitat destruction, as is climate change.



Many human activities cause habitat destruction

• What ecosystems contain lots of biodiversity?



The Amazon rainforest is a great natural resource, as it produces around 20% of the world's oxygen

Tropical rainforests are regarded as the most biologically diverse on Earth. These rainforests cover only about 6% of the Earth's surface but are home to over half of all the species on the planet. Being close to the equator these ecosystems receive a lot of sunlight every year and so are very productive. Plants grow quickly and this in turn provides a lot of food for other organisms to feed off. These rainforests are a vitally important resource, providing food, materials, fuel and medicine, as well as playing an important part in the water cycle and influencing the composition of our atmosphere.

• Suggested Films

- Tropical Rainforests
- Oceans: The Deep Blue
- Oceans: The Abyss

Extension Question

Q8. How do rainforests influence the gaseous composition of the atmosphere?

The plants in a rainforest carry out photosynthesis on a massive scale, absorbing carbon dioxide from the atmosphere and releasing oxygen as a waste product.

• Quizzes

What Is An Ecosystem?

Basic

• What do we call large ecosystems characterised by their climate and vegetation?

- A – habitats
- B – biomes
- C – niches
- D – communities

• What do we call all the living components of an ecosystem?

- A – animals
- B – biotic factors
- C – abiotic factors
- D – plants

• What do we call organisms that feed on plants?

- A – producers
- B – herbivores
- C – carnivores
- D – decomposers

• Which of the following is an abiotic factor within an ecosystem?

- A – the annual rainfall
- B – the plants
- C – the carnivores
- D – the decomposers

Advanced

• What do we call large ecosystems characterised by their climate and vegetation?

- A – habitats
- B – biomes
- C – niches
- D – communities

• What do we call all the non-living components of an ecosystem?

- A – the soil
- B – biotic factors
- C – abiotic factors
- D – rocks

• Which of the following organisms can act as decomposers?

- A – plants
- B – animals
- C – fungi
- D – birds

• What term is used to describe the role an organism plays in its ecosystem?

- A – producer
- B – herbivore
- C – niche
- D – decomposer

• Answers

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