

Ecology Project: Due: Friday 13th September 2019

You will need to bring in your revision notes and the answers to your questions please

Tasks:

- Find out information on the topics and questions below.
- You can produce revision notes, mind map or flash cards for each topic.
- Use knowledge mats, revision guides or the links below to help.

Ecology- Free science lessons youtube

<https://youtu.be/ePsjdKoSA9g>

Topics

1. Ecosystem (habitats, community, habitat)
 - Need to give different examples of ecosystem abiotic (temperatures, light intensity, moisture levels, soil pH, Wind , oxygen availability and biotic factors (food availability, pathogens, predators, interspecific)
2. Distribution of organisms: Describe methods (Quadrats, transects, sample size, mean and median)
3. Competition of animals: Food, territory, mate, examples of successful animals)
4. Competition of plants: What do they compete for and how to they compensate?
5. Adaptations of plants: surface area, collecting water, distribution of stomata, roots, storing water
6. Adaptations of animals: Cold climates, different pH, dry climates, anti freeze cells
7. Feeding relationships examples and primary, secondary, tertiary consumers and producers.
8. Pyramid of numbers and comparing to pyramid of biomass
9. Measuring biomass, trophic levels, dry biomass
10. Biomass transfers: lost to waste, faeces, temperature, and biomass of decomposers

Use your revision notes to answer the questions underneath...

Adaptations, interdependence and competition

1. What is the definition of an ecosystem?
2. What do plants compete with other plants for?
3. What do animal compete with each other for?
4. List two ways a plant may depend on another species for its survival.
5. What is interdependence?
6. What is meant by a stable community?
7. What is the definition of an abiotic factor?
8. List **three** abiotic factors which can affect an aquatic organism.
9. List **three** abiotic factors which can affect a plant.
10. Explain, as fully as you can, what eventually happens to energy from the sun which is captured by the plants in the wood. (10 marks)
11. What is the definition of a biotic factor?
12. List **four** biotic factors which can affect a community.
13. There are three types of adaptation that an organism may show to aid its survival. What are the three types?
14. What is an extremophile?
15. Give three examples of what might make an environment be described as extreme.
16. Name a particular extremophile you have studied.

Biodiversity

1. Define the term biodiversity?
2. What **two** factors have increased the use of resources by humans?
3. List **three** categories of pollution caused by human activity.
4. What can cause pollution in each of these three categories?
5. Name **four** processes which humans carry out that reduces the land available to other animals , plants and microorganisms.
6. Give **three** reasons why humans should not destroy peat bogs to make compost.
7. What is a biofuel?
8. Why do humans undertake large scale deforestation in tropical areas?
9. Name two gases which are increasing in the atmosphere and contribute to global warming.
10. List **three** biological consequences of global warming.
11. Consider the negative aspects of how humans interact with ecosystems. What could be done positively to counteract this effect?

Organisation of an ecosystem

1. What is biomass?
2. What does a food chain show?
3. What do all food chains begin with?
4. Name two different types of organism which would be found at the start of a food chain.
5. What is meant by the terms mode and median?
6. What might eat a secondary consumer?
7. Define the term predator.
8. Define the term prey.
9. What piece of equipment is usually used to sample abundance of an organism in an area? Why is it essential that materials are recycled in the living world?
10. What is precipitation in the water cycle?

11. List three main processes in the carbon cycle.

Biology Only

12. Name three factors that must be present for rapid decay of waste biological material to occur.

13. What do gardeners call the end product after waste biological material has decayed?

14. What is this end product then used for?

15. What causes anaerobic decay to occur?

16. Name a useful end product of anaerobic decay.

17. What is this product used for?

18. What is the name of the equipment used to process and collect this end product?

Biology Higher Tier only

19. List three environmental changes which may alter the distribution of a species in an ecosystem.

20. Name three reasons why these environmental changes may occur.

Tropic Levels

1. Define the term trophic level.

2. What is a carnivore?

3. What is a herbivore?

4. What type of consumer is a carnivore which eats another carnivore?

5. What do we call a carnivore that has no predators?

6. What is a decomposer?

7. How do decomposers gain their food from dead plant or animal matter?

8. What does the pyramid of biomass represent?

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Food production (Biology only)

1. What is meant by the term food security?
2. List four biological factors which threaten food security.
3. Give two ways in which energy transfer to the environment can be restricted in food animals.
4. Some farmers feed their animals high protein food. Why?
5. List two things which can be done to conserve fish stocks in the ocean at a sustainable level.
6. What type of food does the fungus *Fusarium* produce?
7. How is *Fusarium* grown?
8. What is golden rice?
9. What type of organism produces genetically engineered human insulin?

From the specification

Students should be able to describe:

- different levels of organisation in an ecosystem from individual organisms to the whole ecosystem
- the importance of interdependence and competition in a community.

Students should be able to, when provided with appropriate information:

- suggest the factors for which organisms are competing in a given habitat
- suggest how organisms are adapted to the conditions in which they live.

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

To survive and reproduce, organisms require a supply of materials from their surroundings and from the other living organisms there.

Plants in a community or habitat often compete with each other for light and space, and for water and mineral ions from the soil. Animals often compete with each other for food, mates and territory.

Within a community each species depends on other species for food, shelter, pollination, seed dispersal etc. If one species is removed it can affect the whole community. This is called interdependence. A stable community is one where all the species and environmental factors are in balance so that population sizes remain fairly constant.

Students should be able to explain how a change in an abiotic factor would affect a given community given appropriate data or context.

Abiotic (non-living) factors which can affect a community are:

- light intensity
- temperature
- moisture levels
- soil pH and mineral content
- wind intensity and direction
- carbon dioxide levels for plants
- oxygen levels for aquatic animals.

Students should be able to explain how a change in a biotic factor might affect a given community given appropriate data or context.

Biotic (living) factors which can affect a community are:

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

Students should be able to explain how organisms are adapted to live in their natural environment, given appropriate information. Organisms have features (adaptations) that enable them to survive in the conditions in which they normally live. These adaptations may be structural, behavioural or functional. Some organisms live in environments that are very extreme, such as at high temperature, pressure, or salt concentration. These organisms are called extremophiles. Bacteria living in deep sea vents are extremophiles.

Students should understand that photosynthetic organisms are the producers of biomass for life on Earth. Feeding relationships within a community can be represented by food chains. All food chains begin with a producer which synthesises molecules. This is usually a green plant or alga which makes glucose by photosynthesis.

A range of experimental methods using transects and quadrats are used by ecologists to determine the distribution and abundance of species in an ecosystem.

Producers are eaten by primary consumers, which in turn may be eaten by secondary consumers and then tertiary consumers. Consumers that kill and eat other animals are predators, and those eaten are prey. In a stable community the numbers of predators and prey rise and fall in cycles.

Students should:

- recall that many different materials cycle through the abiotic and biotic components of an ecosystem
- explain the importance of the carbon and water cycles to living organisms.

All materials in the living world are recycled to provide the building blocks for future organisms.

The carbon cycle returns carbon from organisms to the atmosphere as carbon dioxide to be used by plants in photosynthesis.

The water cycle provides fresh water for plants and animals on land before draining into the seas. Water is continuously evaporated and precipitated.

Students should be able to explain the role of microorganisms in cycling materials through an ecosystem by returning carbon to the atmosphere as carbon dioxide and mineral ions to the soil.

Decomposition (biology only)

Students should be able to explain how temperature, water and availability of oxygen affect the rate of decay of biological material. Gardeners and farmers try to provide optimum conditions for rapid decay of waste biological material. The compost produced is used as a natural fertiliser for growing garden plants or crops.

Anaerobic decay produces methane gas. Biogas generators can be used to produce methane gas as a fuel.

Impact of environmental change (biology only) (HT only)

Students should be able to evaluate the impact of environmental changes on the distribution of species in an ecosystem given appropriate information.

Environmental changes affect the distribution of species in an ecosystem. These changes include:

- temperature
- availability of water
- composition of atmospheric gases.

The changes may be seasonal, geographic or caused by human interaction.