

AQA B7b Ecology: Biodiversity TRIPLE BIOLOGY

Key word	Definition
Biodiversity	The variety of all different species of organisms on Earth, or within an ecosystem
Apex predator	A predator with no predators. The top of a food chain

Maintaining a great biodiversity

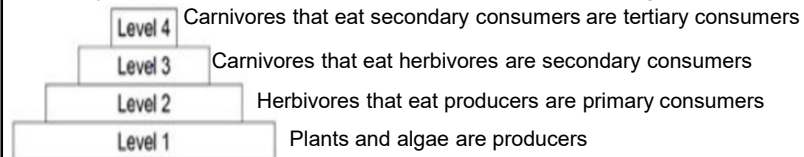
- **Ensures the stability of ecosystems** by reducing the dependence of one species on another for food, shelter and maintenance of the physical environment
- **Ensures the future of the human species.** Many human activities are reducing biodiversity.

Scientists and concerned citizens have put programs in place to reduce the negative impacts of humans on biodiversity including:

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| <ul style="list-style-type: none"> • Breeding programs for endangered species • Protection and regeneration of rare habitats • Field margins and hedgerows in agricultural areas where farmers grow one crop | <ul style="list-style-type: none"> • Reduction of carbon dioxide emissions and deforestation by governments • Recycling resources rather than dumping waste |
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Trophic levels and biomass – Biology only

- Trophic levels can be represented by numbers, starting with plants and algae and continuing depending on how far the organism is up the food chain.
- Pyramids of biomass can represent the relative biomass of each level in the food chain, starting with trophic level 1 at the bottom of the pyramid
- Decomposers break down dead plant and animal matter by secreting enzymes. Small food molecules diffuse into the microorganism.



- Biomass is lost between the trophic levels – some egested as faeces; some lost as carbon dioxide, water and urea; some as large amounts of glucose used in respiration
- Producers transfer approximately 1% of the energy of light for photosynthesis
- Approximately 10% of the biomass from each trophic level is transferred to the level above

Land use

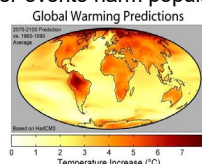
- Humans reduce the amount of land available for plants and animals by for example: building, farming, quarrying and dumping waste
- Decay or burning of peat from peat bogs releases a large amount of carbon dioxide to the atmosphere as peat bogs are a major **carbon sink**
- Destruction of peat bogs and other areas to produce garden compost reduces biodiversity

Global warming

- Levels of carbon dioxide and methane are increasing in the atmosphere due to human activity
- There is a global consensus about the human impact on global warming and climate change, based on thousands of **peer reviewed** publications.

Some effects of global warming on biodiversity are:

- Sea level rise
- Decreased land availability caused by sea level rise
- Damaged and destroyed habitats due to temperature rise
- Extreme weather events harm populations of plants and animals



Food production – Biology only

Factors affecting **food security** – having enough food to feed the population

- Increasing birth rate
- Changing diets in developing countries
- New pests and pathogens
- The cost of agricultural inputs
- Environmental change e.g. a widespread famine if less rain
- Conflicts (war) affecting availability of water or food

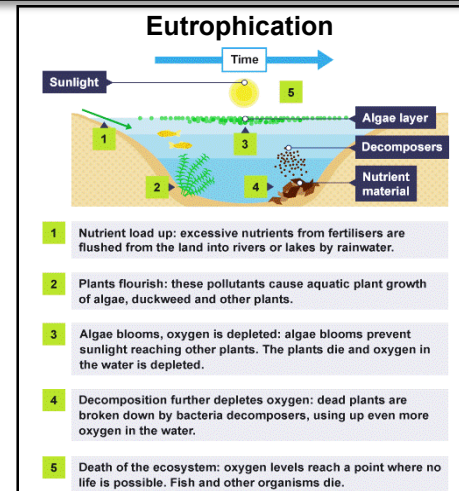
Biotechnology can meet the demands of a growing population

- Genetically modified (GM) bacterium produces human insulin. This is harvested and purified to treat people with diabetes
- GM crops can provide food with an improved nutritional value such as golden rice (increased vitamin A) or more food
- The fungus *Fusarium* is used to produce mycoprotein. A vegetarian protein-rich food. It is grown on glucose syrup, in aerobic conditions.

Large scale deforestation has occurred across the world, particularly in tropical areas to:

- Provide land for cattle
- Provide land for rice fields
- Provide land for growth of biofuels

This deforestation leads to a reduction in biodiversity



- 1** Nutrient load up: excessive nutrients from fertilisers are flushed from the land into rivers or lakes by rainwater.
- 2** Plants flourish: these pollutants cause aquatic plant growth of algae, duckweed and other plants.
- 3** Algae blooms, oxygen is depleted: algae blooms prevent sunlight reaching other plants. The plants die and oxygen in the water is depleted.
- 4** Decomposition further depletes oxygen: dead plants are broken down by bacteria decomposers, using up even more oxygen in the water.
- 5** Death of the ecosystem: oxygen levels reach a point where no life is possible. Fish and other organisms die.

Waste management

Rapid human population growth and increase in standard of living means that more waste is being produced. This pollution can kill animals and plants, reducing biodiversity

Pollution can occur:

- In water from sewage and toxic chemicals
- In air from smoke and acidic gases
- On land from landfill and toxic chemicals

Farming techniques – increasing efficiency of food production by:

- Restricting movement of animals to limit energy loss
- Feeding animals high protein foods
- Controlling temperature of their surroundings

Sustainable fisheries are needed as fish stocks are declining

- Must maintain or grow fish stocks to a sustainable level otherwise species will become extinct
- Techniques include controlling net size and introducing fishing quotas