

Definitions and Concepts for OCR (B) Biology GCSE

Topic 3: Living Together – Food and Ecosystems

Definitions in **bold** are for higher tier only

Definitions marked by '*' are for separate sciences only

Abiotic factors - The non-living factors of an ecosystem, e.g. temperature, light intensity, moisture, wind direction, wind intensity, soil pH, soil mineral content, carbon dioxide levels and oxygen levels.

Active site - The part of the enzyme which is specific and complementary to the substrate.

Active transport - The movement of particles from an area of low concentration to an area of high concentration, against the concentration gradient. This process requires energy.

***Aerobic decomposition** - The breakdown of dead or decaying matter by microorganisms in the presence of sufficient oxygen.

Amino acids - Small molecules which join together in a chain to make up a protein.

***Anaerobic decomposition** - The breakdown of dead or decaying matter by microorganisms in the absence of oxygen. This process usually occurs in waterlogged soils. The products are methane gas and carbon dioxide.

***Biomass** - The mass of all the living material present in a particular area or particular organism.

Biotic factors - The living factors of an ecosystem, e.g. food availability, pathogens, predators and other species.

Biuret test - A test used to check for peptide bonds. If peptide bonds are present, there will be a colour change from blue to violet.

Capture-mark-release-recapture - A ecological method used to estimate the size of a population. A sample of organisms of a species are captured, marked and released in the habitat again. After a period of time, another sample is captured. The ratio of marked to unmarked organisms in the second sample is assumed to be proportional to the ratio of marked to unmarked in the entire population.

Carbohydrate - A large molecule that is synthesised from simple sugars.

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Carbon cycle - The cycle through which carbon (in the form of carbon dioxide) moves between the environment and living organisms. It involves respiration, photosynthesis, combustion and decomposition.

Carnivore - An organism that feeds on animals.

Cell membrane - A selectively permeable barrier which controls the movement of substances into and out of the cell. It also has protein receptor molecules on the surface for signalling and recognition.

Cell wall - An outer layer made of cellulose fibres in plant cells. It provides the cell with strength and support.

Cellular respiration - A universal, continuously occurring chemical process in all living cells. It is exothermic and releases energy (in the form of ATP) from the breakdown of organic compounds such as glucose.

Chlorophyll - A green pigment contained in chloroplasts. It absorbs light for photosynthesis.

Chloroplasts - Organelles that perform photosynthesis. They contain chlorophyll, which absorbs light energy, and important enzymes needed for photosynthesis.

Combustion - The process by which organic matter is burnt to release energy, carbon dioxide and water. It is part of the carbon cycle.

Community - All of the populations of different species that are living in a habitat together.

Competition - When different organisms compete for the same resources (e.g. food, shelter and mates) in an ecosystem. It limits population size.

Concentration gradient - The difference in concentration between two areas.

Condensation - The process by which vapour turns into liquid.

Detritus - Dead organic material.

Diffusion - The net spreading out of particles from a high concentration to a lower concentration (down their concentration gradient). Energy is not required, so it is a passive process.

Ecosystem - The community of living (biotic) and non-living (abiotic) components of an area and their interactions.

***Efficiency of biomass** - The efficiency of biomass transfer between trophic levels is calculated using:

$$= (\text{Biomass available after transfer} / \text{Biomass available before transfer}) \times 100$$

Emulsion test - A test to check for the presence of lipids. Ethanol is added, then water; a cloudy emulsion indicates lipids are present.



Endothermic reaction - A process which takes in energy, usually in the form of thermal energy.

Enzymes - Biological catalysts that increase the rate of chemical reactions.

Enzyme specificity - A property of enzymes: enzymes will only act on specific substrates that have a complementary shape to the active site of the enzyme.

Eutrophication - When an aquatic ecosystem (e.g. river) becomes enriched with nutrients which stimulates excessive algae growth.

Fatty acid - A carboxylic acid that has a long carbon chain. Fatty acids react with glycerol to make lipids.

Food chain - A food chain shows the feeding relationships between organisms and the resultant biomass transfer. It follows the structure of:

producer → primary consumer → secondary consumer → tertiary consumer

Food web - A food web shows the relationships between different food chains and how they interact with each other.

Fossil fuel - The burning of fossils for energy, releasing carbon dioxide into the air.

Glycerol - A small molecule made of carbon, hydrogen and oxygen. It can react with fatty acids to produce lipids.

Guard cells - Cells that control the opening and closing of the stomata.

Herbivore - An organism that feeds on plants.

Interdependence - The dependence of organisms on each other in order to survive, e.g. herbivores rely on plants, birds rely on trees for shelter.

Light dependent stage - The first stage of photosynthesis where light is absorbed by the chlorophyll; this splits water molecules, producing hydrogen ions and oxygen.

Light independent stage - The second stage of photosynthesis where light is not needed. Hydrogen ions and carbon dioxide combine to produce glucose.

Light microscope - A microscope that used light to produce an image of a specimen.

Limiting factor - A factor that, when in short or inadequate supply, limits the rate of a reaction.

Lipid - A large molecule that is synthesised from three fatty acids and a glycerol molecule.

Lock and key hypothesis - A theory that describes how substrates must be the correct shape to fit the active site of an enzyme.



Microorganisms - Very small organisms that are involved in the recycling of materials in an ecosystem. They are able to convert carbon into carbon dioxide which is then released into the atmosphere. They also return mineral ions to the soil.

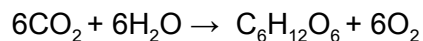
Mitochondria - The organelle at which aerobic respiration takes place. It contains enzymes required for cellular respiration.

Osmosis - The net movement of water molecules from a region of high water concentration to a region of low water concentration across a partially permeable membrane.

Pathogen - A bacterium, virus or any other microorganism that can cause disease.

Phloem - A plant tissue that transports sugars from the source (photosynthetic parts of the plant) to the sink (non-photosynthetic parts).

Photosynthesis - An endothermic reaction that takes place in the chloroplasts, converting carbon dioxide and water into glucose and oxygen using light energy. It is a two stage process.



Sunlight energy

Photosynthetic organisms - Organisms that are the main producers of food and therefore biomass for life on earth.

Potometer - A piece of capillary tube that is used to investigate the rate of transpiration. Water loss from the surface of the leaf is measured by the distance that an air bubble (in the tube) travels over a certain period of time.

Precipitation - A part of the water cycle where water returns to land in the form of rain, snow or hail.

Predator - A consumer that preys on and eats other animals.

Prey - A consumer that is eaten by a predator.

Primary consumer - An organism that cannot produce its own food, so must obtain energy by feeding on the producer. They are herbivores which consume at trophic level two of the food chain.

Producer - An organism that makes its own food, usually via photosynthesis.

Prokaryotic cell - A unicellular organism that lacks a nucleus and other membrane-bound organelles. Bacterial cells are prokaryotic cells.

Protein - A large molecule synthesised from amino acid monomers.

***Pyramid of biomass** - A table showing the dry mass of living material at each trophic level in a food chain. This table forms the shape of a pyramid.



Quadrat - A square grid used for sampling a known area to determine the abundance and distribution of organisms.

Root hair cells - Specialised cells of a plant root that provide a large surface area for the uptake of water and minerals from the soil.

Secondary consumer - An organism that cannot produce its own food so it must obtain energy by feeding on the primary consumer. They are carnivores which consume at trophic level three of the food chain.

Sieve tubes - Cells of the phloem that have no nuclei and are connected via the cytoplasm.

Stomata - Small pores in the epidermis of the leaves that facilitate gaseous exchange.

Sugar - Small molecules made of carbon, hydrogen and oxygen. Glucose is a sugar.

Tertiary consumer - A carnivore that eats other carnivores.

The Inverse square law - Light intensity is inversely proportional to the square of the distance from the light source (the inverse square law). This explains why the rate of photosynthesis changes in the way that it does with distance from a point light source. †

Transect - A line (usually created by a tape measure) along which samples are taken. It is used to measure the abundance and distribution of an organism in an ecosystem.

Translocation - The process of transporting sucrose and other nutrients around the plant through the phloem.

Transpiration - The loss of water from the surface of the leaves by evaporation from the open stomata.

Trophic level - The position of an organism in the food chain.

Turgid - A state of a plant cell in which the vacuole is swollen and enlarged with water.

Water cycle - The cycle of water moving between the environment and living organisms. It involves precipitation, condensation, transpiration, biomass transfer and evaporation.

Xylem - A specialised plant tissue that transports water and dissolved minerals from the roots to the leaves of the plant.

† Definition taken from: [OCR Gateway Science Biology \(B\) Specification \(J257\) V3.1 \(January 2020\)](#)

