

GCSE



CCEA GCSE

# Double Award Science Biology

Glossary of Terms



For first teaching from September 2017



# GLOSSARY OF TERMS

## DOUBLE AWARD SCIENCE: BIOLOGY

*This glossary is not exhaustive. Where a definition which is given here differs from that given in the specification, either definition will be accepted.*

### Unit B1

#### 1.1

- Bacteria – A group of microorganisms which have a cell wall without cellulose and with no nucleus.
- Cell – The basic building block in the structure and function of living cells.
- Cell membrane – The membrane found on the outside of living cells controlling the substances entering and leaving the cell.
- Cell sap – The liquid found in cell vacuoles.
- Cell wall – A stiff layer outside the cell membrane of plant, bacterial and fungal cells which provides support.
- Cellulose – A complex carbohydrate molecule found in plant cell walls.
- Cytoplasm – The contents of a cell between the cell membrane and the nucleus where chemical reactions take place.
- Field of view – The circular area that is visible when looking down a microscope lens.
- Magnification – The number of times an image is larger than the object being viewed.
- Mitochondria – Structures in the cytoplasm where the reactions of respiration occur.
- Multi-celled – An organism made up of many cells.
- Nuclear membrane – The membrane surrounding the nucleus.
- Nucleus – The large structure in a cell containing chromosomes.
- Specialised – A cell that has adaptations to a particular function.
- Vacuole – A liquid filled space in the cytoplasm of a cell which is large and permanent in plant cells.

#### 1.2

- Chlorophyll – A green coloured chemical in chloroplasts that is responsible for absorbing light energy during photosynthesis.
- Chloroplast – A structure in the cytoplasm of plant cells which contains chlorophyll and carries out photosynthesis.
- Compensation point – When the environmental conditions a plant is growing in produce rates of photosynthesis and respiration that are equal i.e. there is no net gas exchange.
- Cuticle – The waxy layer on the outside surface of a plant epidermis that allows light through and reduces water loss.

- Destarch – The procedure that removes starch from plant leaves.
- Epidermis – An outer layer of cells.
- Gas exchange – The movement of gases between an organism and its surroundings.
- Limiting factor – Any factor which is at a level less than its optimum which slows or limits a process, e.g. photosynthesis.
- Palisade mesophyll – The upper of the two layers of mesophyll cells in the centre of a leaf. The cells are closely packed end on to the upper surface and contain many chloroplasts. They are the main site of photosynthesis.
- Photosynthesis – The chemical process in green plants which uses light energy to convert carbon dioxide and water into sugars and oxygen.
- Spongy mesophyll – The lower of the two layers of mesophyll cells in the centre of a leaf. The cells are loosely arranged with air spaces in between them. They are the main site of gas exchange.
- Stomata – The small pores in the surface of plant leaves.

### 1.3

- Amino Acids – Small molecules which join together to form proteins.
- Carbohydrate – A type of food molecule, including sugars, starch and cellulose, that are the main source of energy in the diet.
- Glycerol – A molecule that makes up part of fats/lipids.
- Protein – A type of food molecule, containing nitrogen, formed by long chains of amino acids that are important in the structure and functioning of cells.
- Reagent – A chemical used to test for the presence of a particular substance.

### 1.4

- Active site – The part of an enzyme molecule which the substrate molecule fits into because they have complementary shapes.
- Complementary – Shapes that fit into each other as in an enzyme and its substrate.
- Denaturation – An irreversible change in the shape of an enzyme which means that it is no longer complementary to the substrate and cannot catalyse the reaction. (caused by high temperature or pH)
- Digestion – The breaking down of large complex insoluble food molecules into small simple soluble molecules by enzymes so that the molecules can be absorbed into the blood.
- Enzyme – A protein molecule that is a biological catalyst. Enzymes speed up the rate of reactions without being used up.
- Enzyme specificity – The ability of an enzyme to catalyse only one type of substrate.
- Ileum – The longest part of the small intestine where digestion occurs and small simple molecules are absorbed into the blood.
- Inhibitor – A molecule which fits into the active site of an enzyme and stops the normal substrate entering. This reduces the reaction rate of the enzyme.

- Lock and Key model – Model used to explain how an enzyme reacts with its substrate.
- Optimum – The value of a factor which allows a reaction to happen at its fastest rate.
- Substrate – A molecule that is acted upon by an enzyme.
- Aerobic respiration – A chemical process, using oxygen, in which energy is released.
- Alveolus – A single bubble-shaped air sac in the lungs

## 1.5

- Anaerobic respiration – A chemical process in which energy is released without the use of oxygen.
- Breathing rate – The number of breaths per unit time.
- Exothermic reaction – A reaction in which heat energy is given out.
- Respiration – The process that releases energy from food.

## 1.6

- Association nerve – A nerve that links sensory and motor nerves.
- Antidiuretic hormone – A chemical messenger molecule, produced in the brain, which controls the amount of water absorbed by the kidneys.
- Auxin – A plant hormone which controls the growth of plants cells.
- Bladder – The organ that stores urine.
- Central Nervous System – The term referring to the co-ordinator in the nervous system i.e. the brain and the spinal cord.
- Cortex – The outer region of the kidney.
- Diabetes (type 1) – A condition in which the pancreas stops producing insulin. It usually occurs early in life.
- Diabetes (type 2) – A condition that is caused when there is less insulin produced by the pancreas or the insulin does not work as effectively. Usually occurs in older people.
- Effector – An organ (muscle or gland) which produces the response when the body has reacted to a stimulus.
- Excretory system – An organ system which removes waste from the body.
- Glycogen – A complex carbohydrate molecule use for storage in animals.
- Homeostasis – The ability of the body to maintain a constant internal environment.
- Lethargy – A lack of energy in a person.
- Kidney – The organ that carries out osmoregulation and produces urine.
- Medulla – The inner region of the kidney.
- Nerve impulses – Small electrical charges that pass along neurones.
- Neurones – The nerve cells of the nervous system.
- Osmoregulation – The ability to control the amount of water in the body.
- Pelvis of ureter – The first part of the ureter in the kidney.
- Phototropism – A growth movement of plants in response to light.

- Receptor – A structure which can detect a change (stimulus) in the environment.
- Reflex action – A very fast response to a stimulus by means of a nervous pathway involving a small number of nerve cells.
- Renal artery – The blood vessel that carries blood to the kidney.
- Renal vein – The blood vessel that carries blood away from the kidney.
- Response – The action of an effector.
- Stimulus – A feature of the environment that stimulates a receptor in the nervous system.
- Synapse – The small junction (gap) between adjacent neurones.
- Voluntary action – A response to a stimulus which involves thinking.

## 1.7

- Abiotic factor – A physical (non-living factor) which affects an organism.
- Active uptake/transport – A process which uses energy released by respiration to move from a low concentration to a high concentration.
- Algal bloom – The excessive growth of green algae on the surface of lakes and rivers.
- Belt transect – A method used when sampling, where a line is placed across a habitat to estimate the distribution of organisms.
- Biodiversity – The variety of living organisms in an area.
- Biotic factor – A factor caused by the living organisms in an area.
- Carbon cycle – The cycling of substances containing carbon within the environment.
- Combustion – The reaction of fuels with oxygen, releasing energy.
- Community – All the species normally found in a habitat.
- Competition – The interaction between two or more organisms as they try to get sufficient resources to survive.
- Consumer – An animal that gets its food from eating other organisms.
- Decomposer – An organism (e.g. bacterium/fungus) which breaks down the tissues of dead organisms and excretory products.
- Denitrification – A process carried out by bacteria in anaerobic conditions which changes nitrates into nitrogen gas.
- Ecosystem – An area in which a community of organisms interact with each other and their physical surroundings.
- Energy flow – The transfer of energy between the trophic levels in food chains and food webs.
- Environment – The conditions which surround and affect organisms in their habitat.
- Eutrophication – The process, occurring in water with too many nitrates, which leads to the death of animal species.
- Fertiliser – A substance that provides plants with minerals, especially nitrates, that they need to grow. Can be natural, e.g. animal waste, or artificial, produced by the chemical industry.
- Food Chain – A sequence of organisms which feed off each other, passing nutrients and energy.

- Food Web – A number of interlinked food chains.
- Fossil – The remains of a living organism that has been preserved in rocks for millions of years.
- Habitat – The place where an organism or population lives.
- Indicator species – A species which can be used to monitor the level of pollution in a habitat.
- Legume – A group of plants including peas, beans and clover, that contain nitrogen fixing bacteria.
- Nitrifying bacteria – Bacteria that convert ammonium compounds into nitrates in the nitrogen cycle.
- Nitrogen fixation – A process carried out by nitrogen fixing bacteria where they change nitrogen gas into nitrates.
- Nutrient cycle – The cycling of substances (e.g nutrients and elements) in the environment.
- Percentage cover – A measure of estimating the amount of a plant species in a quadrat.
- Population – A group of organisms of the same species living in an area.
- Producer – An organism that produces food (e.g. a plant), at the start of a food chain. Some of its energy is passed onto consumers along with various substances.
- Putrefying bacteria – Decomposing bacteria.
- Quadrat – An apparatus, usually a square frame, used to sample an area.
- Sample – A small part of an area or population.
- Saprophyte – A bacterium or fungus which decomposes material by releasing extracellular enzymes onto the surface of the material and absorbing the breakdown products.
- Trophic level – The level at which an organism feeds in a food chain or web.

## **Unit B2**

### **2.1**

- Cell lysis – The bursting of a cell due to too much water being taken in by osmosis.
- Osmosis – The diffusion of water molecules from a dilute solution to a more concentrated solution through a selectively permeable membrane.
- Plasmolysis – A process in which a plant cell loses water by osmosis and its membrane separates from the cell wall.
- Potometer (bubble) – A piece of apparatus used to compare the rates of transpiration in plants.
- Potometer (weight) – A piece of apparatus used to compare the rates of water uptake in plants.
- Selectively permeable – The ability of a membrane to allow some substances to pass through while preventing others.
- Transpiration – The evaporation of water from mesophyll cells in a leaf followed by diffusion through air spaces and stomata.

- Turgid (turgor) – The state of a plant cell when it has gained enough water by osmosis for the cell membrane to push against the cell wall making the cell firm. Turgor provides support in plants.

## 2.2

- Aorta – The main artery that carries blood under high pressure away from the heart.
- Artery – A blood vessel that carries blood under pressure away from the heart
- Blood pressure – The force exerted by circulating blood on the walls of the blood vessels.
- Capillary – A very thin blood vessel through which the exchange of materials between blood and body cells takes place.
- Cardiac output – The volume (amount) of blood the heart pumps out per minute.
- Circulatory system – The body system that includes the heart and blood vessels.
- Coronary arteries – The very narrow arteries that supply the heart muscle with oxygen and glucose.
- Double circulation – Type of circulation of blood where blood travels through the heart twice for each circulation of the body.
- Haemoglobin – A molecule containing iron that is found in red blood cells.
- Heart Valve – A structure in the heart that prevents the backflow of blood.
- Left atrium – The heart chamber that receives blood from the lungs.
- Left ventricle – The heart chamber that pumps blood around the body.
- Plasma – The liquid part of the blood that functions as a transport medium.
- Platelets – Blood components that help convert fibrinogen to fibrin in the processes of blood clotting. The fibrin forms a mesh and traps red blood cells.
- Pulmonary artery – The blood vessel that carries deoxygenated blood from the heart to the lungs.
- Pulmonary vein – The blood vessel that carries oxygenated blood from the lungs to the heart.
- Recovery rate – The time taken for breathing rate or heart rate to return to normal after exercise.
- Red blood cells – Blood cells that carry oxygen around the body.
- Right atrium – The heart chamber that receives blood from the vena cava.
- Right ventricle – The heart chamber that pumps blood to the lungs.
- Vein – A blood vessel that carries blood back to the heart.
- Vena cava – The vein that returns deoxygenated blood to the heart.
- White blood cells – Blood cells that defend the body against disease.

## 2.3

- Amnion – The lining that contains the amniotic fluid.
- Amniotic fluid – The fluid within the amnion, which cushions the foetus.
- Cervix – The opening of the uterus.
- Condom – A barrier method of contraception.
- Contraception – A method used to try to avoid pregnancy.
- Contraceptive pill – A tablet containing hormones that prevents pregnancy by stopping the release of eggs (ova).
- Differentiate – The ability of a cell to change into a specialised cell with adaptations linked to a particular function.
- Egg/Ovum – female gamete.
- Female sterilisation – The cutting of the oviducts to prevent pregnancy.
- Fertilisation – The fusion of a haploid sperm and a haploid ovum to form a diploid zygote.
- Gamete – Sex cell that contains only one chromosome from each pair of chromosomes. It is haploid.
- Implantation – Process where the embryo attaches itself to the uterine lining.
- Infertility – The inability of a person to have children.
- In-vitro fertilisation – Fertilisation outside the body.
- Male Sterilisation – The cutting of the sperm tubes (vasectomy) to prevent pregnancy.
- Oestrogen – The female sex hormone produced by the ovaries, which both causes the repair and build-up of the uterus lining following menstruation and stimulates ovulation.
- Ovary – The female organ that produces eggs (ova).
- Oviduct – The structure that carries eggs (ova) from the ovary to the uterus.
- Ovulation – The release of an egg by an ovary.
- Ovum – A female gamete (sex cell) formed by meiosis.
- Penis – Organ that introduces sperm into the vagina.
- Placenta – The structure that links the uterus wall to the foetus via the umbilical cord. It is here that exchange of materials takes place between the mother and the foetus.
- Progesterone – The female hormone that maintains the build-up of the uterus lining and prepares the uterus for pregnancy.
- Prostate gland – The male gland that adds fluid to nourish the sperm.
- Scrotum – Sac that holds and protects the testes.
- Sperm – A male gamete (sex cell) formed by meiosis.
- Sperm tubes – The structures that carry sperm from the testes to the penis.
- Testes – The structure that produces sperm in males.
- Testosterone – The male sex hormone produced by the testes.
- Umbilical cord – The structure containing blood vessels that links the placenta to the foetus.
- Urethra – The tube through which the sperm leaves the penis.
- Uterus – The female organ in which the foetus will develop if pregnancy occurs.

- Vagina – The part of the female reproductive system into which sperm is deposited during sexual intercourse.
- Vasectomy – (Male sterilisation) A contraceptive method in which the sperm tubes are cut.
- Zygote – The first cell of the new individual following fertilisation.

## 2.4

- Allele – One of two possible versions of a particular gene.
- Amniocentesis – A process in which foetal cells are obtained from the amniotic fluid and then examined for the presence of genetic abnormalities.
- Base triplet – A sequence of three bases in DNA that codes for a particular amino acid.
- Chromosomes – Genetic structures usually occurring in functional pairs in the nucleus of cells. (except gametes and bacteria)
- Cloning – A laboratory process which uses a single cell to grow a group of genetically identical cells or organisms
- Cystic fibrosis – A genetic condition caused by having two recessive alleles of a particular gene.
- Diploid – The normal number of chromosomes in the cells of an organism.
- DNA – The molecule that forms genes and chromosomes.
- Dominant – An allele that will override a recessive one.
- Double helix – The three dimensional structure of DNA.
- Down's Syndrome – A genetic condition in humans caused by having an extra chromosome. (47 chromosomes)
- Downstreaming – The process of extraction, purification and packaging of a hormone or protein produced by genetic engineering.
- Gene – Short section of DNA on a chromosome that codes for a characteristic.
- Genetic condition – A condition caused by a problem in the genes or chromosomes.
- Genetic engineering – The deliberate modification of the genome (DNA) in an organism.
- Genetic Screening – A process used to test people for the presence of a harmful allele or chromosomal abnormalities.
- Genome – The entire genetic material of an organism.
- Genotype – The genetic makeup of an organism for a characteristic or characteristics. (usually represented by letters)
- Haemophilia – A sex-linked condition where the blood does not clot properly.
- Haploid – A cell or nucleus with half the normal number of chromosomes.
- Heterozygous – Where the two alleles for characteristics are different - one is dominant and the other is recessive.
- Homozygous – Where the two alleles for a particular gene are the same.
- Huntington's disease – A genetic condition caused by the presence of a particular dominant allele of a gene.

- Independent assortment – The process where the chromosomes are resorted randomly during meiosis to produce gametes.
- Meiosis – A type of cell division that produces cells (gametes) that are haploid.
- Menstrual Cycle – The monthly cycle in females of reproductive age that prepares the body for pregnancy.
- Mitosis – A type of cell division that produces cells genetically identical to the parent cell and to each other.
- Mutation – A random change in the number of chromosomes or type of gene.
- Pedigree diagram – A diagram that shows how a particular condition is inherited through the different generations in a family.
- Phenotype – The outward appearance of an individual.
- Plasmid – A small circular ring of DNA in a bacterium.
- Punnett square – A grid used to work out the possible offspring in a genetic cross.
- Recessive – An allele that will only show a characteristic if both alleles are recessive.
- Restriction enzymes – Enzymes used in genetic engineering that cut DNA at particular positions
- Sex chromosome – One of the two chromosomes that determines the sex of an individual.
- Sex linkage – The way in which certain genetic conditions are more likely to affect a particular sex.
- Sticky end – The term used to describe the overlapping (and non-paired) strand that is left when DNA is cut by a restriction enzyme.

## 2.5

- Continuous variation – The type of variation shown by a gradual change in a characteristic in a population.
- Discontinuous Variation – The type of variation where all individuals in a population fall into several separate categories.
- Evolution – The change in a species over time.
- Extinction – Process that results in no living individuals of a species surviving.
- Natural selection – The process in which better adapted individuals of a species survive and pass on their genes to their offspring.
- Selective breeding – The selection and subsequent breeding of organisms chosen by man for their desirable characteristics.

## 2.6

- Active immunity – A type of immunity produced by the body producing antibodies.
- Angioplasty – A surgical procedure used to widen narrowed blood vessels.
- Antibiotic – A chemical produced by fungi that kills bacteria.
- Antibiotic resistance – A process where bacteria mutate so that an antibiotic/antibiotics does not kill them.

- Antibody – A structure produced by lymphocytes that has a complementary shape to antigens on a particular microorganism and that can attach to the antigens.
- Antigen – A distinctive marker on a microorganism that leads to the body producing specific antibodies.
- Aseptic technique – The procedures used to prevent contamination when culturing microorganisms in the laboratory.
- Benign tumour – A tumour that is surrounded by a capsule and does not spread around the body.
- Booster vaccination – A second/additional vaccination that is given in a vaccination programme to combat a particular disease.
- Bronchitis – The narrowing of the airways in the lungs, usually caused by chemicals in cigarette smoke.
- Cancer – Uncontrolled cell division.
- Communicable disease – A disease that can be passed from one organism/ person to another.
- Emphysema – Damage to the gas exchange surfaces in the lungs, usually caused by cigarette smoke.
- Heart disease – A disease that prevents the heart functioning normally.
- Immunity – The ability of an organism to resist a particular infection.
- Lymphocyte – A type of white blood cell that produces antibodies.
- Malignant tumour – A tumour that is not surrounded by a capsule and is capable of spreading around the body.
- Memory lymphocyte – A special type of lymphocyte that remains in the body for a long time and knows how to produce particular antibodies. Can produce these antibodies quickly if required.
- MRSA – A type of bacterium that is resistant to most antibiotics.
- Nicotine – The addictive substance in tobacco smoke, which also affects heart rate.
- Obesity – Being extremely overweight.
- Passive immunity – A type of immunity produced by injecting antibodies.
- Penicillin – The first antibiotic that was developed.
- Phagocyte – A type of white blood cell that destroys microorganisms by engulfing and digesting them. (Phagocytosis)
- Primary response – The response of the immune system to the first exposure of the body to a particular type of microorganism.
- Secondary response – The rapid immune response that occurs when the body is exposed to a second infection by a particular microorganism.
- Stent – A small mesh-like structure that is inserted into a blood vessel to keep the lumen open.
- Stroke – A type of cardiovascular disease that affects the brain.
- Superbug – A type of bacterium that is resistant to a number of antibiotics.

- Vaccination – The injection of dead or modified pathogens (disease-causing microorganisms) that produces raised antibody levels in the blood and causes production of memory lymphocytes .
- White blood cells – Blood cells that help defend against disease.

### **General**

- Concentration gradient – The difference in concentration of a molecule or ion present in one area compared to another area.
- Diffusion – The movement of molecules or ions from an area where they are in high concentration to an area where they are in lower concentration.
- Reliable results – Results which, when repeated, are consistent.
- Side effect – An unwanted or unplanned effect of a drug on a person.
- Surface area – A measure of the external boundary of an object, a cell or an organism that is exposed to the environment.