

ESSENTIAL LEAVING CERT BIOLOGY DEFINITIONS



Written by
Dr. Declan Cathcart



Abiotic factors

The influence of non-living parts of the environment on an organism.

Active immunity

The body's ability to fight off infection and disease by producing its own antibodies.

Active site

The part of an enzyme that binds to the substrate and catalyses the reaction to form the product.

Active transport

The movement of substances into a cell against the concentration gradient, requiring energy (ATP).

Adaptation

A structural or behavioural characteristic of an organism that allows it to better survive and reproduce.

Aerobe

An organism that requires oxygen for respiration.

Aerobic respiration

The controlled release of energy from food using oxygen.

Alleles

Alternative forms of the same gene.

'All-or-nothing' law

A nerve impulse is only generated if the stimulus is at or above the threshold.

Amnion

a membrane or sac that surrounds the embryo, holding fluid to protect it.

Anabolic

Metabolic process in which smaller molecules are combined to form large molecule, requiring energy.

Anaerobe

An organism that does not require oxygen for respiration.

Anaerobic respiration

The controlled release of energy from food without the use of oxygen.

Antagonistic pair of muscles

Two muscles that have opposite effects to each other; as one muscle contracts, the other one relaxes.

Antibiotic

A chemical produced by bacteria and fungi that kills or inhibits the growth of bacteria.

Antibiotic resistance

A bacteria's ability to survive the action of an antibiotic.

Antibody

A specific protein produced by lymphocytes in response to the presence of an antigen.

Antigen

A (non-self) substance that stimulates the production of antibodies by lymphocytes.

Aquatic factors

Environmental influences on organisms relating to aquatic habitats.

Artificial active immunity

Immunity acquired when a person is given a dose of an inactivated pathogen or antigen (vaccination).

Artificial passive immunity

Immunity that occurs when a person is injected with antibodies made by another organism.

Aseptic technique

Any measures taken to exclude pathogenic microorganisms from an area, as far as is possible.

Asexual reproduction

Reproduction that involves only one parent and does not involve the production or fusion of gametes.

Autotroph

An organism that makes its own food from inorganic materials using energy from light (photosynthetic autotrophs) or from chemical reactions (chemosynthetic autotrophs).

Balanced diet

A healthy eating habit, whereby all the essential nutrients are included in the correct proportions.

Batch culture

the process of growing bacteria in a bioreactor by starting with a fixed amount of nutrients and emptying the contents of the vessel at the end to harvest the product.

Biology

The study of living things.

Biomolecules

Chemicals made by organisms.

Bioprocessing

The use of living cells, their components or enzymes to make useful product or destroy harmful waste.

Bioreactor

A vessel in which microorganisms or enzymes are used to make useful products.

Biosphere

The part of the Earth inhabited by living organisms.

Biotechnology

The use of organisms (or other biological systems) to provide useful products or processes.

Biotic factors

The influences of other living things on an organism in its habitat.

Blastocyst

A hollow, fluid-filled ball of cells formed from a morula.

Cancer

A group of disorders in which our cells lose the ability to control the rate and frequency of mitosis or cell division.

Carcinogen

Any factor that results in a DNA mutation that causes cancer.

Carnivore

Animal that feeds only on animals.

Catabolic

A metabolic reaction in which a large complex molecule is broken down into smaller molecules, which requires energy.

Centromere

The location on a chromosome where the two sister chromatids are attached.

Chemosynthetic

Organisms (bacteria) that use the energy from chemical reactions to make food.

Chemotropism

A plant growth response to chemicals.

Chromatid

One of two identical copies of DNA making up a replicated chromosome joined together at a centromere.

Chromatin

The fibrous loose mixture of DNA and protein that chromosomes loosen to form.

Chromosomes

Tightly coiled structures found in the nucleus, composed of DNA and protein, consisting of genes (coding regions) and non-coding regions.

Climatic factors

The influences of weather conditions on living organisms in the ecosystem.

Clone

Genetically identical offspring of an organism.

Codon

A codon is a sequence of three DNA or RNA nucleotides in a gene that correspond to a specific amino acid (or a stop signal) during protein synthesis.

Commensalism

A close relationship between two organisms of different species living together in which one benefits, while the other is unaffected.

Community

All the populations of different species living in the same habitat or area.

Competition

The struggle between organisms for limited resources. Competition can take place within the same species (intra-specific) or between different species (inter-specific).

Conservation

The wise management of our environment to ensure the survival of organisms and their habitat.

Consumer

An organism that cannot make its own food, but instead must obtain it by eating other organisms.

Contest competition

The struggle for limited resources where there is direct conflict between two individuals and only one is successful in gaining the resource – 'the winner takes all'.

Continuity of life

All living things arise from other living things.

Continuous culture

The process of growing bacteria in a bioreactor by maintaining the log phase of growth by the ongoing addition of fresh nutrients and removal of waste and cells.

Contraception

Methods used to prevent fertilisation or implantation.

Control experiment

An experiment carried out as a comparison to the test experiment. The control is identical to the test experiment, but without the variable that is being tested.

Cross-pollination

The transfer of pollen from the anther of a flower to a stigma of another flower on a different plant of the same species.

Data

The measurements, observations and other information gathered during a scientific investigation.

Denatured enzyme

A biological catalyst that can no longer function due to it losing its shape.

Diffusion

The passive movement of substances from an area of high concentration to an area of low concentration.

Digestion

The physical and chemical breakdown of food into smaller soluble particles that can be absorbed by the body.

Dihybrid cross

A genetic cross that studies the inheritance of two different traits together.

Diploid

A term that describes a cell or nucleus that has two copies of each chromosome present in its nucleus.

DNA profiling

The process of making a unique pattern of bands (like a barcode) from the DNA of a person, which can be distinguished from the pattern of another person's DNA.

DNA triplet

A sequence of bases that codes for one amino acid.

Dominant allele

An allele that is expressed in either the heterozygous or homozygous condition.

Dormancy

A resting period when a seed does not germinate despite environmental conditions being suitable for growth.

Ecological niche

The functional role of an organism in the community.

Ecology

The study of how organisms interact with each other and with their environment.

Ecosystem

The organisms in a habitat, their environment, and the interactions between them.

Ectotherm

An animal whose body temperature varies with the external environmental temperature.

Edaphic factors

Soil-related features that influence the growth of plants or animals.

Ejaculation

The release of semen from the penis.

Endocrine glands

Ductless glands that secrete hormones directly into the bloodstream.

Endotherm

An animal that maintains its body temperature independent of the environment temperature.

Enzyme

A biological catalyst (usually made of protein).

Evolution

The change in the genetic characteristics in a population over a long period of time, in response to environmental conditions. It occurs by means of natural selection.

Excretion

The removal of waste products of metabolism from the body of an organism.

Exocrine glands

Glands that release substances through ducts.

Fertile period

The time during the menstrual cycle in which an egg is most likely to be fertilised.

Fertilisation

The fusion of male and female gamete nuclei to form a diploid zygote.

Food chain

A series of organisms in which one organism is eaten by the next, and energy is transferred.

Food web

Two or more interconnecting food chains.

Gene

A sequence of nucleotides in the DNA that codes for a protein, i.e. it encodes a specific characteristic.

Gene cloning

The production of many copies of a specific gene that occurs when the DNA in a genetically modified organism is replicated for cell division.

Gene expression

the process of decoding a gene into a protein.

General defence system

The part of the immune system consisting of the first lines of defence against the entry of pathogens.

Genetic engineering

The artificial manipulation or alteration of the genes of an organism.

Genetically modified organism (GMO)

An organism with artificially altered DNA.

Genetics

The study of inheritance of genes and their effect.

Genetic screening

The testing of an organism's DNA to show the presence or absence of a gene.

Genome

An organism's complete set of DNA, including its genes.

Genotype

The genetic make-up of an organism.

Geotropism

A plant growth response to gravity.

Germ layers

Layers of cells in the blastocyst which give rise to all the tissues and organs.

Germination

The re-growth of a plant embryo, after a period of dormancy.

Gestation

The length of time from first day of the woman's last period to the birth. 40 weeks in humans.

Glycolysis

the first stage of respiration that converts glucose into pyruvic acid and occurs in the cytosol.

Gonad

An animal organ that produces sex cells.

Growth regulator

A chemical that controls the growth of a plant.

Habitat

The place where an organism lives.

Haploid

A cell or nucleus that has one copy of each chromosome.

Herbivore

Animal that feeds only on plants.

Heredity

The passing on of genetic characteristics (traits) from one generation to the next.

Heterotroph

An organism that cannot make its own food, but instead must obtain it by eating other organisms (or their products).

Heterozygous

The alleles in a pair are different.

Homeostasis

The maintenance of a constant internal environment in an organism.

Homologous (chromosomes)

Pairs of chromosomes that have genes at the same loci and that code for the same characteristics.

Homologous (anatomy)

Structures that display a similar basic pattern but have a different function.

Homozygous

The alleles in a pair are the same.

Hormone

A chemical messenger produced by an endocrine gland and carried in the blood to another part of the body, where it causes a specific effect.

Hydrotropism

A plant growth response to water.

Hypha

A thread-like filament that multicellular fungi are made of.

Hypothesis

A possible explanation for an observation that can be tested.

Immobilised enzyme

An enzyme that is trapped in a soft permeable gel or attached to an inert support.

Immunisation

Either the injection of antibodies to produce passive immunity or receiving a vaccine to produce active immunity.

Immunity

The ability of organisms to defend themselves against pathogens and disease.

Implantation

The embedding or attaching of the fertilised egg into the lining of the uterus (endometrium).

Incomplete dominance

The heterozygous genotype produces a phenotype that is intermediate between those produced by the homozygous genotype.

Induced immunity

The ability of an organism to defend itself against a pathogen either by the production of antibodies, or by receiving antibodies from an outside source.

Infection

The harmful colonisation of an organism by another species.

Infertility

The inability to either produce gametes or conceive.

Inherited

Characteristics passed on from parents to offspring using genes.

Insemination

The release of semen into the vagina, either naturally or artificially.

Interspecific competition

The struggle for limited resources between organisms belonging to different species.

Intraspecific competition

The struggle for limited resources between organisms belonging to the same species.

In vitro fertilisation

The fertilisation of eggs with sperm that takes place outside the body.

Lactation

The production of milk by female breasts.

Law of Segregation (Mendel's 1st Law)

Each characteristic is controlled by a pair of factors that separate during gamete formation so that each gamete receives only one of each pair.

Law of Independent Assortment (Mendel's 2nd Law)

During gamete formation, either one of a pair of factors (alleles) is equally likely to combine with either one of another pair of (factors) alleles.

Lenticels

Special pores in woody plants stems used for gaseous exchange.

Ligament

Strong, slightly elastic fibres that connect bone to bone, to prevent dislocation.

Linked genes

Genes for different traits that are located on the same chromosome and are therefore likely to be inherited together.

Locus

The position of a gene on a chromosome.

Meiosis

The division of a diploid nucleus into four genetically different haploid daughter nuclei.

Menopause

The time in a woman's life during which she gradually stops menstruating and therefore cannot reproduce anymore (usually between the ages of 45 to 55).

Menstrual cycle

A monthly series of changes that occurs in the female reproductive system during which an egg is released, and the endometrium is shed if fertilisation does not take place.

Menstruation

The shedding of the blood-filled lining (the endometrium) of the uterus.

Meristem

A region of cells in a plant that are actively dividing by mitosis.

Metabolism

The sum of all the chemical reactions that occur in the cells of an organism.

Mitosis

A form of nuclear division in which one nucleus divides into two nuclei that are genetically identical to one another and to the original nucleus.

Monohybrid cross

A genetic cross that studies the inheritance of one trait.

Morula

A solid ball of cells formed from a zygote by mitosis.

Mutagen

An agent that causes changes in the DNA of an organism (mutations)

Mutation

A change in the sequence or structure of a DNA molecule.

Mutualism

A close relationship between two organisms of different species that live together, in which they both benefit.

Native enzyme

An enzyme that functions normally.

Natural active immunity

The ability to protect against and fight infections and toxins that is acquired due to normal infection.

Natural passive immunity

The ability to protect against and fight infections and toxins that occurs when a baby receives antibodies from its mother.

Natural selection

the process by which members of a species with certain traits that allow them to survive in their environment, reproduce and pass on these traits to their offspring.

Neuron (or neurone)

A nerve cell.

Neurotransmitter

A chemical released by neurons at synapses, which transmits signals across the synaptic cleft from the neuron to a target cell.

Nitrogen fixation

The conversion of atmospheric nitrogen into nitrogen compounds such as ammonia (NH₃) and nitrate (NO₃).

Nutrient recycling

The movement of essential elements from the abiotic environment into living organisms and back again.

Nutrition

The process by which organisms get or produce food.

Obligate anaerobe

An organism that can only respire in environments without oxygen.

Omnivore

An animal that feeds on plants and animals.

Organisation

Living things are made of cells, tissues, organs, and organ systems.

Osmoregulation

The activities of organisms to maintain the optimum internal levels of water and dissolved substances.

Osmosis

The movement of water from an area of high water concentration to an area of low water concentration, across a selectively permeable membrane.

Ovulation

The release of a Graafian follicle of an egg from the ovary.

Parasitism

A close relationship between two organisms of different species in which one benefits (the parasite), while the other (the host) is harmed.

Passive immunity

The ability to protect against and fight infections and toxins that occurs when someone is given antibodies made by another organism.

Pathogen

A disease-causing organism.

Percentage cover

An estimate of the area of ground in a quadrat covered by any species.

Percentage frequency

The chance of finding a particular species (usually a plant) in one quadrat throw.

Phenotype

The physical make-up of an organism.

Photophosphorylation

The addition of a phosphate to ADP to form ATP using light energy.

Photosynthetic

Organisms that use the energy from light to make food.

Phototropism

A plant growth response to light.

Pollination

The transfer of pollen from the anther to a stigma of a flower of the same species.

Pollutant

Anything added to the environment that causes harm.

Pollution

The addition of anything harmful to the environment.

Population

All the organisms of the same species in the same habitat or area.

Portal system

Blood vessels that begin and end in a bed of capillaries.

Predation

The catching and killing of an animal for food.

Predator

An animal that hunts and kills another animal (the prey) for food.

Prey

An animal that is eaten by a predator.

Primary sexual characteristics

The sex organs and associated glands.

Producer

An organism that makes its own food from inorganic material.

Prokaryote

An organism that has no nucleus or other membrane-bound organelles.

Puberty

The time in a young person's life when secondary sexual characteristics develop under the control of sex hormones.

Punnett square

A mathematical device that shows all the possible genotypes in a genetic cross.

Pyramid of numbers

A chart showing the number of organisms at each trophic level in a food chain.

Qualitative study

A habitat survey that records only the presence or absence of a species.

Quantitative study

A habitat survey that records the numbers of individuals of each species present.

Receptor

A cell that can detect a stimulus.

Recessive allele

An allele that is only expressed in the homozygous condition.

Recombinant DNA

DNA that is altered using the techniques of DNA technology.

Reflex action

A very fast, automatic and involuntary response to a nerve stimulus.

Refractory period

The slight delay that occurs after a neuron has carried an impulse, during which time the neuron does not respond to a stimulus.

Reproduction

The ability of an organism to produce new individuals of its own kind.

Respiration

The controlled release of energy from food.

Response

A change in a cell or organism because it receives a stimulus.

Root pressure

The force that can push water up a stem from the root.

Saprophyte

An organism that feeds on dead organic matter.

Scientific law or principle

A statement that is based on repeated experiments that describes an observation.

Scientific method

A series of steps used in an investigation that strives to answer questions and explain the world around us.

Scientific theory

A well-established explanation that has been repeatedly tested and confirmed in many ways and usually over long periods of time.

Scramble competition

The struggle for limited resources, whereby each organism gets some of the resource.

Secondary sexual characteristics

Physical features that distinguish males from females but are not essential for reproduction.

Seed dispersal

The transfer of a seed away from the parent plant.

Self-pollination

The transfer of pollen from an anther of a flower on a plant to a stigma of a flower on the same plant.

Semen

The mixture of sperm cells and seminal fluid.

Sex-linked characteristic

A characteristic that is controlled by a gene carried on a sex chromosome.

Specific defence system

A part of the immune system that protects against particular pathogens. It involves white blood cells either producing specific antibodies or directly destroying infected or abnormal cells.

Sterile

The absence of any (micro)organisms.

Stimulus

A change in the environment of a cell or organism that, if strong enough, results in a response.

Symbiosis (symbiotic)

A close relationship between two organisms of different species living together, in which at least one organism benefits.

Synapse

A specialised junction at which two neurons come close enough so that one can pass a signal to the next.

Synaptic cleft

The tiny gap between two neurons.

Synovial joint

A freely moving joint consisting of synovial membrane, fluid and cartilage.

Tendon

Strong, flexible, inelastic fibres that connect muscle to bone.

Theory

A well-established scientific explanation that has been repeatedly tested and confirmed in many different ways and usually over long periods of time.

Thigmotropism

A plant growth response to touch.

Threshold

The minimum intensity of stimulus needed to generate an impulse in a neuron.

Transcription

The copying of information in the nucleus from a DNA molecule to an RNA molecule.

Translation

The manufacture of a polypeptide based on the sequence of nucleotides in an mRNA molecule.

Transpiration

The loss of water vapour from the surface of a plant.

Trophic level

The position of an organism in the food chain.

Tropism

A growth response of a plant to an external stimulus.

Turgor

the outward pressure of the cytoplasm and water-filled vacuole that presses the cell membrane against the cell wall.

Vaccine

A dose of inactivated antigen (or mRNA encoding it), that triggers the production of antibodies, providing artificial active immunity against a disease.

Variation

The difference between individuals within a population or species caused by genes and the environment.

Vegetative propagation

The asexual reproduction of plants, without the fusion of gametes.

Virus

A small, non-cellular, infectious particle that only replicates inside the living cells of other organisms.

Zygospor

a (fungal) zygote with a resistant coating that can survive adverse conditions.

Zygote

a diploid cell produced by the fusion of two gametes.



www.thetuitioncentre.ie