Glossary

absorption the movement of digested food molecules through the wall of the intestine into the blood or lymph

accommodation the change of shape of the lens, in order to focus on objects at different distances

active site the part of an enzyme molecule into which its substrate fits

active transport the movement of ions in or out of a cell through the cell membrane, from a region of their lower concentration to a region of their higher concentration against a concentration gradient, using energy released during respiration

adrenaline a hormone secreted by the adrenal glands, which prepares the body for 'flight or fight'

aerobic respiration the release of a relatively large amount of energy in cells by the breakdown of food substances in the presence of oxygen

allele any of two or more alternative forms of a gene

alveolus (plural: alveoli) an air sac in the lungs, where gas exchange occurs

amino acids molecules that can link together in long chains to form proteins; they contain carbon, hydrogen, oxygen and nitrogen, and sometimes sulfur

amniotic fluid fluid secreted by the amnion, which supports and protects a developing fetus

amylase an enzyme which breaks down starch to maltose

anaemia an illness caused by a lack of haemoglobin

anaerobic respiration the release of a relatively small amount of energy by the breakdown of food substances in the absence of oxygen

antagonistic muscles muscles that work as a pair – for example, one may cause extension and the other flexing of a joint

anther the part of a stamen in which pollen is produced

antibiotic a drug that kills bacteria in the human body, without damaging human cells

antibodies chemicals secreted by lymphocytes, which attach to antigens and help to destroy them

antigens chemicals on the surfaces of pathogens, which are recognised as foreign by the body

artificial selection the choice by a farmer or grower of only the 'best' parents to breed, generation after generation

asexual reproduction the process resulting in the production of genetically identical offspring from one parent

assimilation the movement of digested food molecules into the cells of the body where they are used, becoming part of the cells

auxin a plant hormone which causes cells to elongate

axon a nerve fibre that conducts impulses away from the cell body

balanced diet a diet containing some of each of the different types of nutrients, in a suitable quantity and proportions

bile a liquid made in the liver, stored in the gall bladder and emptied into the small intestine, where it helps to emulsify fats

bile salts substances in bile that help to emulsify fats

biodegradable able to be broken down (digested) by microorganisms

breathing muscular movements which cause air to move into and out of the lungs

bronchioles the small tubes into which the bronchi branch

bronchus (plural: bronchi) one of the two tubes into which the trachea branches, carrying air into each lung

cancer a disease in which cells divide uncontrollably, producing lumps (tumours)

carbohydrase an enzyme that catalyses the breakdown of carbohydrates

carbohydrates starches and sugars

carcinogen a substance which increases the risk of a person's body developing cancer

cardiac muscle the muscle of which the heart is made

carnivore an animal that gets its energy by eating other animals

carpel the female part of a flower

catalase an enzyme found in almost all living tissues, which catalyses the breakdown of hydrogen peroxide to water and oxygen

catalyst a substance that speeds up a chemical reaction and is not changed by the reaction

cell sap a solution of sugars and other substances inside the vacuole of a plant cell

cell surface membrane a very thin layer of fat and protein that surrounds every living cell

cellulose a polysaccharide carbohydrate which forms fibres and is found in the cell walls of plant cells

central nervous system the brain and spinal cord

chemical digestion the breakdown of large molecules of food into smaller ones, done by enzymes

chlorophyll a green, light-absorbing pigment found inside chloroplasts in plant cells

chloroplast an organelle found in some plant cells, which contains chlorophyll and where photosynthesis takes place

chromosome a thread of DNA, made up of a string of genes

cilia tiny extensions on the surface of a cell, which can wave in unison and cause fluids to move

ciliary muscle a ring of muscle around the lens, which can change its shape

cirrhosis a disease of the liver in which the cells are permanently damaged

clone a group of genetically identical organisms

codominance a situation in which both alleles in a heterozygote have an effect on the phenotype

colon the first part of the large intestine, in which water and ions are absorbed

community all the organisms, of all the different species, living in an area at the same time

competition an interaction between organisms that occurs when both need the same resource which is in short supply

consumer an organism that gets its energy by feeding on other organisms

continuous variation differences in the features of a group of organisms in which there are no definite categories; each individual's features can lie anywhere between two extremes

corpus luteum the structure that forms in an ovary after an egg has been released; it secretes progesterone

cortex in a kidney, the outer layer; in a plant stem or root, a tissue made of typical plant cells (usually, however, without chloroplasts)

cotyledons food storage structures in a seed, which sometimes come above ground during germination and begin to photosynthesise

cross-pollination the transfer of pollen from the anther of one plant to the stigma of another plant of the same species

cuticle a layer of wax on a leaf

deamination a metabolic reaction that takes place in the liver, in which the nitrogen-containing part of amino acids is removed to form urea, followed by the release of energy from the remainder of the amino acid

decomposer an organism that gest its energy from dead or waste organic matter

denatured an enzyme is said to be denatured when its molecule has changed shape so much that the substrate can no longer fit into it

denitrifying bacteria bacteria that obtain their energy by converting nitrate ions into nitrogen gas

deoxygenated blood blood containing only a little oxygen

depressant a drug that inhibits the nervous system and slows it down

development an increase in complexity

dialysis exchange of substances between two solutions through a partially permeable membrane; dialysis machines are used in the treatment of people with kidney failure

diastole the stage of a heart beat in which the muscles in the heart relax

diffusion the net movement of molecules from a region of their higher concentration to a region of their lower concentration down a concentration gradient, as a result of their random movement

digestion the break-down of large, insoluble food molecules into small, water-soluble molecules using mechanical and chemical processes

diploid nucleus a nucleus containing two sets of chromosomes (e.g. in body cells)

disaccharide a complex sugar; a carbohydrate whose molecules are made of two sugar units

discontinuous variation differences in the features of a group of organisms where each fits into one of a few clearly defined categories

DNA the chemical from which genes and chromosomes are made

dominant an allele that is expressed if it is present (e.g. T or G)

dormant a condition in which an organism shuts its metabolism down, so that it can survive in adverse conditions

double circulatory system a system in which blood passes twice through the heart on one complete circuit of the body

drug a substance taken into the body that modifies or affects chemical reactions in the body

dry mass the mass of an organism after all water has been removed

ductless glands glands of the endocrine system, which secrete hormones directly into the blood

ecosystem a unit containing all of the organisms and their environment, interacting together, in a given area e.g. decomposing log or a lake

ectothermic poikilothermic; unable to regulate body temperature physiologically; the organism's temperature varies with that of its environment

effector a part of the body that responds to a stimulus, e.g. a muscle or a gland

egestion the passing out of food that has not been digested, as faeces, through the anus

egg a female gamete

embryo a young organism before birth, and before all the body organs have formed

emphysema a disease in which the walls of the alveoli in the lungs break down, reducing the surface area for gas exchange

emulsification breaking large globules of fat into tiny droplets, so that they mix easily with water

endocrine system the endocrine glands, which secrete hormones

endothermic homeothermic; able to regulate body temperature; the body temperature is independent of the temperature of the environment

environment all the living (biotic) and non-living (abiotic) factors an organism encounters during its life

enzymes proteins that function as biological catalysts

epidermis (mammal) the outer layer of the skin

epidermis (plant) a tissue made up of a single layer of cells which covers the top and bottom of a leaf, and the outside of the stem and root

epithelium a layer of cells covering a surface in an animal, e.g. the cells lining the trachea

euphoria a condition in which a person forgets all their worries and feels completely happy

excretion removal from organisms of toxic materials, the waste products of metabolism (chemical reactions in cells including respiration) and substances in excess of requirements

extensor muscle a muscle that causes a limb to straighten when it contracts

F1 generation the offspring from a parent homozygous for a dominant allele and a parent homozygous for the recessive allele

fermentation the breakdown of glucose by yeast, using anaerobic respiration; it produces carbon dioxide and alcohol

fertilisation the fusion of the nuclei of two gametes

fetus a young organism before birth, once all the body organs have formed

filament the stalk of a stamen

flaccid a term used to describe a cell that has lost a lot of water, becoming soft

flexor muscle a muscle that causes a limb to bend when it contracts

follicle a space inside an ovary in which an egg develops

food chain a chart showing the flow of energy (food) from one organism to the next beginning with a producer (e.g. mahogany tree → caterpillar → song bird → hawk)

food web a network of interconnected food chains showing the energy flow through part of an ecosystem

fossil fuel a substance that can be combusted to release energy, formed millions of years ago from the partially decomposed and compressed bodies of organisms

fruit an ovary of a plant after fertilisation; it contains seeds

FSH follicle stimulating hormone; a hormone secreted by the pituitary gland which causes the development of eggs in the ovaries

fully permeable able to let most substances pass through

gametes sex cells, e.g. eggs and sperm

gas exchange the entry of oxygen into an organism's body, and the loss of carbon dioxide

gene a length of DNA that is the unit of heredity and codes for a specific protein. A gene may be copied and passed on to the next generation

genetic diagram the conventional way to set out a genetic cross

genetic engineering taking a gene from one species and putting it into another species

genotype the genetic makeup of an organism in terms of the alleles present (e.g. Tt or GG)

geotropism a response in which a plant grows towards or away from gravity

glomerulus a tangle of blood capillaries in a Bowman's capsule in the kidney

glucagon a hormone secreted by the pancreas, which increases blood glucose level

glycogen the polysaccharide that is used as an energy store in animal cells and fungi

goblet cells cells which secrete mucus

greenhouse effect the warming effect of carbon dioxide, methane and other greenhouse gases, on the Earth

growth a permanent increase in size and dry mass by an increase in cell number or cell size or both

guard cell one of two sausage-shaped cells in the epidermis in plants, between which there is a hole called a stoma; the guard cells can change shape to open and close the stoma

habitat the place where an organism lives

haploid nucleus a nucleus containing a single set of unpaired chromosomes (e.g. sperm and egg)

hepatic relating to the liver

herbivore an animal that gets its energy by eating plants

heterozygous having two different alleles of a gene (e.g. Tt or Gg), not pure-breeding

hilum the scar where a seed was attached to a fruit

HIV/AIDS HIV is the human immunodeficiency virus, which causes AIDS

homeostasis the maintenance of a constant internal environment

homeothermic endothermic; able to regulate body temperature; the body temperature is independent of the temperature of the environment

homologous chromosomes the two chromosomes of a pair in a diploid cell; they have genes for the same features at the same positions

homozygous having two identical alleles of a particular gene (e.g. TT or gg). Two identical homozygous individuals that breed together will be pure-breeding

hormone a chemical substance produced by a gland, carried by the blood, which alters the activity of one or more specific target organs and is then destroyed by the liver

hypha (plural: hyphae) one of the long, thin threads of which the body of a fungus is made; each hypha is just one cell thick

immune able to fight off a particular type of pathogen before it causes any symptoms in the body

implantation the movement of a young embryo into the lining of the uterus, and its attachment there

infection the entry of a pathogen to the body

infectious disease a disease caused by a pathogen, which can be passed from one person to another

ingestion taking substances (e.g. food, drink) into the body through the mouth

inheritance the transmission of genetic information from generation to generation

inorganic a term used to describe substances that are not made by living organisms

insulin a hormone secreted by the pancreas, which reduces blood glucose level

intercostal muscles muscles between the ribs, which help to produce breathing movements

iris the coloured part of the eye, which controls the amount of light allowed through to the lens and retina

islets of Langerhans groups of cells in the pancreas which secrete insulin and glucagon

lactase an enzyme that breaks down the disaccharide lactose into glucose and galactose

lactation production of milk by mammary glands

LH luteinising hormone; a hormone secreted by the pituitary gland which causes an egg to be released from an ovary

ligament a strong, stretchy cord that joins two bones together at a synovial joint

lignin a tough, waterproof material that makes up the walls of xylem vessels; wood is mostly lignin

limiting factor something present in the environment in such short supply that it restricts life processes

lipase an enzyme that digests fats (lipids) to fatty acids and glycerol

lumen the space in the centre of a tube

lymph the fluid found inside lymph vessels, formed from tissue fluid

lymph nodes organs in which large numbers of white blood cells (which can destroy bacteria or toxins) collect

lymphocytes white blood cells that secrete antibodies

maltose a disaccharide produced by the digestion of starch

mechanical digestion the breakdown of large pieces of food to smaller ones, increasing their surface area; it is done by teeth in the mouth and by the contraction of muscles in the stomach wall

meiosis reduction division in which the chromosome number is halved from diploid to haploid

menstruation the loss of the uterus lining through the vagina

mesophyll the tissues in the centre of a leaf, where photosynthesis takes place

metabolic reactions the chemical reactions that take place inside a living organism

micropyle a tiny hole in the testa of a seed

mitosis nuclear division giving rise to genetically identical cells in which the chromosome number is maintained by the exact duplication of chromosomes

monosaccharide a simple sugar; a carbohydrate whose molecules are made of one sugar unit

movement an action by an organism or part of an organism causing a change of position or place

mucus a viscous, sticky substance which is secreted in many parts of the body for lubrication or the removal of dust or bacteria

mutagen a substance that causes mutations

mutation a change in a gene or a chromosome

mycelium the mass or network of hyphae that makes up the body of a fungus

myelin a fatty substance surrounding the axons of many neurones, enabling the nerve impulse to travel faster

natural selection the greater chance of passing on of genes by the best-adapted organisms

nectary a gland producing a sugary fluid, found in many insect- or bird-pollinated flowers

negative feedback a mechanism used in homeostasis, in which a change in a parameter brings about actions that push it back towards normal

nephron one of the thousands of tiny tubules in a kidney, in which urine is produced

nerve a bundle of axons or dendrons belonging to many different neurones

neurone a nerve cell; a cell specialised for the rapid transfer of electrical impulses

niche the role of an organism in an ecosystem

nitrifying bacteria bacteria that obtain their energy by converting ammonia or nitrite ions to nitrate ions

nitrogen-fixing able to change unreactive nitrogen gas into a more reactive nitrogen compound such as nitrates or ammonia

nitrogenous waste excretory products containing nitrogen – for example, ammonia, urea, uric acid

non-biodegradable not able to be broken down by microorganisms

normal distribution a curve in which the largest number occurs near the midpoint, with approximately equal quantities on either side of this point and a gradual decrease towards the extremes

nutrition the taking in of nutrients which are organic substances and mineral ions, containing raw materials or energy for growth and tissue repair, absorbing and assimilating them

oestrogen a hormone secreted by the ovaries that helps to control the menstrual cycle

omnivore an animal that eats food of both animal and plant origin

optimum temperature the temperature at which something happens most rapidly

organ a structure made up of a group of tissues, working together to perform specific functions

organ system a group of organs with related functions, working together to perform body functions

organelle a structure within a cell

organic a term used to describe substances that have been made by living organisms, or whose molecules contain carbon, hydrogen and oxygen

organism a living thing

osmosis the diffusion of water molecules from a region of their higher concentration (dilute solution) to a region of their lower concentration (concentrated solution), through a partially permeable membrane

ovary an organ in which female gametes are made

oviduct the tube leading from an ovary to the uterus

ovulation the release of an egg from an ovary

ovule a structure in the ovary of a flower which contains a female gamete

oxygen debt the extra oxygen that must be taken in by the body following strenuous exercise, when anaerobic respiration took place; the oxygen is needed to break down the lactic acid that accumulated as a result of anaerobic respiration

oxygenated blood blood containing a lot of oxygen; in humans, blood becomes oxygenated in the lungs

palisade layer the upper mesophyll layer in a leaf, made up of rectangular cells containing many chloroplasts

pancreas an organ lying close to the stomach, which is both an endocrine gland (producing insulin and glucagon) and an exocrine gland (producing pancreatic juice)

pancreatic juice the liquid secreted into the pancreatic duct by the pancreas; it flows into the duodenum where its enzymes help with digestion of fats, proteins and carbohydrates

particulates tiny pieces of carbon and other substances found in smoke, which can irritate the lungs

pathogen a microorganism that causes disease

penicillin an antibiotic which destroys bacteria by damaging their cell walls

pepsin a protease enzyme found in the stomach

peristalsis rhythmic contractions of muscles that ripple along a tube – for example, peristalsis pushes food through the alimentary canal

petiole a leaf stalk

phagocytes white blood cells that surround, engulf and digest pathogens

phenotype the physical or other features of an organism due to both its genotype and its environment (e.g. tall plant or green seed)

phloem tubes long tubes made up of living cells with perforated end walls, which transport sucrose and other substances in plants

photosynthesis the fundamental process by which plants manufacture carbohydrates from raw materials using energy from light

phototropism a response in which a plant grows towards or away from the direction from which light is coming

pigment a coloured substance – for example, chlorophyll, haemoglobin

placenta in mammals, an organ made up of tissues of both the mother and embryo, through which the mother's and embryo's bodies exchange nutrients and waste materials

plasma the liquid part of blood, in which the cells float

plasmolysed the condition of a plant cell that has lost so much water that its cytoplasm shrinks and pulls the cell membrane away from the cell wall

platelets tiny fragments of cells found in blood, which help with clotting

pleural membranes two strong, slippery membranes which surround the lungs

plumule the young shoot in an embryo plant

poikilothermic ectothermic; unable to regulate body temperature physiologically; the organism's temperature varies with that of its environment

pollen grains tough, resistant structures containing the male gametes of a flower

pollination the transfer of pollen from the male part of the flower (anther of stamen) to the female part of the plant (stigma)

polysaccharide a carbohydrate whose molecules are made of hundreds of sugar units linked in long chains – for example, starch, glycogen and cellulose

population a group of organisms of one species, living in the same area at the same time

predator an animal that kills and eats other animals

primary consumers herbivores

producer an organism that makes its own organic nutrients, usually using energy from sunlight, through photosynthesis

progesterone the pregnancy hormone; a hormone secreted by the ovaries and placenta which maintains the lining of the uterus

prostate gland a gland close to a male's bladder, that secretes fluid in which sperm can swim

protease an enzyme that catalyses the breakdown of proteins

protein a substance whose molecules are made of long chains of amino acids; proteins contain carbon, hydrogen, oxygen and nitrogen, and sometimes sulfur

puberty the stage of development during which sexual maturity is reached

pulmonary relating to the lungs

pure-breeding homozygous

pyramid of biomass a sideways-on graph, in which the size of the boxes represents the dry mass of organisms in each trophic level of a food chain

pyramid of numbers a sideways-on graph, in which the size of the boxes represents the number of organisms in each trophic level of a food chain

radicle the young root in an embryo plant

receptor a cell that is able to detect changes in the environment; often part of a sense organ

recessive an allele that is only expressed when there is no dominant allele of the gene present (e.g. t or g)

reflex action a fast, automatic response to a stimulus

reflex arc the arrangement of neurones along which an impulse passes during a reflex action

relay neurone a neurone in the central nervous system which passes an impulse between a sensory neurone and a motor neurone

renal relating to the kidneys

renal capsule the cup-shaped structure at the start of a nephron, where filtration occurs

reproduction the processes that make more of the same kind of organism

respiration the chemical reactions that break down nutrient molecules in living cells to release energy

retina the part of the eye that contains receptor cells

rickets a disease caused by a lack of vitamin D or calcium, in which bones are not as hard as they should be and can grow in a bent shape

root cap a tough, protective covering over the tip of a root

sebaceous gland an oil-producing gland in the skin

secondary consumers carnivores that eat herbivores

secondary sexual characteristics features of the body that develop at puberty, as a result of the increased secretion of sex hormones

seed an ovule after fertilisation; it contains an embryo plant

selection pressure an environmental factor that causes organisms with certain characteristics to have a better chance of survival than others

self-pollination the transfer of pollen from the anther to the stigma on the same plant (but not necessarily the same flower)

semen a mixture of sperm and fluids from the prostate gland and seminal vesicles

seminal vesicles glands that secrete fluid in which sperm can swim

sense organs groups of receptor cells responding to specific stimuli: light, sound, touch, temperature and chemicals

sensitivity the ability to detect or sense changes in the environment (stimuli) and to make responses

sexual reproduction the process involving the fusion of haploid nuclei to form a diploid zygote and the production of genetically dissimilar offspring

sickle cell anaemia a condition caused by a codominant allele of the gene that codes for haemoglobin, in which a person has two copies of the gene and suffers serious health problems

simple sugar a monosaccharide; a carbohydrate whose molecules are made of one sugar unit

species a group of organisms with similar characteristics, which can interbreed with each other to produce fertile offspring

sperm a male gamete

sphincter muscle a muscle surrounding a tube, which can contract to close the tube

spongy layer the tissue beneath the palisade layer in a leaf; it is made up of cells that contain chloroplasts and can photosynthesise, with many air spaces between them

stamen the male parts of a flower

starch the polysaccharide that is used as an energy store in plant cells

stem tuber a swollen part of a stem, which stores food

stigma the part of a flower that receives pollen

stimulant a drug that makes the nervous system work faster

stimulus a change in an organism's surroundings that can be detected by its sense organs

stoma (plural: stomata) a gap between two guard cells, usually in the epidermis on the lower surface of a leaf

stroke damage caused to the brain by an interruption in blood supply, caused either by a blood vessel bursting or a blood vessel becoming blocked by a blood clot

style the connection between the stigma and ovary of a flower

substrate the substance on which an enzyme acts

succulent a plant with swollen stems or leaves, in which water is stored

sucrase a carbohydrase found in the small intestine, which breaks down sucrose to glucose and fructose

sucrose a disaccharide, non-reducing sugar, made of a glucose molecule and a fructose molecule linked together; the form in which carbohydrates are transported in the phloem of plants

suspensory ligaments a ring of ligaments linking the ciliary muscles to the lens

synovial joint a joint at which the two bones can move freely

systole the stage of a heart beat in which the muscles in the walls of the heart chambers contract

target organ an organ that is affected by a hormone

tendons strong, inelastic cords of tissue, which attach muscles to bones; they are also found in the heart, where they attach the atrioventricular valves to the wall of the ventricle

tertiary consumers organisms that feed at the fourth stage in a food chain; they eat carnivores

test cross breeding an offspring with the dominant phenotype with an organism with the recessive phenotype; the offspring of the cross can help to determine the genotype of the parent with the dominant phenotype

testa the tough waterproof covering of a seed

testis (plural: testes) an organ in which sperm are made

testosterone a hormone secreted by the testes, which causes male characteristics

tissue a group of cells with similar structures, working together to perform specific functions

tissue fluid the fluid that surrounds all the cells in the body, formed from blood plasma that leaks out of capillaries

trachea the tube that carries air from the nose and mouth down to the lungs

translocation the movement of sucrose and amino acids in phloem, from regions of production to regions of storage, or to regions of utilisation in respiration or growth

transpiration evaporation of water at the surfaces of the mesophyll cells followed by loss of water vapour from plant leaves, through the stomata

transpiration stream the pathway of water from the root hairs of a plant, up the root and stem and out of the leaves into the atmosphere

triceps muscle a muscle in the upper arm which causes the arm to straighten when it contracts

trophic level the position of an organism in a food chain, food web or pyramid of biomass, numbers or energy

tropism a plant growth response to a stimulus, in which the direction of growth is related to the direction of the stimulus

trypsin a protease enzyme found in pancreatic juice

turgid cell a plant cell that has absorbed water and has cytoplasm that is pressing outwards on the cell wall

umbilical cord an organ linking an embryo to the placenta, containing blood vessels

urea the main nitrogenous excretory product of mammals, produced in the liver from excess amino acids

ureter a tube that leads from a kidney to the bladder

urethra a tube that leads from the bladder to the outside

urine a solution of urea and other excretory products in water, produced by the kidneys

uterus the organ in a mammal in which the embryo develops

vaccination the introduction to the body of dead or weakened pathogens, to make a person immune to an infectious disease

vascular bundle a vein in a plant, containing xylem vessels and phloem tubes

vasoconstriction narrowing of blood vessels

vasodilation widening of blood vessels

villus (plural: villi) a tiny, finger-like process on the inner wall of the small intestine; villi increase the surface area for digestion and absorption

water potential gradient a difference in the concentration of water molecules; a dilute solution has a high water potential, and water tends to move from this, down a water potential gradient, into a concentrated solution

xerophyte a plant adapted to live in dry conditions

xylem vessels long hollow tubes made up of dead, empty cells with lignified walls, which transport water in plants and help to support them

zygote the diploid cell produced when two gametes fuse