

Appendices

Glossary

NASA Resources for Educators

Teacher Reply Card

GRADES 5–12

Section VI



Glossary

Acetylcholine—The neurotransmitter at motor neuron synapses, in autonomic ganglia and a variety of central synapses; which causes cardiac inhibition, vasodilation, gastrointestinal peristalsis, and other parasympathetic effects.

Afferent—Inflowing; conducting towards a center, denoting certain arteries and veins.

Alpha Receptors—A type of receptor for the neurotransmitter, norepinephrine.

Ampula—A saccular dilation of a canal or duct.

Aorta—Large artery that carries blood from the heart to be distributed by branch arteries throughout the body.

Aortic—Relating to the aorta on the aortic orifice of the left ventricle of the heart.

Aperture—An inlet or entrance.

Artery—A relatively thick walled, muscular, pulsating blood vessel conveying blood in a direction away from the heart.

Atrium—A chamber or cavity to which are connected several chambers or passageways. Usually used to describe a chamber of the heart that receives blood from the veins.

Autonomic—Acting independently of volition; relating to the autonomic nervous system.

Axons—Tail-like branch of a neuron that carries the action potential from the nerve cell body to a target.

Axonal—Pertaining to an axon.

Baroreceptor—Any sensor of pressure changes. For regulation of blood pressure, important baroreceptors are located in the aorta and aortic arteries.

Beta Receptors—A type of receptor for the neurotransmitter, norepinephrine.

Brainstem—The entire unpaired subdivision of the brain, composed of the thombencephalon, mesencephalon, and dicephalon as distinguished from the brain's only paired subdivision the telecephalon.

Bifurcation—A forking; a division into two branches.



Cupula—A delicate membrane within the semicircular canals that contains fluid and receptor hair cells.

Carotid Artery—Either of the two main arteries that supply blood to the head.

Catecholamine—Refers to several neurotransmitters, such as epinephrine, norepinephrine and serotonin.

Caudal—Pertaining to the tail.

Cerebellum—Prominent hindbrain structure concerned with motor coordinator, posture, and balance. Composed of a three-layered cortex and deep nuclei.

Cholinergic—Refers to synaptic transmission mediated by the release of acetylcholine.

Chordamesoderm—That part of the protoderm of a young embryo which has the potentiality of forming notochord and mesoderm.

Coagulate—To convert a fluid or a substance in solution into a solid or gel.

Coriolis Effect—Occurs when the head is in motion and constantly changing direction.

Cortex—The outer portion of an organ, such as the brain.

Corticospinal—Of or relating to the cerebral cortex and spinal cord; the corticospinal fibers are columns of motor fibers that run on either side of the spinal cord and are continuations of the pyramids of the medulla oblongata.

Cytokinesis—Changes occurring in the protoplasm of the cell outside the nucleus during cell division (mitosis).

Cytology—The study of anatomy, physiology, pathology, and chemistry of the cell.

Dendrite—One of the two types of branching protoplasmic processes of the nerve cells (the other is the axon).

Diencephalon—That part of the prosencephalon composed of the epithalamus, dorsal thalamus, subthalamus, and hypothalamus.

Distal—Far from the point of attachment of origin. Situated away from the center of the body.

Distend—To enlarge from internal pressure.

Dorsal—Pertaining to the back.



Dorsal Thalamas—The large part of the diencephalon located dorsal to the hypothalamus and excluding the subthalamus and the medial and lateral geniculate bodies.

Ectodermal Cells—The outer layer of cells in the embryo.

Efferent—Conducting (fluid or a nerve impulse) outward from a given organ or part thereof.

Electrocardiogram—Graphic record of the heart's integrated action currents obtained with the electrocardiograph.

Embryo—An organism in the early stages of development.

Embryonic—Of, pertaining to, or in the condition of an embryo.

Epi—Upon, following, or subsequent to.

Epinephrine—A catecholamine that is the chief neurohormone of the adrenal medulla.

Epithalamus—A small dorsomedial area of the thalamus corresponding to the habenula and its associated structures.

Escher, M.C. (June 17, 1898 – March 27, 1972)—Native graphic artist of The Netherlands who designed the Escher Staircase.

Exteroceptors—One of the peripheral end organs of the afferent nerves in the skin or mucous membrane, which respond to stimulation by external agents.

Extracellular—Outside the cells.

Fascicle—A band or bundle of fibers, usually of muscles or nerve fibers.

Fiber—A strand of nerve tissue, especially axons or dendrites.

Folia—Plural of folium; a broad, thin, leaflike structure.

Frontal Lobe—The portion of each cerebral hemisphere, anterior to the central sulcus.

Gametocytes—A cell capable of dividing to produce gametes.

Gametes—One of two haploid cells undergoing karyogamy.

Ganglion—An aggregation of nerve cell bodies located in the peripheral nervous system.



Glossopharyngeal—Relating to the tongue and the pharynx.

Gradients—Change of temperature, pressure or other variable as a function of distance, time, etc.

Gyric—Plural of gyrus; one of the prominent rounded elevations that form the cerebral hemispheres.

Hippocampus—The complex internally convoluted structure that forms the medial margin (hem) of the cortical mantle of the cerebral hemisphere.

Hypertension—High blood pressure.

Hypo—Prefix denoting deficient, below normal.

Hypothalamus—The ventral and medial region of the diencephalon forming the walls of the ventral half of the third ventricle.

Inertial—The tendency of a physical body to oppose any force tending to move it from a position of rest or to change its uniform motion.

Inhibition—Depression or arrest of a function.

Innervation—The supply of nerve fibers functionally connected with a part.

Karyogamy—Fusion of the nuclei of two cells, as occurs in fertilization or true conjugation.

Lateral—On the side farther from the median.

Lumen—Space in the interior of a tubular structure, such as an artery of the intestine.

Medulla—The caudal (hind) portion of the brainstem.

Medial—Relating to the middle or center.

Meiosis—A special process of cell division comprising two nuclear divisions in rapid succession that result in four gametocytes, each containing half the number of chromosomes found in somatic cells.

Meninges—One of the membranous coverings of the brain and spinal cord.

Mesencephalon—That part of the brain stem developing from the middle of the three primary cerebral vesicles of the embryo.

Metencephalon—The anterior of the two major subdivisions of the rhombencephalon.



Microtubule—Any of the minute cylindrical structures in cells distributed in the protoplasm and made up of protein subunits.

Migration—Passing from one part to another.

Mitosis—Cell division that results in nuclei having the same number of chromosomes as the parent nucleus; the usual process of cell division with non-reproductive tissues.

Mitotic—Relating to or marked by mitosis.

Mitral—Relating to the mitral or bicuspid valve of the heart.

Myelencephalon—The brain.

Myelinated—Refers to an axon that is ensheathed in the fatty, insulating substance, myelin.

Neonatal—Relating to the period immediately succeeding birth and continuing through the first 28 days of life.

Nerves—A whitish cordlike structure composed on one or more bundles of myelinated or unmyelinated nerve fibers, or more often mixtures of both, coursing outside of the central nervous system, together with connective tissue within the fascicle and around the neurolemma of individual nerve fibers.

Neural—Relating to any structure composed of nerve cells or their processes, or that on further development will evolve into nerve cells.

Neurolemma—A cell that enfolds one or more axons of the peripheral nervous system.

Neurons—Nervous system cell consisting of the nerve cell body, dendrites and axon.

Neurotransmitter—Any specific chemical agent released by a presynaptic cell, upon excitation, that crosses the synapse (gap between cells) to stimulate or inhibit the postsynaptic cell.

Neurula—Stage in embryonic development after the gastrula state, in which the prominent processes are the formation of the neural plate and the plate's closure to form the neural tube.

Neurulation—Processes involved in the formation of the neurula stage.

Norepinephrine—A neurotransmitter found in the brain and sympathetic nervous system.

Nucleus—In cytology, typically a rounded or oval mass of protoplasm within the cytoplasm of a plant or animal cell, in which the chromosomes are located.



Occipital Lobe—The posterior, somewhat pyramid-shaped, part of each cerebral hemisphere.

Olfactory—Relating to the sense of smell.

Optics—The science concerned with the properties of light, its refraction and absorption, and the refracting media of the eye in that relation.

Organs—Any part of the body exercising a specific function as of respiration, secretion, digestion.

Organogenesis—Formation of organs during development.

Otolith—Crystalline particles of calcium carbonated and a protein adhering to the gelatinous membrane of the maculae of the utricle and saccule.

Oxygenation—Addition of oxygen to any chemical or physical system.

Palpating—Examination with the hands, for example, when feeling the heart or pulse beat.

Parasympathetic—Pertaining to the division of the autonomic nervous system that organizes the body's responses that save energy and balance the body's various systems.

Parietal—Relating to the wall of any cavity.

Peripheral—Relating to or situated at the periphery (or edge) of something or extremities; the outer part or surface.

Periphery—The part of a body away from the center.

Peristalsis—The movement of the intestine or other tubular structure, caused by successive waves of involuntary muscular contractions.

Pharynx—The upper expanded portion of the digestive tube, between the esophagus below and the mouth and nasal cavities above and in front.

Pitch—An up and down movement.

Plasma—The fluid portion of the circulating blood.

Postnatal—Occurring after birth.

Postganglionic—Relating to or being an axon originating from a cell body within an autonomic ganglion.

Postsynaptic—Pertaining to the area of the distal side of a synaptic cleft.



Presynaptic Cell—Pertaining to the area on the proximal side of a synaptic cleft.

Preganglionic—Situated proximal to or preceding a ganglion, referring specifically to the preganglionic motor neurons of the autonomic nervous system (located in the spinal cord and brainstem).

Proliferation—Growth and reproduction of similar cells.

Prophase—The first stage of mitosis or meiosis, consisting of linear contraction and increase in thickness of the chromosomes.

Proprioception—The sense or perception, usually at a subconscious level, of the movements and positions of the body and especially its limbs, independent of vision.

Prosencephalon—The anterior primitive cerebral vesicle and the most rostral of the three primary brain vesicles of the embryonic neural tube.

Pulmonary—Relating to the lungs, to the pulmonary artery, or to the aperture leading from the right ventricle of the heart into the pulmonary artery.

Proximal—Nearest the trunk or the point of origin said of part of a limb, or an artery or a nerve.

Pyro—Prefix referring to fire, heat or fever.

Radius—The lateral and shorter of the two bones of the forearm.

Receptor—A structural protein molecule on the cell surface or within the cytoplasm that binds to a specific factor, such as a hormone, antigen, or neurotransmitter.

Replicate—One of several identical processes or observations; to repeat.

Rhombencephalon—That part of the developing brain that is the most caudal (towards the tail) of the three primary vesicles of the embryonic neural tube.

Roll—To cause to revolve by turning over and over on or as if on an axis.

Rostral—Towards the front or head.

Somatic—Relating to the soma or trunk, the wall of the body cavity, or the body in general.

Saccule—One of the otolith organs of the vestibular system.

Spatial—Relating to space or position in three dimensions.

Sternum—A long, flat bone, articulating with the cartilages of the first seven ribs and with the clavicle, that forms the middle part of the anterior wall of the thorax. Breast bone.



Stethoscope—An instrument originally devised by Laennec for aid in hearing the respiratory and cardiac sounds in the chest, but now modified in various ways and used to listen to vascular or other sounds anywhere in the body.

Stress—Reactions of the body to forces of a deleterious nature, infectious, and various abnormal physiologic equilibrium.

Sub—Prefix, denoting beneath, less than the normal, inferior.

Subcortical—Beneath the cerebral cortex.

Sulcus—One of the grooves or furrows on the surface of the brain, bounding the several convolutions or gyri.

Sympathetic Ganglia—Those ganglia of the autonomic nervous system that receive efferent fibers originating from preganglionic visceral motor neurons in the intermediolateral cell column of thoracic and upper lumbar spinal segments.

Sympathetic—Part of the autonomic nervous system of vertebrates that organizes and regulates the body's response to stress.

Synapse—The functional membrane-to-membrane contact of the nerve cell with a target cell (another nerve cell or other type of cell).

Synthesis—A building up, putting together, composition stage in the cell cycle; production of a molecule through chemical processes.

Tectum—Any rooflike covering or structure.

Telencephalon—The anterior division of the prosencephalon, which develops into the olfactory lobes, the cortex of the cerebral hemispheres, and the subcortical telencephalic nuclei, and the basal ganglia.

Temporal Lobe—The lowest of the major subdivisions of the cortical mantle, forming the posterior two-thirds of the ventral surface of the cerebral hemisphere.

Thalamus—The large ovoid (an oval egg-shaped form) mass of gray matter that forms the larger dorsal subdivision of the diencephalon.

Tricuspid—Having three points, prongs, or cups. As the tricuspid valve of the heart.

Ulna—The medial and larger of the two bones of the forearm.

Utricle—The larger of the two membranous sacs in the vestibles of the labyrinth, lying in the elliptical recess.



Vagal—Relating to the vagus nerve.

Vagus Nerve—The nerve responsible for slowing heart rate; part of the parasympathetic nerve system.

Vasoconstriction—Narrowing of the blood vessels.

Vasodilation—Widening of the lumen of blood vessels.

Vasomotor—Causing constriction of the blood vessels.

Vein—A blood vessel carrying blood toward the heart; all the veins except the pulmonary carry dark or oxygenated blood.

Ventricle—The thick-walled chambers of your heart that pump blood into your lungs and body.

Ventro—The belly.

Ventrolateral—Both ventral and lateral.

Vestibulo-Ocular Reflex (VOR)—A reflex that allows your eye to remain fixed on an object although your head or the object is moving.

Vestibular—Relating to the sense of balance.

Yaw—A side-to-side movement.



NASA Resources for Educators

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- Home Page: <http://spacelink.nasa.gov/CORE>

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Mail Stop 253-2

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Moffett Field, CA 94035-1000
Phone: (650) 604-3574

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Greenbelt, MD 20771-0001
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How to Access Information on NASA's Education Program, Materials, and Services, EP-1998-03-345-HQ

This brochure serves as a guide to accessing a variety of NASA materials and services for educators. Copies are available through the ERC network, or electronically via NASA Spacelink. NASA Spacelink can be accessed at the following address: <http://spacelink.nasa.gov>



The Brain in Space

A Teacher's Guide with Activities for Neuroscience

EDUCATOR REPLY CARD

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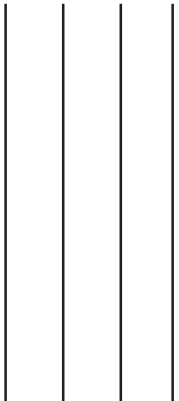
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