Oklahoma Science

Anatomy and Physiology: Grades 9-12

Organization of the Body I	A	Define and explain how anatomy and physiology are related. I.A
	B	Identify levels of structural organization that make up the human body and explain the relationship. I.B
	C	State the human body organ systems and list their functions. I.C
	D	Identify, locate, and label anatomical position, regional terms, directional terms, body cavities, planes of the body, abdominopelvic quadrants, and abdominopelvic regions. I.D
	E	Describe the functions of the human body and explain how these functions aid in the maintenance of life. I.E
	F	Explain homeostasis and its role in normal body function. I.F
Chemical Basis for Life II	A	Review how the study of living materials requires understanding of chemistry. II.A
	B	Explain the concept of pH, and its effect on body functions II.B
	C	Describe how and where enzymes work in the body II.C
	D	Explain the importance of water and salts to body homeostasis II.D
	E	Compare the structures and functions of carbohydrates, lipids, proteins, and nucleic acids II.E
	F	Compare and contrast the structure and functions of DNA and RNA II.F
Cells and Tissues III	A	Identify or diagram the cell organelles and be able to explain their function III.A
	B	Compare osmosis, diffusion, filtration and give examples III.B
	C	Describe different cell types and explain the functionality of the differences III.C
	D	Describe the cell cycle, including the phases of mitosis and explain how the timing of cell division is regulated. III.D

	E Identify the use of stem cells in modern medical procedures and research III.E
	F Name classes of human tissues and explain their structure, function, and location III.F
	G Describe ways the body repairs damaged tissue III.G
	H Identify the various forms of cancer and describe how it affects the body III.H
Integumentary System IV	**A** Identify structure and function of the skin and accessory structures IV.A
	B Describe the normal and pathological colors and conditions of the skin IV.B
	C Identify and differentiate between the different types of skin cancer IV.C
	D Describe the three classes of burns, the rule of 9s and treatment of each class IV.D
	E Understand the role of the integumentary system in maintaining homeostasis IV.E
Skeletal System V	**A** Differentiate between axial and appendicular skeleton V.A
	B Identify functions of the skeletal system V.B
	C Identify, locate, and label bones and bone markings of the body. V.C
	D Describe bone development through the lifespan V.D
	E Identify, locate, and label the joints of the body V.E
	F Identify location and function of tendons and ligaments V.F
	G Name different types of fractures V.G
	H Identify causes and current medical treatments of skeletal disorders V.H
Muscular System VI	**A** Distinguish between the three types of muscle tissue and tell where they are in the body VI.A
	B Identify major muscle groups of face, neck, shoulder, chest, abdomen, back, arms, and legs. VI.B
	C Describe the function of the muscular system VI.C
	D Compare the structure of the whole muscle and the structure of a single muscle fiber. VI.D
	E Explain how skeletal muscle meets its energy demands during rest and exercise VI.E

	F State the criteria for naming muscles VI.F
	G Describe action of each muscle group related to origin and insertion. VI.G
Nervous System VII	**A** List the general functions of the nervous system VII.A
	B Explain the structural and functional divisions of the nervous system VII.B
	C List the types of supporting cells and cite their functions VII.C
	D Identify and label parts of neurons and relate each to a physiological role VII.D
	E Classify sensory receptors according to body location, structure, and stimulus detected VII.E
	F Describe the events that led up to, happen during, and result after a nerve impulse and its conduction from one neuron to another VII.F
	G Identify and indicate the functions of the major regions of the cerebral hemispheres, diencephalons, brain stem, and cerebellum on a human brain model or diagram VII.G
	H Identify the three meningeal layers, and state their functions VII.H
	I Understand the formation and function of cerebrospinal fluid and the blood-brain barrier VII.I
	J Describe spinal cord structure and list its functions VII.J
	K List the components of the peripheral nervous system VII.K
	L Distinguish between sensory, motor, and mixed nerves VII.L
	M Name and locate the cranial nerves and describe their function VII.M
	N Identify the major nerve plexuses, give the major nerves of each, and describe their distribution VII.N
	O Distinguish between autonomic and somatic reflexes VII.O
	P Compare and contrast the general functions of the parasympathetic and sympathetic nervous systems VII.P
	Q Understand from an anatomical and physiological perspective, the functions of sight, hearing & balance, taste, and smell VII.Q
	R Identify diseases and disorders of the special sense systems VII.R
Endocrine System VIII	**A** Compare between hormonal and neural controls of body functioning VIII.A

	B List the major endocrine organs, and describe their locations in the body and the hormones they secrete VIII.B
	C Describe what a hormone is and how it functions VIII.C
	D Understand the negative feedback mechanism VIII.D
	E Describe major pathological consequences of hypersecretion and hypo-secretion of hormones VIII.E
	F Identify the endocrine role of the kidneys, the stomach and intestine, the heart, and the placenta VIII.F
	E Describe the effect of aging on the endocrine system and homeostasis VIII.E
Blood IX	**A** Describe the composition and physical characteristics of whole blood and explain why it is classified as a connective tissue IX.A
	B List the functions of blood IX.B
	C Discuss the composition and functions of plasma IX.C
	D Describe the blood-clotting process IX.D
	E Describe the ABO and Rh blood groups and explain the basis of transfusion reactions IX.E
	F Explain the importance of blood testing as a diagnostic tool IX.F
	G Name some blood disorders that become more common with age IX.G
Cardiovascular System X	**A** Describe the location of the heart in the body, and identify its major anatomical structures X.A
	B Describe the structure and functions of the heart chambers. Name each chamber and provide the name and general route of blood flow X.B
	C Trace the electrical activity of the heart (EKG) X.C
	D Compare and contrast the structure and function of arteries, veins, and capillaries X.D
	E Define vasoconstriction and vasodilation X.E
	F Trace blood flow through the heart. X.F
	H Identify the body's major arteries and veins, and name the body region supplied by each X.H

	I Discuss the unique features of special circulations of the body: arterial to the brain, hepatic portal, pulmonary, and fetal X.I
	J List and explain the factors that influence blood pressure and describe how blood pressure is regulated X.J
	K Describe the structure and function of a capillary bed X.K
	L Draw a diagram of a normal electrocardiogram tracing: name the individual waves and intervals, and indicate what each represents X.L
Lymphatic System and Immune Systems XI	**A** Identify the structures of the lymphatic system and explain how the lymphatic system is functionally related to the cardiovascular and immune systems XI.A
	B Describe the composition of lymph and explain its formation and transport XI.B
	C Describe the general location, histological structure, and functions of lymph nodes XI.C
	D Name and describe the other lymphoid organs of the body. Compare and contrast them with lymph nodes structurally and functionally XI.D
	E #VALUE! XI.E
	F Explain the difference between an antigen and an antibody. XI.F
	G Explain how fever helps protect the body against invading pathogens XI.G
	H Describe immune-deficiencies, allergies, and autoimmune diseases XI.H
Respiratory System XII	**A** Identify locate and label the structures of the respiratory system. XII.A
	B Trace the air from nostrils to alveoli XII.B
	C Describe the process of inspiration and expiration XII.C
	D Identify lung volumes and capacities XII.D
	E Discuss voluntary and involuntary control of breathing XII.E
	F Describe common lung diseases and disorders XII.F
	G Explain the functional importance of the intra-pleural space XII.G
	H Describe how oxygen and carbon dioxide are transported in the blood XII.H
	I Name several physical factors that influence respiratory rate XII.I

Digestive System and Metabolism XIII	**A** Describe the function of the digestive system XIII.A
	B List and briefly describe the major processes occurring during digestion XIII.B
	C Identify, locate and label the structures of the digestive system XIII.C
	D Differentiate between the organs of the alimentary canal and accessory organs XIII.D
	E List the major functions of the large intestine XIII.E
	F List the major enzymes produced by the digestive system and how they function XIII.F
	G List the major nutrient categories their dietary sources and the main cellular uses XIII.G
	H Explain metabolism XIII.H
	I Analyze and explain the chemical reactions that provide energy for the body XIII.I
	J Explain the importance of electrolytes balance and its role in homeostasis XIII.J
	K Identify common diseases and disorders of the digestive system. XIII.K
Urinary System XIV	**A** Describe the general structure and function of the urinary system including kidneys, ureters, bladder, and urethra XIV.A
	B Identify the parts of the nephron responsible for filtration, reabsorption, and secretion XIV.B
	C Describe the physical and chemical properties of urine XIV.C
	D Describe diseases and disorders of the urinary system. XIV.D
	E Define micturition XIV.E
Reproductive System XV	**A** Describe the common structure and function of the male and female reproductive systems XV.A
	B Define spermatogenesis and trace the pathway of sperm cells from their site of formation to the body exterior XV.B
	C Discuss effects of testosterone on male reproductive system XV.C
	D Describe the phases of the ovarian cycle and relate them to events of oogenesis XV.D
	E Describe effects of hormones on the female reproductive organs XV.E

F **Discuss disorders and diseases of the male and female reproductive systems.** XV.F

G **Describe the process of fertilization and the changes of the female body during pregnancy** XV.G

H **Explain how labor is initiated and describe the three stages of labor** XV.H

I **Discuss risk factors that interfere with normal fetal development** XV.I

J **Distinguish among the types of inheritance and explain techniques to predict genetic disease** XV.J