

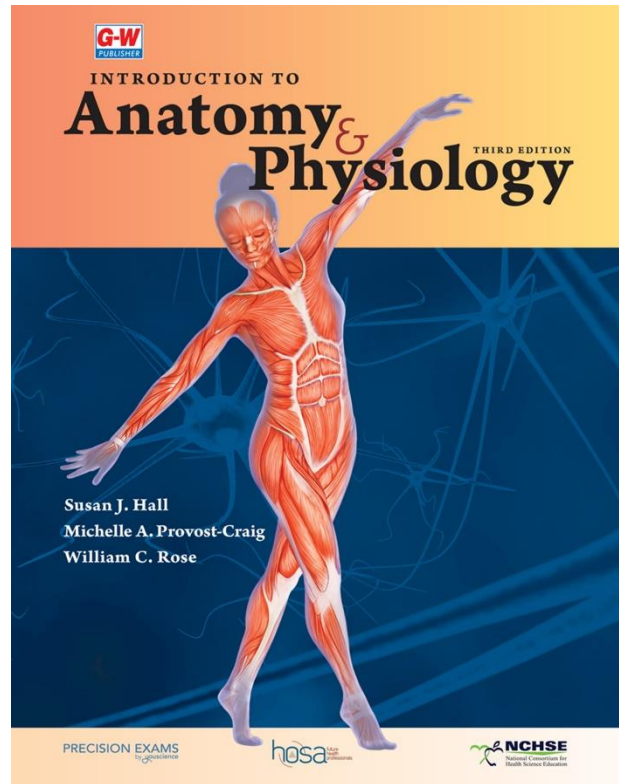


**Correlation of
Introduction to Anatomy and Physiology
(Goodheart-Willcox Publisher ©2024)**

to

**Oklahoma Department of Career and Technology Education Anatomy and Physiology
Standards (2005)**

Introduction to Anatomy and Physiology covers all body systems using a student-friendly writing style that makes complex subjects easier to understand. Written specifically for the high school market, the chapters in this textbook are divided into lessons, providing content in a manageable format for the student. To add realism, clinical case studies and real-world applications enhance student interest and involvement. An abundance of study aids, such as learning objectives, lesson summaries, and extensive assessment opportunities increase students' ability to succeed in this challenging course.



Standards / Objectives / Indicators	Textbook Pages
I. Organization of the Body	
I.A. Define and explain how anatomy and physiology are related.	4
I.B. Name and explain the relationship between levels of structural organization that make up the human body.	4-5, 8, 12-15, 48-59, 61-75, 76-87
I.C. Identify and state the major functions of the organ systems of the body.	12-15
I.D. Properly use the terms that describe relative positions, body sections, and body regions.	5-9
I.E. Describe the functions of the human body and explain how these functions aid in the maintenance of life.	4-5
I.F. Develop an understanding of homeostasis and its role in normal body function.	15-18, 19, 41, 42, 64, 93, 109, 110, 133, 168, 214, 233, 258, 296-297, 321-323, 324, 325, 330-331, 334, 338, 352, 396, 399, 432, 550, 553, 574, 587

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 2

Standards / Objectives / Indicators	Textbook Pages
I. Activities/Labs—Organization of the Body	
I.a. Observe, measure, and describe the anatomical body directions, regions, and planes.	11
I.b. Interpret a biological model	11
I.c. Analyze and formulate treatments and outcomes from real-world case studies	
II. Chemical Basis for Life	
II.A. Explain how the study of living materials requires understanding of chemistry.	15-18, 48
II.B. Describe the relationships among matter, atoms, and molecules.	12
II.C. Identify three major types of chemical reactions that occur in the body	15-18, 61-71
II.D. Differentiate between a salt, an acid, and a base	59
II.E. Describe factors that affect chemical reaction rates	52
II.F. Compare the processes of osmosis, diffusion, filtration and give examples of their uses in the body	62-64, 75, 77, 576, 580-586, 592, 636-637, 641
II.G. Explain the concept of pH, and its affect on body functions	59
II.H. Explain the importance of water and salts to body homeostasis	16, 17, 59
II.I. Distinguish between organic and inorganic compounds	48
II.J. Compare the structures and functions of carbohydrates, lipids, proteins, and nucleic acids	sweat
II.K. Distinguish between different types of proteins	51-52
II.L. Describe how and where enzymes work in the body	52
II.M. Compare and contrast the structure and functions of DNA and RNA	56-57
II. Activities/Labs—Chemical Basis for Life	
II.a. Investigations with enzymes that illustrate criteria for their proper function	
II.b. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	18
II.c. Build a model of DNA	75
II.d. Inquiry activities that investigate pH range	60, 603
III. Cells and Tissues	
III.A. Identify on a cell model or diagram the cell organelles and be able to explain their functions	62, 93
III.B. Describe the structure of the plasma membrane, and explain how the various transport processes account for the directional movements of specific substances across the plasma membrane	61-63
III.C. Describe different cell types and explain the functionality of the differences	76-86
III.D. Describe the cell cycle, including the phases of mitosis and explain how the timing of cell division is regulated.	71-74

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 3

Standards / Objectives / Indicators	Textbook Pages
III.E. Have an understanding of stem cells and how they are used in modern medical procedures and research	85, 402, 415, 416, 419, 420, 422, 423, 648
III.F. Name the four primary classes of human tissues and explain how they differ structurally and functionally	76-86
III.G. Know the anatomical location of the different tissue types	76-86
III.H. Describe ways the body repairs damaged tissue	86
III.I. Identify the various forms of cancer and describe how it affects the body	71, 73-74, 114-115, 120-121, 170, 383-384, 420-422, 512-514, 515, 563-564, 595, 647-650
III. Activities/Labs—Cells and Tissues	
III.a. Osmosis and diffusion investigations	75, 592, 641
III.b. Microscope labs with either prepared or student-made cell and tissue slides	75, 87, 95, 109, 129, 617, 651
III.c. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	37
III.d. Multimedia that enables students to visualize what occurs in the body microscopically	93, 355
IV. Integumentary System	
IV.A. Have an understanding of the functions of the skin and be able to relate them to its structure	101-108
IV.B. Recognize and identify the major skin structures when provided a diagram or model	103, 128
IV.C. Identify and know the purpose of the accessory structures of the skin	105-108
IV.D. Describe the normal and pathological colors that the skin can have and explain their causes	108
IV.E. Identify and differentiate between the three types of skin cancer	120-121
IV.F. Describe the three classes of burns and the priorities in burn treatment	111-112
IV.G. Understand the role of the Integumentary System in maintaining homeostasis	109, 110
IV. Activities/Labs—Integumentary System	
IV.a. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	110
IV.b. Multimedia that enables students to visualize what occurs physiologically	93, 355
IV.c. Microscope lab that enables the student to observe either prepared or fresh skin cells	75, 87, 95, 109, 129, 617, 651
V. Skeletal System	
V.A. Identify the subdivisions of the skeleton as axial or appendicular	142, 152
V.B. State several functions of the skeletal system	132-137
V.C. Demonstrate knowledge, with the use of models or pictures, the major bones, their surface features, and basic functions	151, 160

**Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards,
page 4**

Standards / Objectives / Indicators	Textbook Pages
V.D. Describe the developmental aspects of the skeleton from formation in the fetus throughout the lifetime of the bones	137-138
V.E. Distinguish between and give the function of the four major classes of joints	161-164
V.F. Be able to identify and understand the function of tendons and ligaments	163
V.G. Understand the causes and current medical treatments of skeletal disorders and abnormalities	165-175
V. Activities/Labs—Skeletal System	
V.a. Classification of joints according to their shape and function	164
V.b. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	165
V.c. Multimedia that enables students to visualize what occurs physiologically	93, 355
VI. Muscular System	
VI.A. Distinguish between the three types of muscles, and tell where they are located in the body	186-188
VI.B. Describe the structure of a skeletal muscle with respect to location and names of its connective tissue coverings and attachments	192-196
VI.C. Describe the microscopic structure and functional role of the skeletal muscle fiber	195-196
VI.D. Explain how muscle fibers are stimulated to contract and what occurs during a muscle twitch with regard to each component's function	195-197
VI.E. Explain how skeletal muscle fibers are innervated and how they contract	192-194
VI.F. Explain how skeletal muscle meets its energy demands during rest and exercise	196-199
VI.G. Explain oxygen debt and muscle fatigue and discuss situations that would cause them	196, 199, 200
VI.H. Describe the effects of aerobic and resistance exercise on skeletal muscles and other body organs	196-199, 228
VI.I. List and define the criteria used in naming muscles and be able to provide an example to illustrate the use of each criterion	201, 203
VI.J. Name and identify, on a diagram or model, each of the muscles. State the origin and insertion for each, and describe the action of each.	211
VI. Activities/Labs—Muscular System	
VI.a. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	212
VI.b. Labs that demonstrate muscle fatigue	200
VI.c. Labs that model the mechanical advantage of certain muscle groups	200
VI.d. Microscope lab that enables the student to observe either prepared or fresh muscle tissue	
VI.e. Multimedia that enables students to visualize the action of muscles from within the body	

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 5

Standards / Objectives / Indicators	Textbook Pages
VII. Nervous System	
VII.A. List the general functions of the nervous system	232
VII.B. Explain the structural and functional divisions of the nervous system	232-234
VII.C. List the types of supporting cells and cite their functions	235-236
VII.D. Describe the important anatomical regions of a neuron and relate each to a physiological role	234-235
VII.E. Classify sensory receptors according to body location, structure, and stimulus detected	102, 104, 233, 242, 243, 247, 248, 257-258, 306, 308, 441
VII.F. Describe the events that lead up to, happen during, and result after a nerve impulse and its conduction from one neuron to another	238-244
VII.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	245-251
VII.H. Identify the three meningeal layers, and state their functions	249-250
VII.I. Understand the formation and function of cerebrospinal fluid and the blood-brain barrier	250-251
VII.J. Describe spinal cord structure and list its functions	251
VII.K. List the components of the peripheral nervous system	253-260
VII.L. Distinguish between sensory, motor, and mixed nerves	233, 255
VII.M. Name the 12 pairs of cranial nerves and describe the body region and structures innervated by each	253-258
VII.N. Name the four major nerve plexuses, give the major nerves of each, and describe their distribution	256-257
VII.O. Distinguish between autonomic and somatic reflexes	258
VII.P. Compare and contrast the general functions of the parasympathetic and sympathetic divisions	260
VII.Q. Understand from an anatomical and physiological perspective, the functions of sight, hearing & balance, taste, and smell	280-315
VII.R. Describe the developmental aspects of the nervous system, from embryo to old age	259
VII. Activities/Labs—Nervous System	
VII.a. Modeling of the human nervous system, either made by the student or prepared	252, 261
VII.b. Observation/dissection of preserved animal central nervous systems and/or special sense organs	
VII.c. Labs demonstrating human reflex	
VII.d. Multimedia that enables students to visualize what occurs physiologically with the nervous system	
VII.e. Microscopically observing different parts of the special sense organs	
f VII.. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	262
VIII. Endocrine System	
VIII.A. Indicate important differences between hormonal and neural controls of body functioning	320-321
VIII.B. List the major endocrine organs, and describe their locations in the body and the hormones they secrete	325-337
VIII.C. Describe what a hormone is and how it functions	319-320

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 6

Standards / Objectives / Indicators	Textbook Pages
VIII.D. Understand the negative feedback mechanism and describe its role in regulating blood levels of the various hormones	16, 321-323
VIII.E. Describe major pathological consequences of hypersecretion and hyposecretion of the hormones	338-346
VIII.F. Identify the endocrine role of the kidneys, the stomach and intestine, the heart, and the placenta	325-337, 587, 636-638
VIII.E. Describe the effect of aging on the endocrine system and body homeostasis	335
VIII. Activities/Labs—Endocrine System	
VIII.a. Multimedia that enables students to visualize what occurs physiologically with the endocrine system	355
VIII.b. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	338
VIII.c. Microscopically observing different types of cells in different endocrine glands	
IX. Blood	
IX.A. Describe the composition and physical characteristics of whole blood and explain why it is classified as a connective tissue	396-406
IX.B. List the functions of blood	396
IX.C. Discuss the composition and functions of plasma	399
IX.D. Describe the blood-clotting process	403-406
IX.E. Describe the ABO and Rh blood groups and explain the basis of transfusion reactions	409-411
IX.F. Explain the importance of blood testing as a diagnostic tool	413-414, 428
IX.G. Name some blood disorders that become more common with age	419
IX. Activities/Labs—Blood	
IX.a. Examining the formed elements of blood microscopically	
IX.b. Mathematical computation activity in which the ratio of components in human blood is found	
IX.c. Hematologic Tests-Hematocrit, hemoglobin determination, coagulation time, blood typing	413-414
IX.d. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	413
IX.e. Multimedia that enables the student to visualize what is occurring physiologically	429
X. Cardiovascular System	
X.A. Describe the location of the heart in the body, and identify its major anatomical areas on a model or diagram	432
X.B. Name the coverings of the heart	434
X.C. Describe the structure and functions of the four heart chambers. Name each chamber and provide the name and general route of its associated great vessels	432-439
X.D. Identify the elements of the intrinsic conduction system of the heart, and describe the pathway of impulses through this system	443-444
X.E. Explain what information can be gained from an electrocardiogram	443-444

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 7

Standards / Objectives / Indicators	Textbook Pages
X.F. Compare and contrast the structure and function of arteries, veins, and capillaries	446-449
X.G. Define vasoconstriction and vasodilation	432
X.H. Identify the body's major arteries and veins, and name the body region supplied by each	449-456
X.I. Discuss the unique features of special circulations of the body: arterial to the brain, hepatic portal, pulmonary, and fetal	449-456
X.J. List and explain the factors that influence blood pressure and describe how blood pressure is regulated	458-459
X.K. Describe the structure and function of a capillary bed	449
X.L. Describe the fetal circulatory system	455
X. Activities/Labs—Cardiovascular System	
X.a. Draw a diagram of a normal electrocardiogram tracing: name the individual waves and intervals, and indicate what each represents. Name some abnormalities that can be detected on an ECG tracing	444, 463-464
X.b. Examining blood vessel and cardiac muscle slides microscopically	
X.c. Modeling of the human circulatory system	481
X.d. Investigations of pulse, heart sounds, and blood pressures	445, 461, 481
X.e. Observation/dissection of preserved animal heart	
X.f. Multimedia that enables the student to visualize what is occurring physiologically	
X.g. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	445, 461, 462
XI. Lymphatic System and Immune Systems	
XI.A. Name the two major types of structures composing the lymphatic system and explain how the lymphatic system is functionally related to the cardiovascular and immune systems	484-492
XI.B. Describe the composition of lymph and explain its formation and transport	484-488
XI.C. Describe the general location, histological structure, and functions of lymph nodes	490
XI.D. Name and describe the other lymphoid organs of the body. Compare and contrast them with lymph nodes structurally and functionally	490-492
XI.E. Describe the surface membrane barriers and their protective functions	496-497
XI.F. Explain the importance of phagocytosis and natural killer cells in nonspecific body defense	497-498
XI.G. Relate the events of the inflammatory process.	500
XI.H. Name several antimicrobial substances produced by the body that act in nonspecific body defense	497-500
XI.I. Explain how fever helps protect the body against invading pathogens	500
XI.J. Explain what an antigen and haptens are and name those that act as complete antigens	504
XI.K. Compare and contrast the origin, maturation process, and general function of B and T lymphocytes. Describe the role of macrophages and other phagocytes in immunity	506-509

**Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards,
page 8**

Standards / Objectives / Indicators	Textbook Pages
XI.L. Describe immunodeficiencies, allergies, and autoimmune diseases	512-519
XI. Activities/Labs—Lymphatic System and Immune Systems	
XI.a. Multimedia that enabling the student to visualize the physiology of the lymphatic system	
XI.b. Creating a model of the human lymphatic system	493, 502, 511
XI.c. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	512
XII. Respiratory System	
XII.A. Identify the organs forming the respiratory passage-way in descending order until the alveoli are reached	358-365
XII.B. Describe several protective mechanisms of the respiratory system	361, 368
XII.C. Describe the makeup of the respiratory membrane and relate its structure to its function	363, 364, 366-368
XII.D. Describe the structure and function of the lungs and the pleural coverings	363-364
XII.E. Explain the relative roles of the respiratory muscles and lung elasticity in effecting volume changes that cause air to flow into and out of the lungs	366-373
XII.F. Explain the functional importance of the partial vacuum that exists in the intrapleural space	367
XII.G. Describe several physical factors that influence pulmonary ventilation	366-373
XII.H. Explain and compare the various lung volumes and capacities. Indicate types of information that can be gained from pulmonary function tests	370-373
XII.I. Describe how oxygen and carbon dioxide are transported in the blood	369
XII.J. Describe the neural controls of respiration	368-369
XII.K. Name several physical factors that influence respiratory rate	370
XII.L. Describe the symptoms and probable causes of Chronic Obstructive Pulmonary Disease and lung cancer	379-381, 383-384
XII.M. Describe normal changes that occur in respiratory system functioning from infancy to old age	372-373, 374
XII. Activities/Labs—Respiratory System	
XII.a. Measure volumes and capacities of lungs with either a commercial or homemade spirometer	374
XII.b. Measuring respiratory rate	393
XII.c. Examining prepared slides of trachea and lung tissue microscopically	
XII.d. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	375, 393
XII.e. Multimedia enabling the student to visualize the physiology of the respiratory system	
XIII. Digestive System and Metabolism	

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 9

Standards / Objectives / Indicators	Textbook Pages
XIII.A. Describe the overall function of the digestive system and differentiate between organs of the alimentary canal and accessory digestive organs	537
XIII.B. List and briefly describe the major processes occurring during digestive system activity	537-539
XIII.C. Explain how villi aid digestive processes in the small intestine	548
XIII.D. Describe the anatomy and basic function of each organ and accessory organ of the alimentary canal	541-555
XIII.E. Name the deciduous and permanent teeth and describe the basic anatomy of a tooth	542-543
XIII.F. Describe the composition and functions of saliva and explain how salivation is regulated	543
XIII.G. Describe the mechanism of chewing and swallowing	542
XIII.H. Explain how gastric secretion and motility in the stomach are regulated	545-547
XIII.I. Describe the function of local hormones in the digestive process	535, 547, 552
XIII.J. State the roles and tell how bile and pancreatic juice are regulated in the small intestine	552-553
XIII.K. List the major functions of the large intestine and describe the regulation of defecation	553-555
XIII.L. List the major enzymes or enzyme groups produced by the digestive organs or accessory glands and name the foodstuffs on which they act and the end products of protein, fat, carbohydrate, and nucleic acid digestion	543, 547, 549
XIII.M. List the six major nutrient categories and note important dietary sources and the main cellular uses of each	530-536
XIII.N. Define metabolism and explain the difference between catabolism and anabolism	18, 530
XIII.O. Analyze and explain the chemical reactions that provide energy for the body. Identify the means, including the structure and function of the digestive system by which energy is processed and stored within the body	57-58, 549-554
XIII.P. Explain the importance of energy balance in the body and indicate consequences of energy imbalance	319
XIII.Q. Define basal metabolic rate and total metabolic rate and name several factors that influence each	530-531
XIII.R. Describe how body temperature is regulated and indicate the common mechanisms regulating heat production/retention and heat loss from the body	16-17
XIII.S. Analyze the effects of energy deficiencies in malabsorption disorders and name important congenital disorders of the digestive system and significant inborn errors of metabolism	557-558, 560, 561, 565
XIII. Activities/Labs—Digestive System and Metabolism	
XIII.a. Multimedia enabling the student to visualize the physiology of the digestive system and metabolic processes	556, 571
XIII.b. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	557
XIII.c. Observations/dissections of preserved digestive system specimens	

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 10

Standards / Objectives / Indicators	Textbook Pages
XIII.d. Examining parts of the digestive system microscopically using prepared slides	
XIII.e. Experimentation in which the process and products are found when protein, carbohydrates, and lipids are broken down	556
XIII.f. Observation and classification of movements and sounds of digestion	
XIII.g. Mathematically calculate basal metabolic rate	
XIV. Urinary System	
XIV.A. Describe the anatomy of the kidney and its coverings	574-578
XIV.B. Trace the blood supply through the kidney	578
XIV.C. Identify the parts of the nephron responsible for filtration, reabsorption, and secretion and describe the mechanisms underlying each of these functional processes	580-588
XIV.D. Describe the normal physical and chemical properties of urine	593-594
XIV.E. List several abnormal urine components and name the condition when each is present in detectable amounts	594-602
XIV.F. Describe the general structure and function of the ureters, bladder, and urethra	588, 589
XIV.G. Compare the course, length, and functions of the male urethra with those of the female	588, 589
XIV.H. Define micturition and describe the micturition reflex	589-591
XIV.I. List the factors that determine body water content and describe the effect of each factor	
XIV.J. Compare and contrast the relative speed of buffers, the respiratory system, and the kidneys in maintaining the acid-base balance of the blood	
XIV.K. Describe some congenital problems and explain the effect of aging of the urinary system	333, 586-587
XIV. Activities/Labs—Urinary System	
XIV.a. Observation/dissection of preserved specimen	
XIV.b. Multimedia enabling the student to visualize the physiology of the digestive system and metabolic processes	579
XIV.c. Examining the nephron microscopically via prepared slides	
XIV.d. Creating a model of the human urinary tract with an understanding of the function of all its components	579, 609
XIV.e. Conduct urinalysis testing on known and unknown samples of urine	
XIV.f. Conduct dialysis testing	
XIV.g. Perform glucose analysis on urine	
XIV.h. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	593
XV. Reproductive System	
XV.A. Describe the common function of the male and female reproductive systems	611, 612
XV.B. Using a model or diagram, identify the organs and accessory organs of the male and female reproductive systems and discuss the general function of each	619, 620, 624, 625, 626, 627

Correlation of *Introduction to Anatomy & Physiology* to Oklahoma Department of CTE Anatomy & Physiology Standards, page 11

Standards / Objectives / Indicators	Textbook Pages
XV.C. Know the process of meiosis to the extent of comparing and contrasting it to mitosis	613-615
XV.D. Outline the process of spermatogenesis	621
XV.E. Discuss hormonal regulation of testicular function and the physiological effects of testosterone on male reproductive anatomy	615-616
XV.F. Trace the pathway of sperm cells from their site of formation to the body exterior	619-621
XV.G. Describe the phases of the ovarian cycle and relate them to events of oogenesis	627-631
XV.H. Describe how hormones control the activities of female reproductive organs and the development of female secondary sex characteristics	615-616, 627-631
XV.I. Discuss the structure and function of the mammary glands	639
XV.J. Describe the process of fertilization and the changes of the female body during pregnancy	633-638
K. Understand the major functions of the placenta	636-637
XV.L. Explain how labor is initiated and describe the three stages of labor	638, 639
XV.M(1). Describe the stages of human embryology and gestation including investigation of gestational and congenital disorders	636-638
XV.M(2). Discuss several agents that can interfere with normal fetal development	644-646
XV.N. Distinguish among the modes of inheritance and describe the events that lead to genetic variability of gametes	56-57, 614
XV.O. List and explain several techniques used to determine or predict genetic diseases	648, 650
XV. Activities/Labs—Reproductive System	
XV.a. Case study exercises in which students formulate explanations and design controlled experimental procedure to resolve real-world dilemmas	617, 622, 632, 641
XV.b. Multimedia enabling the student to visualize the physiology of the digestive system and metabolic processes	651
XV.c. Microscopic examination of prepared slides of sperm cells and ovarian tissue	617, 651