

Human Biology Unit 1 Learning Objectives

When you are prepared for exam 1, you will be able to demonstrate your learning of the following, being ready to apply this knowledge to new situations presented in the exam. Knowledge of information in the pre-lecture quizzes will be assumed in the exam. Review this material as you prepare for the exam.

Chapter 1 - Introduction

For the exam:

1. Identify characteristics of humans.
2. Identify components of the scientific method.

Chapter 2 - Chemistry

For the pre-lecture quiz:

1. Differentiate between acidic, basic, and neutral solutions using the pH scale (Figure 2.11).
2. Differentiate between dehydration synthesis and hydrolysis reactions (Figure 2.14).
3. Identify carbohydrates: glucose, sucrose (Figure 2.15), and glycogen (Figure 2.16).
4. Identify lipids: triglycerides (Figure 2.17), phospholipids (Figure 2.18), and steroids (Figure 2.19).
5. Identify components of proteins (Primary, secondary, tertiary and quaternary structure; peptide bonds, alpha helices, beta pleats) (Figure 2.21).
6. Identify DNA (Figure 2.24).
7. Identify ATP (Figure 2.26).

For the exam:

1. Identify what makes different elements different.
2. Differentiate between types of chemical bonds.
3. Identify properties of water.
4. Use the pH scale to describe solutions, including acids, bases, and buffers.
5. Identify elements of life.
6. Match classes of macromolecules of life with their unit molecules, the elements found in each, and whether or not they are polymers.
7. Characterize types of carbohydrates and their functions.
8. Characterize types of lipids and their functions.
9. Characterize amino acids.
10. Differentiate between levels of protein structure.
11. Identify properties of enzymes.
12. Identify functions of enzymes and coenzymes.
13. Identify characteristics of nucleic acids and their functions.

Chapter 3 - Cells

For the pre-lecture quiz:

1. Differentiate between solutions of differing tonicity by their effects on cells immersed in them (figure 3.13).

2. Identify parts of cells (figure 3.14) and their functions.
3. Identify parts of a mitochondrion (figure 3.19).
4. Differentiate between the sites of the four pathways of cellular respiration (figure 3.29).

For the exam:

1. Characterize cell membranes, including membrane diffusion and transport mechanisms.
2. Identify reactions of cellular respiration by substrates, products, and the site of reactions; identify means by which energy is derived from different types of food molecules.
3. Match organelles with their functions.

Chapter 4 - Tissues, cavities, skin, and systems

For the pre-lecture quiz:

1. Differentiate between major tissue types using Figure 4.1 and Table 4.1.
2. Identify body cavities shown in Figure 4.8.
3. Identify anatomical components of skin (figure 4.10).
4. Match systems with their functions (Human Systems Work Together, pages 86 & 87).

For the exam:

1. Match types of tissues with their characteristics and functions.
2. Match layers of the skin with their functions.
3. Identify measures of normal human homeostasis.

Chapter 14 Digestive system

For the pre-lecture quiz:

1. Identify anatomical components of the digestive system (figure 14.1).
2. Identify types of teeth and anatomical components of a tooth in longitudinal section (figure 14.4).
3. Identify anatomical components of the mouth, pharynx, and associated structures (figure 14.6).
4. Identify layers of the digestive tract (figure 14.2).
5. Match vitamins and minerals with their functions (tables 14.4 & 14.5).

For the exam:

1. Differentiate between digestion and absorption.
2. Order parts of the gastrointestinal tract from mouth to anus, including segments of the small and large intestines; match each with their characteristics and functions.
3. Match digestive system organs with their functions.
4. Identify functions of the liver and the pancreas.
5. Differentiate between essential and non-essential nutrients.
6. Relate energy balance to body weight; match Calorie-yielding nutrients with the kcal/g they provide.

Human Biology Unit 2 Learning Objectives

When you are prepared for exam 2, you will be able to demonstrate your learning of the following, being ready to apply this knowledge to new situations presented in the exam. Knowledge of information in the pre-lecture quizzes will be assumed in the exam. Review this material as you prepare for the exam.

Chapter 7 -- Blood

For the pre-lecture quiz:

1. Identify blood cells (figure 7.5).

For the exam:

1. Identify functions of the circulatory system.
2. Differentiate between plasma and serum.
3. Identify blood cells by description and function.
4. Identify the site of blood cell formation.
5. Differentiate between plasma proteins by function.
6. Identify components of a hemoglobin molecule.
7. Identify names used to describe the process that occurs when blood is removed from the body.

Chapter 8 -- Cardiovascular system

For the pre-lecture quiz:

1. Identify anatomical components of the internal heart (figure 8.7).
2. Identify blood vessels as depicted on a cardiovascular system diagram (figure 8.10)
3. Identify the lymphatic system and a lymph node (figure 9.3 & 9.4).

For the exam:

1. Differentiate between types of blood vessels by location and function.
2. Differentiate between structures in the heart by description and purpose.
3. Outline an overview of the flow of blood through the circulatory system of the body.
4. Sequence the cardiac cycle, noting the time elapsed for each event in the cycle.
5. Identify the source of heart sounds and differentiate between the two typical heart sounds.
6. Differentiate between systole and diastole and between systolic and diastolic blood pressure measurements
7. Identify components of cardiac electrical conduction.
8. Identify the diagnostic test used to examine cardiac electrical conduction.
9. Identify the source of your pulse.

Chapter 10 -- Respiratory System

For the pre-lecture quiz:

1. Identify anatomical components of the respiratory tract (figure 10.1).
2. Identify names for lung volumes (figure 10.10).
3. Differentiate between external and internal respiration, identifying the flow of respiratory

- gasses (O₂ and CO₂) in either case (figure 10.11).
4. Differentiate between normal lungs and those of a heavy smoker (figure 10.14).

For the exam:

1. Differentiate between inspiration and expiration by characteristics of the gases going in and out of the lungs.
2. Differentiate between breathing, external respiration, internal respiration, and cellular respiration.
3. Identify conditions that are required to allow hemoglobin to deliver oxygen to the tissues and pick up oxygen in the lungs.
4. Identify functions and characteristics of parts of the respiratory system.
5. Identify the mechanism used for gas exchange in the lungs.
6. Identify mechanisms of breathing and the anatomic structures involved.
7. Identify measures of lung capacities.
8. Identify effects of smoking.

Chapter 15 -- Urinary System

For the pre-lecture quiz:

1. Identify urinary organs and associated blood vessels (figure 15.2).
2. Identify anatomical components of the kidney (figure 15.2B) and a representative nephron (figures 15.4 & 15.5).

For the exam:

1. Name metabolic byproducts that must be removed from the body by excretion and organ that is primarily responsible for their excretion.
2. Identify organs of the urinary system by function and structure.
3. Identify components of urine by description and proportion of usual urine.
4. Differentiate between processes involved in urine formation.
5. Identify the functional unit of the kidney (nephron); differentiate between parts of nephrons by the functions that they perform.
6. Identify regulatory functions of the kidney.

Chapter 5 -- Skeletal System

For the pre-lecture quiz:

1. Identify components of long bone anatomy (figure 5.1).
2. Identify bones and differentiate between those of the axial and appendicular classifications (figure 5.5).
3. Differentiate between segments of the vertebral column (figure 5.7).
4. Differentiate between joint movements (figure 5.13).

For the exam:

1. Identify functions of bone.
2. Differentiate between compact and spongy bone.
3. Differentiate between red and yellow bone marrow.

4. Differentiate between types of bone cells.
5. Differentiate between types of joints.

Human Biology Unit 3 Learning Objectives

When you are prepared for exam 3, you will be able to demonstrate your learning of the following, being ready to apply this knowledge to new situations presented in the exam. Knowledge of information in the pre-lecture quizzes will be assumed in the exam. Review this material as you prepare for the exam.

Chapter 6 – Muscular System

For the pre-lecture quiz:

1. Differentiate between muscle types (Table 6.2).
2. Identify anatomical components of muscle (figures 6.3, 6.4, 6.5 & 6.6).
3. Identify muscles (figure 6.2).

For the exam:

1. Differentiate between types of muscle.
2. Identify characteristics and anatomical parts of skeletal muscles.
3. Identify characteristics of antagonistic pairing of muscles.
4. Identify the functional unit of skeletal muscle and the processes used for contraction.
5. Identify definitions of summation and tetanus.
6. Identify features of muscle tone.
7. Identify the reserve sources of oxygen and energy in muscles and the causes of fatigue in muscles.
8. Differentiate between types of muscle fibers.

Chapter 11 – Nervous System

For the pre-lecture quiz:

1. Differentiate between types of neurons and identify their components (figure 11.2).
2. Identify anatomical components of the spinal cord (figure 11.13).
3. Identify anatomical parts of the brain (figures 11.2 & 11.4) and lobes of the cerebrum (figure 11.15).
4. Differentiate between the sympathetic and parasympathetic branches of the autonomic nervous system (figure 11.11).

For the exam:

1. Differentiate between the divisions of the nervous system.
2. Identify the parts of a neuron and types of neurons.
3. Identify the functions of Schwann cells and other glial cells.
4. Identify the components of an action potential, including before and after the action potential.
5. Identify characteristics of a synapse and synaptic impulse transmission.
6. Differentiate between sensory and motor nerves.
7. Identify components of a reflex arc.
8. Characterize the sympathetic and parasympathetic nervous systems.
9. Identify parts of the brain by location and structure, and by function.
10. Identify functions of the limbic system.

Chapter 12 – Sensory Systems

For the pre-lecture quiz:

1. Match proprioceptors and cutaneous receptors with their functions (figure 12.1 and table 12.1).
2. Identify parts of the eye (figure 12.14) and the retina (figure 12.17).
3. Identify parts of the ear (figure 12.9) and the cochlea (figure 12.10).

For the exam:

1. Differentiate between different types of general sensory receptors.
2. Identify types of receptors found in skin, skeletal muscles, and joints.
3. Identify structures and processes used for taste and smell
4. Identify structures and processes used for sight; differentiate between the types of light-detecting cells found in the retina.
5. Identify structures and processes used for hearing and balance.

Chapter 13 – Endocrine System

For the pre-lecture quiz:

1. Identify endocrine glands (figure 13.1).
2. Match endocrine glands with their functions.
3. Differentiate between the cellular activities of peptide and steroid hormones (figure 13.2 & 13.3).

For the exam:

1. Differentiate between steroid and peptide hormones.
2. Match the hormones made by each endocrine gland with their function.

Chapter 16 – Reproductive System

For the pre-lecture quiz:

1. Identify parts of the male reproductive system (figures 16.1 and 16.2).
2. Identify parts of the female reproductive system (figure 16.4 and 16.6).
3. Identify stages of the ovarian and uterine cycles (figures 16.6 & 16.7).
4. Match common birth control methods a description of their procedures and methodologies (table 16.3 & figure 16.11).
5. Match symptoms of sexually transmitted diseases (including photos from chapter) with their causative agents (figure 16.7).

For the exam:

1. Identify the site, steps, and processes in the development of human spermatozoa and their delivery to the site of fertilization.
2. Identify the anatomical parts of the mature spermatozoon.
3. Identify the site of testosterone production in human males and its purpose.

4. Identify the site, steps, and processes in the development of a mature human ovum and the conditions required for the process to occur.
5. Identify the sites of fertilization and implantation in the female.
6. Identify roles of female sex hormones on the menstrual cycle and pregnancy.
7. Differentiate between types of birth control.
8. Identify causes of infertility.

Chapter 21 – Development and Aging

For the pre-lecture quiz:

1. Identify egg and sperm components involved in fertilization (figures 21.1, 21.2 & 21.3).
2. Identify stages of early embryonic development (figures 21.5 & 21.6); also, identify the zygote in the picture.
3. Identify extra-embryonic membranes (figure 21.2 & table 21.1).
4. Identify breast anatomical components (figure 16.14).

For the exam:

1. Differentiate between a zygote, an embryo, and a fetus.
2. Identify the stages of development of germ cell layers and processes that occur in each stage.
3. Identify fates of germ cell layers in humans.
4. Identify characteristics of mother's milk – both colostrum and later milk.
5. Identify effects of aging, their causes, and ways of reducing these effects (to a degree!).

Human Biology Unit 4 Learning Objectives

When you are prepared for exam 4, you will be able to demonstrate your learning of the following, being ready to apply this knowledge to new situations presented in the exam. Knowledge of information in the pre-lecture quizzes will be assumed in the exam. Review this material as you prepare for the exam.

Chapters 17 – Cell Cycle & Chromosomal Inheritance

For the pre-lecture quiz:

1. Identify cell division and fertilization processes of the human life cycle (figure 17.12).
2. Match names of stages of the cell cycle with processes occurring (figure 17.1).
3. Identify stages of mitosis and cells in interphase (figure 17.9).
4. Identify processes and names of chromosome parts involved in crossing-over (figure 17.2).
5. Identify meiotic stages and an overview of the stages of meiosis (figure 17.11).
6. Identify processes and structures involved in spermatogenesis and oogenesis (figure 17.12).

For the exam:

1. Match stages in the life cycle with the type of cell division occurring.
2. Name types of chromosomes and names used to refer to chromosomes in different parts of the cell cycle.
3. For both mitosis and meiosis, differentiate between production of diploid/haploid cells, the sites of their occurrence, and the number of chromosomes and chromatids in daughter cells.
4. Differentiate between types of aneuploidy.

Chapter 19 – Genetic Inheritance

For the exam:

1. Use Punnett Squares to predict phenotypes and genotypes for autosomal and sex-linked traits of offspring.
2. Use terminology of Mendelian genetics.

Chapter 17 & 20 – Molecular Genetics and Biotechnology

For the pre-lecture quiz:

1. Summarize processes involved in DNA replication (figure 17.4).
2. Summarize processes and components of transcription (figure 17.6).
3. Summarize processes and components of translation (figure 17.8).

For the exam:

1. Identify differences between DNA and RNA and types of RNA.
2. Characterize DNA replication.
3. Identify products of transcription and translation.
4. Identify tools and processes used in biotechnology

Chapter 9 – Immunity Against Disease

For the pre-lecture quiz:

1. Identify lymphatic organs (figure 9.3 & 9.4).
2. Identify processes of clonal expansion as applied to cytotoxic T cells (figure 9.13).

For the exam:

1. Identify functions of the lymphatic system.
2. Match lymphatic system components with their function.
3. Identify lines of defense against disease.
4. Differentiate between white blood cells by function.
5. Describe the reactions of antibodies in the body and how they are produced.
6. Differentiate between cellular and humoral immunity and between active and passive immunity.
7. Identify the function of immune memory in the body.
8. Differentiate between side effects of when something goes wrong with the immune system.

Chapter 18 – Cancer

For the exam:

1. Differentiate between characteristics of normal versus cancer cells.
2. Summarize apoptosis.
3. Differentiate between a benign versus a malignant tumor.
4. Identify causes, warning signs, and screening tests for cancer.

Chapter 22 – Human Evolution

For the exam:

1. Summarize steps hypothesized to be involved in the origins of life, identifying characteristics of the evolving Earth.
2. Summarize biological evolution citing the evidence.
3. Summarize primate evolution.