

Objective 2 Systems

1. Interpret the functions of systems in organisms including circulatory, digestive, nervous, endocrine, reproductive, integumentary, skeletal, respiratory, muscular, excretory, and immune
2. Compare the interrelationships of organ systems to each other and to the body as a whole . **11th grade only**

There are 11 major systems in the human body. All are important for survival and serve as an important function of homeostasis, or equilibrium. They are as follows:

1. Circulatory

Structure: The circulatory system consists of the *heart*, *arteries* (carry blood away from the heart), *veins* (carry blood to the heart), *capillaries* (where nutrient and gas exchange occurs with tissue), and *blood*.

Function: The function of the circulatory system is to transport blood to every part of the body. In the blood are all of the necessary gases, nutrients, and waste products; which are all transported to the necessary parts of the body.

2. Digestive

Structure: The digestive system begins with the *mouth*. It continues with the *esophagus*, *stomach*, *small intestine*, *large intestine*, and ends with the *rectum*. There are several organs that are associated with the digestion process. The *liver*, among other functions, produces *bile* (a digestive enzyme). The *gall bladder* stores the bile. The *pancreas* also secretes digestive enzymes and hormones.

Function: The function of the digestive system is to digest food and provide vital nutrients to the body. It also helps to regulate metabolism, as well as eliminate wastes.

3. Nervous

Structure: The nervous system is broken down into two parts: the *central nervous system* and the *peripheral nervous system*. The brain and spinal cord combine to create the central nervous system (acts as the body's control center and coordinates body's activities). The nerves that carry messages to and from the central nervous system to the entire body makes up the peripheral nervous system.

Function: The nervous system controls all bodily activities.

4. Endocrine

Structure: The endocrine system consists of a network of glands including the *pituitary*, *thyroid*, *thymus*, *pancreas*, *testes*, *ovaries*, *adrenal*, and *parathyroid glands*.

Function: The endocrine system consists of glands that secrete hormones that play a key role in the regulation of digestion, metabolism, and homeostasis.

5. Reproductive

Structure: The male reproductive system consists of the *testis* (produce sperm), *vas deferens* (tube to transport sperm), *urethra* (continuation of vas deferens), and the *penis*. The female reproductive system consists of the *ovary* (produces eggs), the *uterus*, and the *vagina*.

Function: The function of the reproductive systems in males and females is to perpetuate the species through reproduction.

6. Integumentary (skin)

Structure: The skin is composed of two parts, the *epidermis* and the *dermis*. The epidermis is the outer, thinner portion of the skin. The dermis is the inner, thicker portion of the skin. Also associated with the skin are *melanin* (pigment in the skin), *keratin* (dead, waterproofing cells), and *hair follicles*.

Function: The skin has several vital roles in maintaining equilibrium within the body. The skin is responsible for regulating your body temperature. It also serves as a protective layer to the underlying tissues.

7. Skeletal

Structure: The skeleton is comprised of two parts, the *axial skeleton*, and the *appendicular skeleton*. The axial skeleton is made up of the skull, the vertebral column, the ribs, and the sternum. The appendicular skeleton are the bones of the arms and legs, including the shoulders and pelvic girdle. *Joints*, *ligaments* (connects bones to bones), and *tendons* (connects muscles to bones) are also associated with the skeletal system.

Function: The skeletal system provides a framework for the tissue of the body. It also protects the upper organs. Muscles are anchored to the bones to allow for movement. Bones also produce blood cells, and store vital minerals.

8. Respiratory

Structure: The first part of the respiratory system is the *trachea*, this is the passageway of air from the mouth or nasal cavity. The trachea then divides into two *bronchi*, which are the tubes that lead to the lungs, which then branch into *bronchioles* that lead to the tiny air sacs called *alveoli*, where gas exchange occurs with the blood.

Function: The purpose of the respiratory system is to provide the body with oxygen, and also to dispel carbon dioxide from the body.

9. Muscular

Structure: There are three types of muscles: *smooth*, *cardiac*, and *skeletal*. Smooth muscle is found in internal organs and blood vessels. Cardiac muscle is found in the heart. Skeletal muscles are attached to bones. Muscles are also *voluntary* (skeletal muscle) or *involuntary* (smooth and cardiac).

Function: Smooth muscle allows for the contraction of organs (moves food along the intestines) and blood vessels (pushes blood through). Cardiac muscle is responsible for the pumping of the heart. Skeletal muscle allows for all movement of the body.

10. Excretory/Urinary

Structure: The excretory system consists of the *kidneys* (filters the blood), the *ureters* (tubes that lead from kidneys to urinary bladder), the *urinary bladder* (where urine is stored), and the *urethra* (tubes that lead from the urinary bladder to the outside of the body).

Function: The function of the excretory system is to filter the blood and remove major waste products such as ammonia and urea. It is also responsible for regulating the pH (acidity level) of the blood.

11. Immune/Lymphatic

Structure: The immune system consists of a variety of structures found throughout the body. The *lymph nodes* and *lymph vessels* are found throughout the body and help to filter out *antigens* (disease causing microorganisms). The tonsils, thymus gland, spleen, and bone marrow are also involved in the immune system.

Function: The function of the immune system is to protect the body from infections and antigens.