Body Systems

Cells: Are individual units compose the parts of the body**. Examples are** muscle, nerve, skin (epithelial), and bone cells.

Tissues: are similar cells grouped together**. Groups of muscle cells are muscle** tissue, and groups of epithelial cells are epithelial tissue.

Organs: are collections of different tissues working together. An organ, such as the stomach, has specialized tissues, such as muscle, epithelial (lining of internal organs and outer layer of skin cells), and nerve, that help the organ function.

Systems: are groups of organs working together. The digestive system, for example, includes the mouth, throat (pharynx), esophagus, stomach, and intestines, which bring food into the body, break it down, and deliver it to the bloodstream.

The **circulatory system (heart, blood, and blood vessels such as arteries, veins,** and capillaries) transports blood (containing all types of blood cells) throughout the body.

The **lymphatic system includes lymph vessels, and nodes that carry a clear fluid** called lymph. Lymph contains white blood cells called lymphocytes that fight against disease and play an important role in immunity.

The **digestive system brings food into the body and breaks it down so that it can** enter the bloodstream. Food that cannot be broken down is then removed from the body at the end of the system as waste.

The **endocrine system, composed of glands, sends chemical messengers called** hormones into the blood to act on other glands and organs.

The **female and male reproductive systems produce the cells (eggs and sperm)** that join to form the embryo. Male (testis) and female (ovary) sex organs produce hormones as well.

The **musculoskeletal system, including muscles, bones, joints, and connective** tissues, supports the body and allows it to move.

The **nervous system carries electrical messages to and from the brain and spinal** cord.

The **respiratory system controls breathing, a process by which air enters and** leaves the body.

The **skin and sense organ system, including the skin and eyes and ears, receives** messages from the environment and sends them to the brain.

The **urinary system produces urine and sends it out of the body through the** kidneys, ureters, bladder, and urethra.

Body Cavities

The **cranial cavity is located in the head and surrounded by the skull** (CRANI/O means skull). The cranial cavity contains the brain and other organs, such as the pituitary gland (an endocrine gland located below the brain).

The **thoracic cavity, also known as the chest cavity (THORAC/O means chest),** is surrounded by the breastbone and ribs. The lungs, heart, windpipe (trachea), bronchial tubes (leading from the trachea to the lungs), and other organs are in this cavity.

The lungs are each surrounded by a double membrane known as the **pleura.**

The **pleural cavity is** the space between the pleural membranes**.** The large area between the lungs *is **the*** **mediastinum**. The heart, esophagus (food tube), trachea, and bronchial tubes are organs within the mediastinum.

The **abdominal cavity** is the space below the thoracic cavity.

The **diaphragm** is the muscle that separates the abdominal and thoracic cavities.

Organs in the abdomen include the stomach, liver, gallbladder, and small and large intestines.

The organs in the abdomen are covered by a double membrane called the **peritoneum**. The peritoneum attaches the abdominal organs to the

abdominal muscles and surrounds each organ to hold it in place.

The **pelvic cavity** , below the abdominal cavity. The **pelvic cavity** is surrounded by the **pelvis** (bones of the hip).

The major organs located within the pelvic cavity are the urinary bladder, ureters (tubes from the kidneys to the bladder), urethra (tube from the bladder to the outside of the body), rectum, and anus, and the uterus (muscular organ that nourishes the developing embryo and fetus) in females.

The **spinal cavity**: This is the space surrounded by the spinal column (backbones).

The **spinal cord** is the nervous tissue within the spinal cavity. Nerves enter and leave the spinal cord and carry messages to and from all parts of the body.

Divisions of the Back

The **spinal column** is a long row of bones from the neck to the tailbone. Each bone in the spinal column is called a **vertebra** (backbone). Two or more bones are called **vertebrae**.

A piece of flexible connective tissue, called a **disk** (or **disc**), lies between each backbone. The disk, composed of **cartilage**, is a cushion between the bones.

If the disk slips or moves out of its place, it can press on the nerves that enter or leave the spinal cord, causing pain.

DIVISION	BONES	ABBREVIATION
Cervical (neck) region	7 bones	C1-C7
Thoracic (chest) region	12 bones	T1-T12
Lumbar (loin or waist) region	5 bones	L1-L5
Sacral (sacrum or lower back)	region 5 fused bones	S1-S5
Coccygeal (coccyx or tailbone) region	4 fused bones	

Planes of the Body

A plane is an imaginary flat surface. Organs appear in different relationships to one another according to the plane of the body in which they are viewed.

1. **Frontal (coronal) plane**

A vertical plane that divides the body, or body part such as

an organ, into front and back portions.

Anatomically, anterior means the front portion and posterior means the back portion.

2. **Sagittal (lateral) plane**

A vertical plane that divides the body or organ into right and left sides. The **midsagittal plane** divides the body vertically into right and left **halves.**

3. Transverse (axial) plane

A horizontal plane that divides the body or organ into upper

and lower portions, as in a cross section. (Think of cutting

a long loaf of French bread into circular sections.)

Knowing the planes of the body is helpful in looking at imaging studies such as x-ray films (radiographs) and computed tomography (CT) scans.

Magnetic resonance imaging (MRI) is another technique for producing images of the body. With MRI, magnetic waves instead of x-rays are used to create the images, which show organs and other structures in specialized detail and in all three planes of the body.