Anatomy is the study of structure, while physiology is the study of function. These two subjects go hand-in-hand with one another. Structure determines Function as Function determines Structure.
LEARNING STRATEGIES

- Mnemonic Devices
- Repetition
- Breaking into individual Sections
- Games
ATOMS AND MOLECULES

The **atom** is a basic unit of matter that consists of a central nucleus surrounded by a cloud of electrons.

Atoms are the basic building blocks of matter that make up everyday objects.

Atoms are in your body, the chair you are sitting in, your desk and even in the air.
Atoms and Molecules

Atoms are used to create the elements, and each element is listed on the periodic table. The elements can combine to form molecules.

The 4 basic molecules are:
- Proteins
- Carbohydrates
- Lipids
- Nucleic Acid
There are many different types of cells. The slides above show just how different cells can be for different parts of the body.
The first slide shows epithelial cells.
The second slide shows the cells of the bone.
The third slide shows the cells of the muscle.
Fourth slide shows cells of the nervous system.
Tissues are groups of cells with a common structure and function.

The 4 main categories of tissues in animals are:

1) Epithelial
2) Connective
3) Muscle
4) Nervous

1) Epithelial tissue covers the body and lines its organs and cavities.
2) Connective tissue binds and supports other tissue.
3) Muscle tissue functions in movement.
4) Nervous tissue forms a communication network.
Organs are made up of tissues

An organ system usually consists of many organs

Example- Digestive system absorbs food or nervous system controls body functions.
1) Integumentary – skin.
2) Muscular- muscles.
3) Skeletal- bones.
4) Nervous (CNS and PNS)
5) Endocrine (hormones/regulation)
6) Cardiovascular or circulatory (heart and blood vessels)
7) Lymphatic (lymph fluid)
8) Respiratory (lungs)
9) Digestive (stomach, intestine)
10) Urinary (kidneys, bladder)
11) Female Reproductive
12) Male Reproductive
13) Immune (Special)(not really organs, cells in the blood/body)
1) Skin – epidermis
2) Hair
3) Sweat and Oil Glands
4) Sensory Organs and Glands
1) Striated (voluntary) – Contract on command (moving in general)
2) Smooth (involuntary) – Contracts on its own (digestive tract)
3) Cardiac (heart) – Contracts in rhythmic fashion on its own (propels blood throughout body)
1) Bone
2) Cartilage
3) Tendons
4) Ligaments
5) Joints
1) Brain and Spinal Cord (CNS)
2) Nerve and Sensory Organs (PNS)
NERVOUS SYSTEM

1) Pituitary Gland
2) Pineal Gland
3) Thyroid Gland
4) Thymus
5) Adrenal Gland
6) Pancreas
7) Ovary
8) Testies
ENDOCRINE SYSTEM

- http://www.purposegames.com/game/2588
- http://www.purposegames.com/game/the-endocrine-system-quiz
1) Heart
2) Blood Vessels (arteries, veins, capillaries)
3) Blood (serum, proteins, red and white cells)
CARDIOVASCULAR SYSTEM

1) Lymph Nodes and Vessels
2) Spleen
3) Thymus
4) Other Scattered Lymph Tissue
LYMPHATIC SYSTEM / IMMUNITY

- [http://www.purposegames.com/game/lymphatic-system-quiz](http://www.purposegames.com/game/lymphatic-system-quiz)
1) Nasal Cavity
2) Pharynx
3) Larynx
4) Trachea
5) Bronchus
6) Lung

(h) Respiratory System
Keeps blood constantly supplied with oxygen and removes carbon dioxide. The gaseous exchanges occur through the walls of the air sacs of the lungs.
RESPIRATORY SYSTEM


1) Oral Cavity (teeth, salivary glands)
2) Esophagus
3) Liver
4) Pancreas
5) Stomach
6) Small Intestine
7) Large Intestine
8) Rectum
9) Anus
DIGESTIVE SYSTEM

- [link](http://www.purposegames.com/game/1918)
- [link](http://www.purposegames.com/game/the-digestive-system-quiz)
1) Kidneys
2) Ureters
3) Bladder
4) Urethra
URINARY SYSTEM

- http://www.purposegames.com/game/2a95996a4d
1) Mammary Glands
2) Ovary
3) Uterus
4) Uterine Tube
5) Vagina
FEMALE REPRODUCTIVE SYSTEM

- http://www.purposegames.com/game/09c6d587f9
1) Testis
2) Scrotum
3) Penis
4) Duct System for Sperm

(k) Male Reproductive System
Overall function is production of offspring, and male ducts and glands aid in delivery, produce eggs and female sex hormones, fertilization and development of the fetus, milk to nourish the newborn.
MALE REPRODUCTIVE SYSTEM

- http://www.purposegames.com/game/16a2af920e
- http://www.purposegames.com/game/a54c83d622
White blood cells and other special immune cells
- Identify foreign material and eliminate it
ORIENTATION AND DIRECTIONAL TERMS

1. Superior (Cranial)
2. Inferior (Caudal)
3. Ventral (Anterior)
4. Dorsal (Posterior)
5. Medial
6. Lateral
7. Intermediate
8. Proximal
9. Distal
10. Superficial (External)
11. Deep (Internal)
Cranial Cavity is superior to the Thoracic Cavity
The Urinary Bladder is inferior to the Stomach
The Abdominal Cavity is ventral to the Vertebral Cavity
The heart is posterior to the breastbone

- Toward or at the back of the body
- Behind
The heart is medial to the arm
The arms are lateral to the chest

- Away from the midline of the body
- On the inner side of
The collarbone is intermediate between the breastbone and the shoulder.
PROXIMAL

- Closer to the origin of the body part or the point of attachment of a limb to the body trunk

The elbow is proximal to the wrist
The knee is distal to the thigh

DISTAL

- Farther from the Origin of a body part or the point of attachment of a limb to the body trunk
The skin is superficial to the skeletal muscles

- Toward or at the body surface
The Lungs are deep to the skin

- Away from the body surface
- More internal
ANATOMICAL POSITIONS

- http://www.purposegames.com/game/ac42566289
Best approach is to memorize by regions.

Cephalic
Extremities
Trunk

Mnemonic device for Anterior (Trunk)

Sternal, Thoracic, Mammary, Abdominal, Umbilical, Pelvic, Coxal, Inguinal, Pubic

Stern Touched Moms Abdomen Under Painful Conditions In Pregnancy
ANATOMICAL REGIONS

- [link](http://www.purposegames.com/game/body-regions-quiz)
**ANATOMICAL TERMINOLOGY**

**Planes and Sections**

1. Sagittal
   - Midsagittal
   - Parasagittal
2. Frontal (coronal)
3. Horizontal (transverse)

Sagittal separates left from right (symmetric).

Frontal (Coronal) separates front (anterior) and back (posterior).

Horizontal separates up (superior) and down (inferior).

Someone coming over the horizon has their abdomen cut in the horizontal plane.

These terminologies are very important!
Body Cavities

- **Dorsal** (shown in yellow)
  - Cranial
  - Vertebral

- **Ventral** (shown in red)
  - Thoracic
  - Abdominopelvic

The body cavity is separated into dorsal and ventral. The dorsal cavity refers to the cranial (brain) and vertebral (spinal cord). The ventral cavity refers to the thoracic and abdominopelvic cavity. (Visceral)
ANATOMICAL TERMINOLOGY

- Other cavities

Nasal and Oral

Orbital

OTIC
BODY CAVITIES

- http://www.purposegames.com/game/body-cavities-quiz
ANATOMICAL TERMINOLOGY: ABDOMINOPELVIC CAVITY

- The abdominopelvic cavity is divided into 4 quadrants
  1. right upper quadrant
  2. left upper quadrant
  3. right lower quadrant
  4. left lower quadrant
The abdominopelvic cavity can further be divided into 9 regions. The right and left side each includes the hypochondriac, lumbar, and iliac region. The middle regions are called from top to bottom, the epigastric, umbilical, and hypogastric region.

Important terminology:
- Hypochondriac - below the costal cartilage
- Epigastric – above the stomach
- Hypogastric – below the stomach
Regions
1) Liver, Gallbladder
2) Stomach
3) Diaphragm
4) Ascending Colon Of Large Intestine
5) Small Intestine, Transverse Colon of Large Intestine
6) Descending Colon of Large Intestine
7) Cecum, Appendix
8) Urinary Bladder
9) Initial Part of Sigmoid Colon
MEDICAL IMAGING TECHNIQUES

- Classical X-Ray (Radiography)
- Computed Tomography (CT) or Computerized Axial Tomography (CAT) Scanning
- Magnetic Resonance Imaging (MRI)
- Dynamic Spatial Reconstruction (DSR)
- Ultrasound (US)
- Position Emission Tomography (PET)
- Digital Subtraction Angiography (DSA)
Good for Dense Structures (Bones and Tumors)
COMPUTED TOMOGRAPHY (CT)

(a) A CT scan through the superior abdomen.
Computed Tomography (CT) or Computerized Axial Tomography (CAT) Scanning

- Employs X-ray technology to create clearer image
- Tumors, Aneurysms, Kidney Stones, Gallstones, etc.
Uses Magnetic properties of molecules, not X-Rays
Presence of cancer cells, chemical disease of brain, spinal cord disorders, blood flow problems, injury after stroke, measure effects of drugs on tissues
Use chiefly on soft tissues such as brain and heart
DYNAMIC SPATIAL RECONSTRUCTION (DSR)

- Employs X-Ray technology to see organ action/motion
- Measures physiology of heart, lungs, vessels, can indicate abnormality/deformity in structure; tissue damage
Uses high frequency sound waves
Gall stones, pelvic organs, blood flow, fetal development
Uses radioisotopes such as Carbon-11, Nitrogen-13
Effects of drugs, site of molecules, cancer cells
Very good at studying glucose absorption by neurons in the brain during certain tasks
Takes X-Ray picture before and after administration of contrast substance to the vessels
Used to study vessels of the brain and heart to help prevent strokes and heart attacks