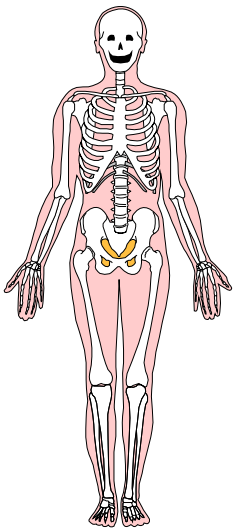
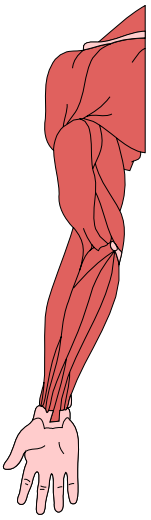
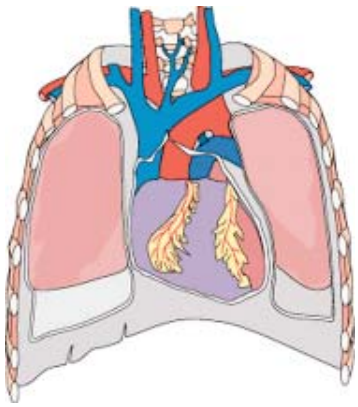
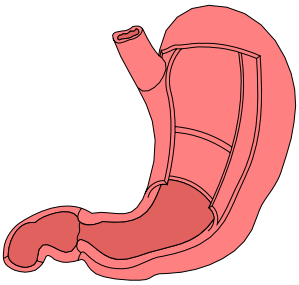
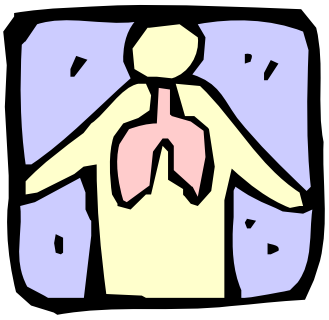


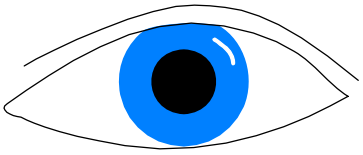
Systems

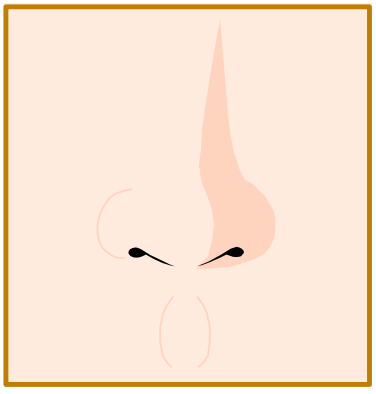


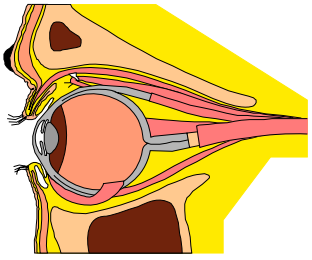












Cardiovascular System

(Heart, Blood Vessels)

What and where is it?

Heart - hollow muscular organ center of chest with upper chamber (atrium) - collects blood and lower chamber (ventricle) - ejects blood, supplies oxygen to the body, rid of waste products (Carbon Dioxide/CO2)

-Heart muscle - (myocardium) receives a fraction of the large volume of blood, most blood flow takes place when heart is relaxing between beats

-Collects oxygenless blood, pumps to lungs, picks up oxygen and drops off CO2, heart then collects oxygen rich blood from the lungs and pumps to tissues of body

Cardiovascular System is made of arteries, arterioles, capillaries, venules, veins

-**Arteries** - strong, flexible, carry blood away from the heart, highest blood pressure

-**Arterioles** - smaller arteries, muscular walls increase or decrease blood flow

-**Capillaries** -tiny, thin-walled vessels, bridges between arteries, carry blood away from the heart, a low oxygen and nutrients to pass from the blood to tissues, waste to pass from tissue to the blood

-**Venules** -capillaries drain into the venules to veins, back to the heart

-**Veins** - thin walls, carry blood back to the heart at same volume, lower speed, less pressure

What does it do?

*Pumps blood around the body

*Takes oxygenated blood to all organs and tissues

*Adapts quickly to changes

*Removes waste products from the body

*Transports oxygen and carbon dioxide (gases) to and from all body parts

What is the normal heart rate?

Rest- 60 - 100 beats per minute

*Lower if younger and physically fit

*Depends on hunger, exercise, inactivity, pain, stress

Digestive System

What and where is it?

***Digestive tract*- mouth, throat, esophagus, stomach, small intestine, large intestine, rectum, anus and organs - pancreas, liver, gallbladder

What does it do?

*Between the mouth and the anus

*Stores, digests, breaks down into substances absorbed by body cells

*Eliminates waste

***Healthy digestion*- depends on stable nervous system

***Mouth*- entrance for digestive and respiratory systems, tongue - taste, mix food, throat (pharynx), taste (sweet, sour, bitter, salty) by tongue - simple, smell by nose - complex

**Esophagus*- connects throat with stomach, food travels by rhythmic muscular contractions, relaxations (peristalsis)

**Stomach*- large, bean shaped, hollow organ with 3 regions, food enters and is stored and HCL (hydrochloric acid) breaks down protein, barrier against infection

**Small intestine* - Stomach releases food into the duodenum, first segment of the small intestine, when full the stomach empties

**Pancreas*- digest proteins, carbohydrates and fats - see Pancreas

***Liver*- nutrients of food are absorbed into the wall of the intestine

**Gallbladder and Biliary Tract*- bile assists in the digestion and absorption of fats, elimination of certain waste products - see Gallbladder

**Large Intestine*- Largely responsible for absorption of water, electrolytes from feces

**Rectum and Anus*- Begins at the end of the large intestine, ends at the anus, empty - feces is stored in the descending colon and when full passes to the rectum, causing an urge to have a bowel movement

Endocrine System
(Glands, Hormones)

What and where is it?

Collection of hormone- producing glands, cells, pancreas, ovaries, heart, stomach, kidneys

Hormones - complex chemical substances, secreted into bloodstream, regulate body functions - metabolism, growth, sexual reproduction

What does it do?

Hormones are chemicals - act on specific tissues, body's internal balance, circulate in blood and other body fluids

Endocrine system- initiates the changes at puberty

Rising levels of sex hormones - Male produce sperm and transport to female

Female - production of egg cells in the ovaries, triggers the start of menstruation, menopause - fertility ceases

Produce and secrete hormones (messengers)- directly to bloodstream to coordinate activities of the body

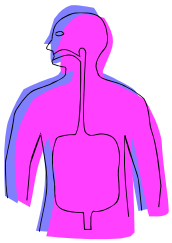
Main organs - hypothalamus, thyroid, pituitary, parathyroid, islets of pancreas, testes, ovaries, adrenal glands

Pregnancy - placenta acts as an endocrine gland plus other functions

Hormones- bind to a receptor and alters the cells function to slow down or to speed up, growth, development, reproduction, sexual characteristics, use and storage of energy, volume of fluid, salt and sugar in the blood

Insulin- affects the metabolism of protein, fat, glucose in body

Excretory System



What and where is it?

Large Intestine - final stage of digestion - colon is 5 feet, changes waste into feces excreted through rectum and anus

* Muscular walls of the colon squeeze feces to the rectum, different sizes and shapes

What does it do?

Converts- liquid chyme from small intestine to solid feces

-billions of bacteria live in the intestine

-feed on undigested fiber

-absorbs water and some salt to dry it out

-make Vitamins K, B, gases -methane, hydrogen sulfide, hydrogen

Process:

*Enters through a trapdoor - ilepcecal valve

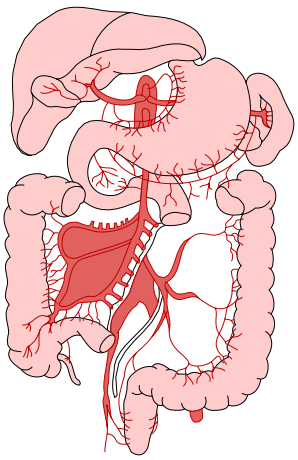
*Colon absorbs 3 quarts of water

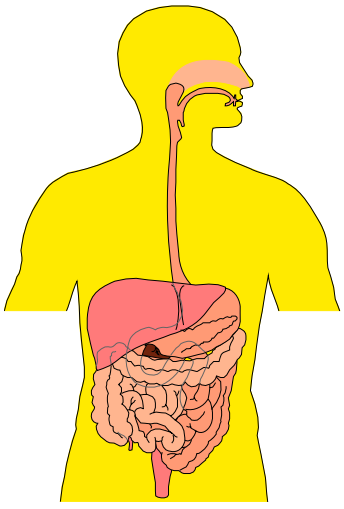
-ascending colon - goes upward

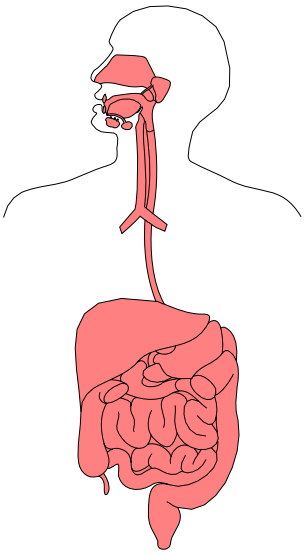
-descending colon - around and down

*Absorbs sodium, chloride, water and replace with potassium and bicarbonate

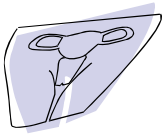
*1/3 is bacteria







Female Urinary and Reproductive System



What and where is it?

Kidneys form urine - eliminate waste, excess fluids, maintain chemical balance

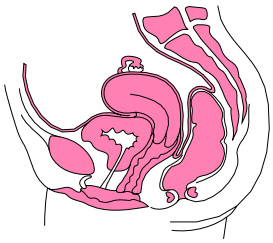
Urine production - determined by blood pressure, flow, hormones, body cycles and rhythms

Urine excreted through urethra (shorter in female) - vagina

*Female parts are lower in the body than male

Who does it do?

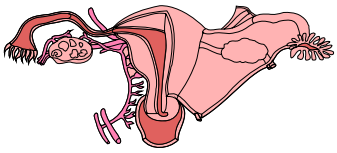
Urethra - opens in front of the vagina, shorter than in male

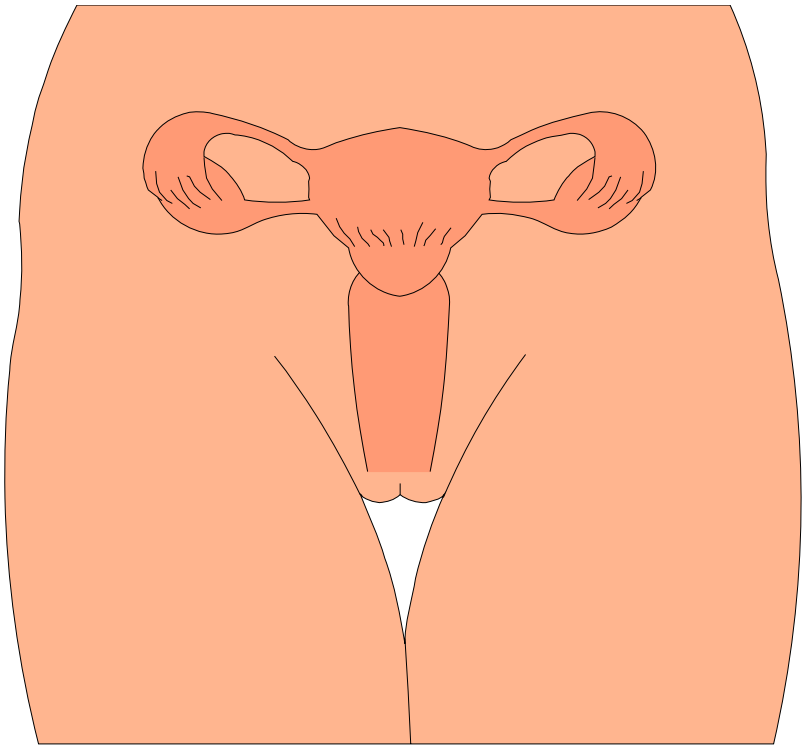


Reproductive System:

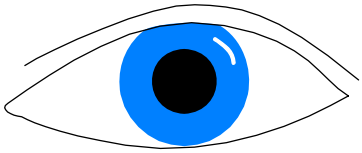
*Production of egg cells monthly

*Fertile phase begins at puberty





Immune System



What and where is it?

*Lymphatic system, white blood cells, antibodies (defends against germs)

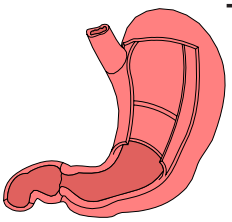
*Protects against germs

How are we protected?

Eye - protected by tears, enzyme that kills bacteria (lysozyme)

Mouth - protected by saliva, enzyme that kills bacteria (lysozyme)

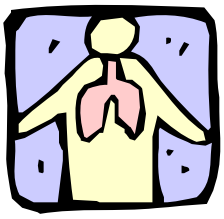
Airway/Lungs - protected by mucus (traps germs)



Stomach - protected by mucus and stomach acid

Nose - protected by hairs, sneezing

Genitals - protected by mucus



Inner Defenses:

Blood - liquid proteins (complement) attacks and activates bacteria

-Interferon (proteins) released by the cells attack viruses, stimulate killer cells

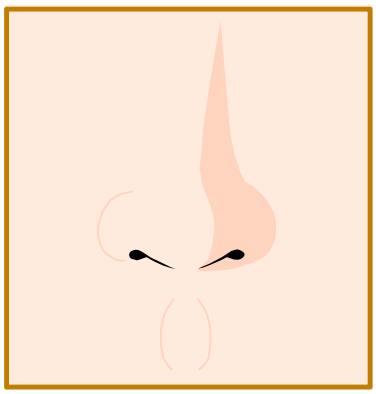
-Germs may be attacked by cytotoxic (cell poisoning) white blood cells

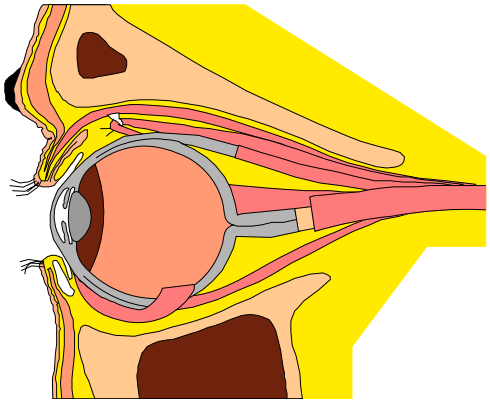
-Germs may be eaten by white blood cells (phagocytes-

-(attracted to infection, eaten, stored in a pouch in membrane, digested by enzymes)

B Cells - effective against bacteria as cholera, measles, malaria

T Cells - effective against viruses as flu, TB, few fungi





Lymphatic System

(Major Part of the Immune System)

What and where is it?

*Network of transparent lymph nodes and vessels

*Internal defense mechanism (Immune System)

Lymph = watery fluid from blood vessels to tissues drain to capillaries and vessels, have fibers called nodes filled with WBC's which neutralize or destroy microorganisms and return to bloodstream

-lymph is circulated by muscles

What does it do?

*Helps to provide vital protection from infections and tumor cells

*Prevent malfunction of internal organs

*Physical, chemical, cellular defenses work as a barrier against threats

*Returns excess tissue fluid to circulation

*Guards against disease, cancer

-based on white blood cells - lymphocytes

Facts: (These produce antibodies to help the body):

Spleen - large lymph organ - filters out damaged RBC's (Red Blood Cells)

Tonsils/Adenoids - protects against ingested or inhaled organisms

Lacrimal gland - produces tears

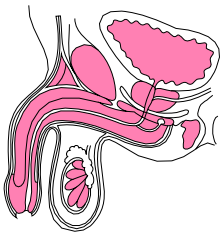
Male Urinary and Reproductive System

What and where is it?

Kidneys form urine - eliminate waste, excess fluids, maintain chemical balance

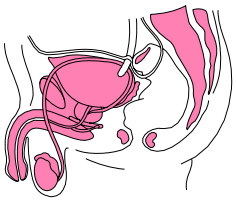
Urine production - determined by blood pressure, flow, hormones, body cycles, rhythms

Urine excreted through urethra - penis, also transports semen



Who does it do?

Urethra - tubes from the kidney to the bladder



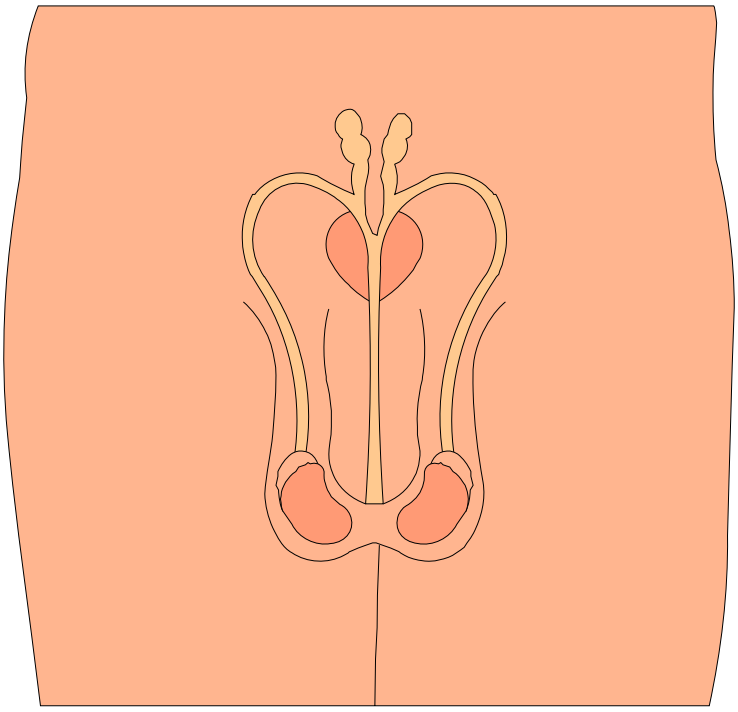
Reproductive System:

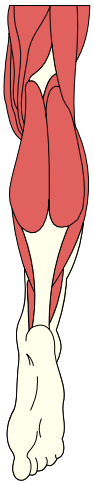
*Produces sperm to transport to female

*Fully functioning with rising levels of sex hormones

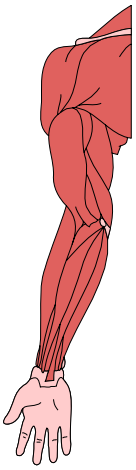
*Triggered by endocrine system

*Changes during puberty





Muscular System



What and where is it?

***Muscles**- enable you to move, involved in other body systems

What does it do?

***1/2 the body's bulk** = muscles

***Voluntary muscles**- allow the body to speak even, lift objects, make precise movements

***Involuntary muscles** - heart and smooth muscle - provide essential power for the functioning of respiratory, digestive, cardiovascular systems

Body Muscles:

***40% of the body's weight** - skeletal muscles

-> 640, can control each pair individually, most work in combination

-longest muscle - sartorius (inner thigh)

-gluteus maximus - biggest muscle (buttock)

-muscle fibers - average is 1 inch long

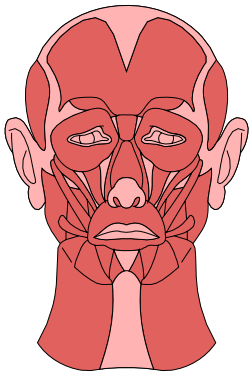
*Long, bulge in center, triangular (trapezius in upper back), sheetlike (external oblique)

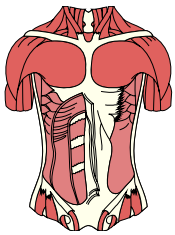
Kinds of Muscles:

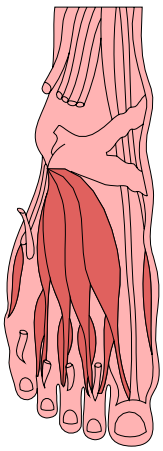
Smooth** - drives movement, propels food through the gut, regulates blood flow through arteries and veins, forms tubes, sacs, in smooth flat sheets ***- involuntary

Cardiac** - muscle that makes the heart beat, combination of skeletal and smooth muscle, 100 beats per minute, needs large amounts of glucose and oxygen, transmits nerve signals - ***involuntary

Skeletal** - muscles covering the body, dark bands (stripy), leg muscles, message goes out from brain to nerves - ***voluntary







Nervous System

What and where is it?

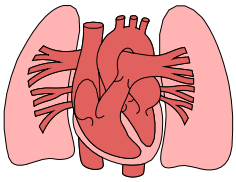
Complex communication system- made of the brain, spinal cord, nerves
*Has 2 main divisions
-CNS (Central Nervous System) - brain and spinal cord
-PNS (Peripheral Nervous System) - nerve fibers branching out into the body from the CNS, send information to the CNS to process and sends signals back to PNS, some nerve fibers form into groups to keep important areas under fine control
Nervous system contains > 100 billion nerve cells that run throughout the body like threads connecting all, neurons (nerve cells) receive messages, many branches

What does it do?

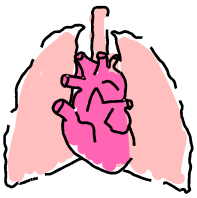
Brain- site for creativity, conscious thought
Brain- controls all body movements through nerves
Interacts with endocrine glands- other systems and body functions

Brain, Spine, Spinal Cord, Nerves:

Brain - Produces our moods, behaviors, memories, beliefs, fantasize
*Site of thinking, control center for rest of body, adjust alertness, mood
*Coordinates ability to move, see, smell, hear, touch, form words, understand, compose, appreciate music, communicate, organizes, plans ahead
*Brain has 3 centers - cerebrum, brain stem, cerebellum
Spine - column of bones (vertebrae), disc are between to cushion
2 nerve bundles (cauda equina looks like coarse thick hair)- spinal nerves - motor, sensory nerves - allow spinal cord and brain to communicate
Spinal Cord - long, fragile, begins at brain stem to end of spine protected by backbone (vertebrae), motor nerves - front of the spinal cord carry information from the brain to the muscles, sensory nerves - back of the spinal cord carry sensory information from distant parts of the body to the brain
Nerves - transmit messages, different nerves use different neurotransmitters, can transmit and receive multiple amounts of information



Respiratory System



What and where is it?

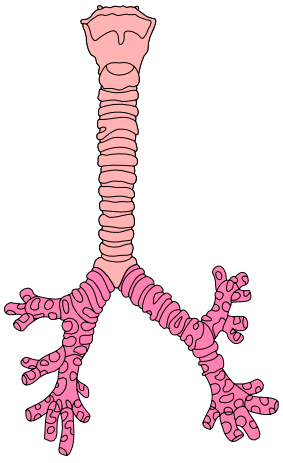
*Consists of air passages, lungs, pulmonary vessels, breathing muscles
*Supplies fresh oxygen to the blood to send to the body tissues
-Nose, lungs, diaphragm

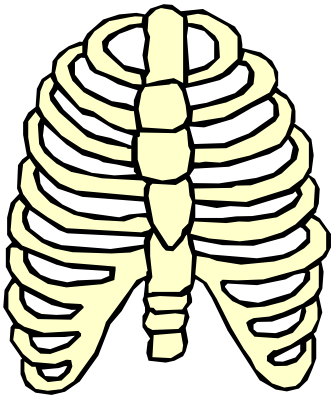
What does it do?

*Respiratory working with breathing muscles carries air in and out of the lungs
*Oxygen and Carbon Dioxide are exchanged
*Respiration removes CO2 (Carbon Dioxide)- waste product
*Respiration has three processes:
-***Pulmonary Ventilation*** - air is taken into the lungs
-**External Respiration** - exchange of respiratory gases between lungs and blood
-**Internal Respiration** - exchange of respiratory gases between blood and body tissues

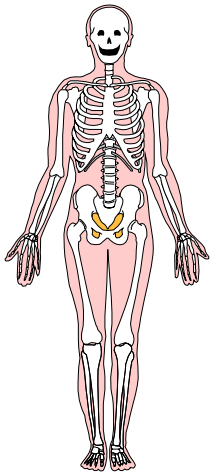
Diaphragm:

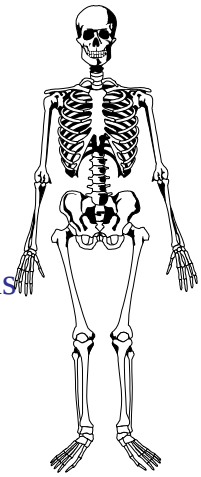
*is the most important muscle used in breathing
- is a muscular sheet between the base of the lungs and abdominal cavity
-is assisted by the internal and external intercostal muscles (between ribs), neck, and abdominal muscles
-breathes in and out 500 cc per day (about 1 pint) of air 12 to 17 times/minute
-average air pressure 760 mm Hg
-contracts and increases the chest cavity when taking a breath
-looks like a upside down butterfly





Skeletal System





What and where is it?

*Supports the body, skin, tissues

Protects internal organs - lungs, heart, brain, organs

*Anchor for the muscles

What does it do?

*Framework for the body

*Plays a role in outer body systems

-Red and white blood cells grow and develop-

to make red marrow a fatty inner tissue

Essential minerals are stored in the bones and released as needed- calcium

Skeleton is:

*Made of 200 rigid bones

-87 bones in axial skeleton (skull, spine, ribcage)

-126 in appendicular (arms, shoulders legs, pelvis or hipbone)

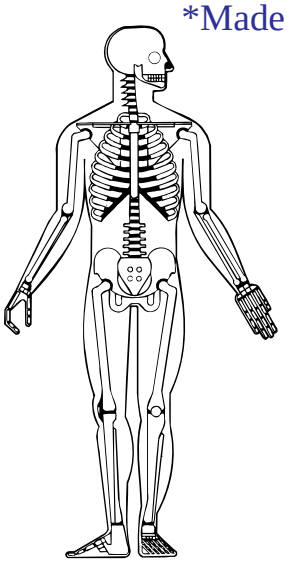
*Held together with rubbery cartilage

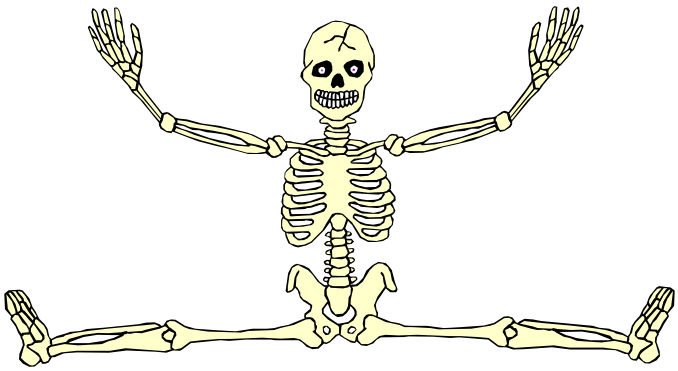
*The only part of the body that remains after death

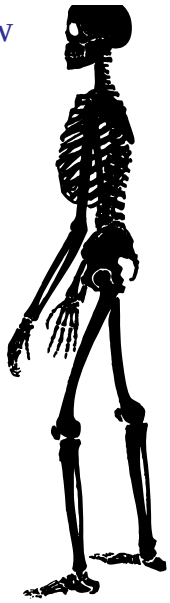
*A living tissue while we are alive

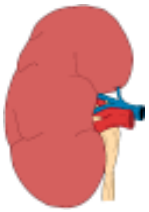
*Constantly renewed as old bone cells die and new ones born

*Made of 300 bones as a baby, fuse together as we grow









Urinary System

What and where is it?

***Urinary System/Tract*- body's filtering system**

***-blood passes through the kidneys*- remove waste products plus excess fluids to make and excrete urine**

Made of- kidneys (2), ureters (2 tubes), bladder, urethra

***-Kidneys*-** each kidney is 4 to 5 inches long, ≥ 1,000 filtering units

-filters metabolic waste, excess sodium, regulates blood pressure and RBC (Red Blood Cell) production

***-Ureter- walls have 3 layers*-** drains urine from the kidneys into the bladder

***-1- outer layer*-** connective/adipose tissue

***-2- middle layer*-** made of muscle fibers contract to push urine to the bladder

***-3- inner layer*-** mucosal layer stretches/protects the ureter from acidity of the urine

***-Bladder*-** when empty is folded, smooth out as fills

***-Urethra*- *female*-** 1 1/2 inches long causing more urinary tract infections, outlet in front of vagina

***-male*-** about 8 inches long with 3 sections- spongy, membranous, prostatic

-transports urine and semen through penis to tip at end, upper end where it leaves the bladder is encircled by the prostate gland, enlargement of the prostate gland can compress the urethra causing urinary problems

***Regulates*-** volume and composition of fluids, keeps an internal balance

Complications:

***Pyelonephritis*-** acute bacterial infection of the kidney (urine collecting system)

-often linked to a bladder infection, 90% is E coli in same community, 50% in hospitals

***Glomerulonephritis*-** inflammation of the filtering units of the kidney (glomeruli)

-related to an autoimmune disorder, blood in the urine, protein in the urine

***Nephriti*s-** begins 1-2 weeks after infection may be up to 6 weeks, streptococci dead and antibiotics do not work, more common in children < 3, young adults

-often caused by- reaction to infection, chickenpox, pneumonia

***Symptoms*-** fever, malaise (sick feeling), cystitis (bladder infection) usually without fever

***Normal urine output*-** 3 cups to 2 quarts/day