Biology

Physiology Unit

Week 2 Jan. 23rd – 27th

Levels of Organization, Physiology, Scientific Method, Excel Data

Show Biology Website

Start working on Scientific Method

- Control vs. Variable
- Hypothesis
- Data: Dependent Variable vs. Independent Variable

1/23 Body Systems P. 1048

Obj: TSW Understand how body systems interact to maintain homeostasis. Pg. 12NB

1. Define homeostasis.
2. Name two body systems that you think of that interact to maintain homeostasis.
3. For each of the body systems you named in question #2, name a cell, tissue, and organ that make up that body system.

Homeostasis – maintaining constant internal environment

Examples and explanation of how the body maintains homeostasis:

- Body temperature – 98.7 F, On a hot day you sweat.
- Water 70 – 75% You get thirsty after eating salty foods
- Salt – Less than a teaspoon/day You crave salty foods.
- Glucose – 80 – 120 mg/L in the blood Your energy picks up after you eat.

Homeostasis is important because without the control of our internal environment we would not be able to live.

Introduction to the Physiology Systems P. 1048 BB

Directions: Copy the 11 Body systems down in your Notebook. Write the Organ Systems of the Body and match the organ or functions to that system. Use the Internet or CH 34 – 39 in your biology book. P. 11 NB

Circulatory	Digestive	Endocrine
Integumentary	Lymphatic/ Immune	Muscular
Nervous	Reproductive	Respiratory
Skeletal	Urinary/ Excretory	

Circulatory/ Cardiovascular Digestive Endocrine
Integumentary Lymphatic/ Immune Muscular
Nervous Reproductive Respiratory
Skeletal Urinary/ Excretory

1. **Urinary/ excretory** Rids the body of nitrogen containing wastes.
2. **Endocrine** Is affected by the removal of the thyroid gland.
3. **Skeletal** Provides support & Levers on which the muscular system can act.
4. **Cardiovascular** Includes the heart.
5. **Integumentary** Protects underlying organs from drying out & mechanical damage.
6. **Immune** Protects the body; destroys bacteria & tumor cells.
7. **Digestive** Breaks down food into small particles that can be absorbed.

Circulatory Digestive Endocrine
Integumentary Lymphatic/ Immune Muscular
Nervous Reproductive Respiratory
Skeletal Urinary/ Excretory

8. **Respiratory/Circulatory** Removes carbon dioxide from the blood.
9. **Respiratory/Circulatory** Delivers oxygen & nutrients to body tissues.

10. **Muscular** Moves the limbs; allows you to make facial expressions.
11. **Urinary/Excretory** Conserves body water or eliminates excess water/ waste.
12. **Reproductive** Provides for conception & birth.
13. **Endocrine** Controls the body with chemicals called hormones.
14. **Integumentary** Is damaged when you cut your finger or get a severe burn/ sunburn.

Circulatory/Cardiovascular Digestive Endocrine
Integumentary Lymphatic/ Immune Muscular
Nervous Reproductive Respiratory
Digestive Urinary/ Excretory

15. **Cardiovascular** Blood vessels, Heart
16. **Endocrine** Pancreas, pituitary, adrenal glands.
17. **Urinary/Excretory** Kidney's, bladder, urethra.
18. **Reproductive** Testis, vas deferens, urethra.
19. **Digestive** Esophagus, Large Intestine, Rectum.
20. **Skeletal** Breastbone, vertebrae, skull.
21. **Nervous** Brain, nerves, spinal cord.

Goals of each Body System

- What is the function of the system?
- What are the cells, tissues & organs of the system?
- How does the system maintain Homeostasis?
- What other systems and does the your system work with?
- **How** does the how does your system work with other systems?

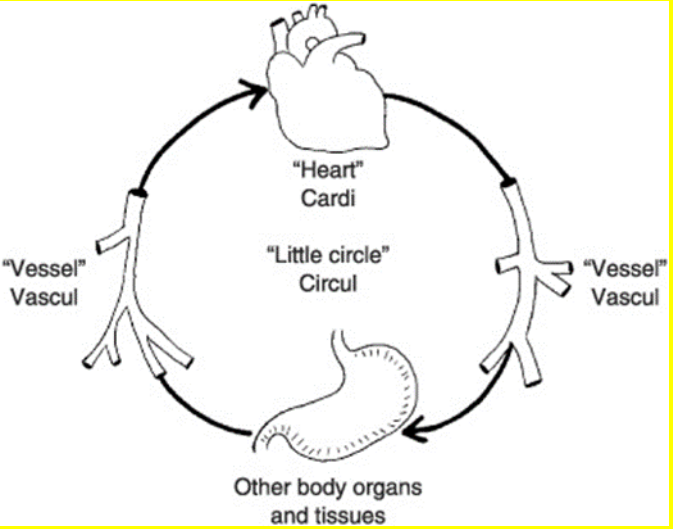
How to make a Data Table & Graph in Excel Activity

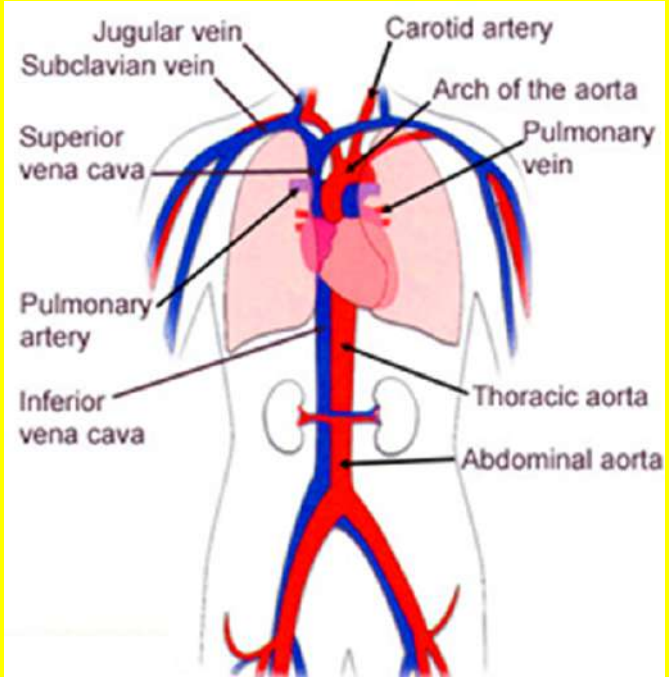
- Check out a Laptop.
- Log In
- Open Excel (Windows Office)
- New Spreadsheet
- Wait for McAllister to give specific instructions.

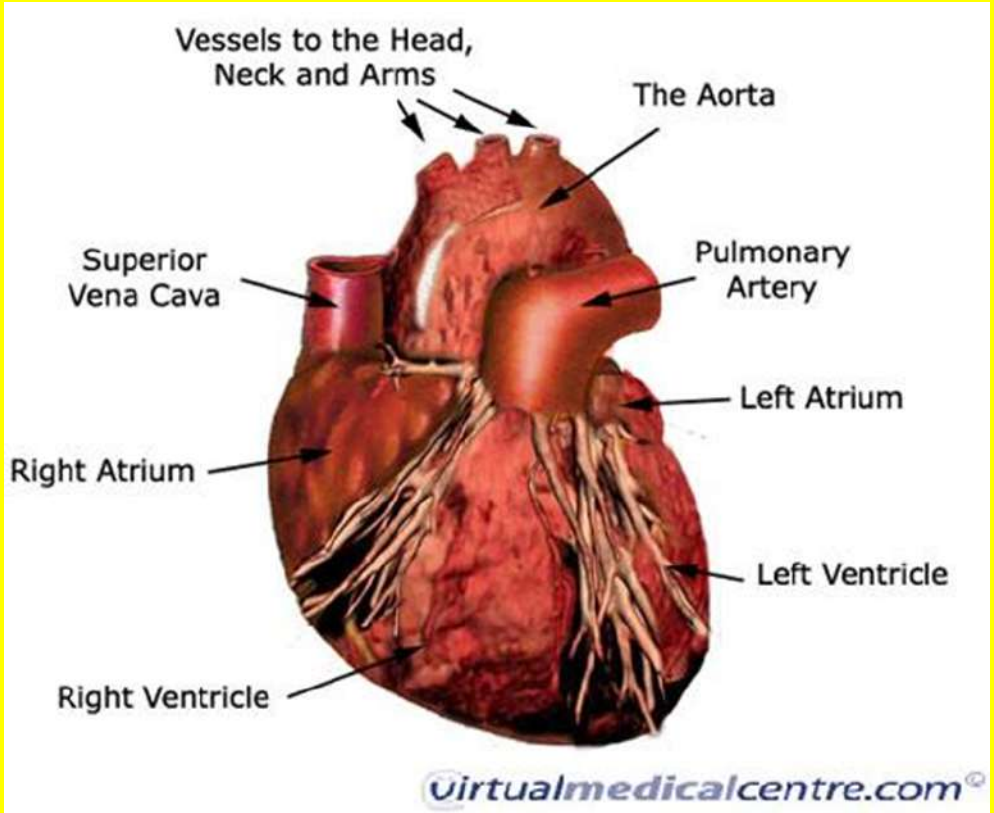
	5	4	3	2	1
Picture or diagram of your system	Detailed, complete, colored, labeled	Detailed and complete. Colored	Mostly complete, illustrates system, may be colored	Does not illustrate the system. Not colored	No effort
Clear description/ function of your system and how it works	Complete sentences, completely explains the topic in a few sentences	Complete sentences, the topic is mostly clear, but the description has some components that are confusing	Mostly complete sentences. Description is basic, leaves the audience with a few questions	Incomplete sentences. The audience has many questions after reading this description	No effort
Diseases	Clear description of possible diseases	Description of some diseases mentioned	One disease mentioned and described	Disease mentioned, no description	No disease or problem mentioned
Addresses specific prompt	Prompt completely addressed	Prompt mostly addressed	Response to prompt basic, not well explained	Very little response to prompt	Prompt not addressed
organized	Logical layout of poster. Titles, spacing good	Logical layout	Mostly organized, some components messy	Some components organized	Unorganized or random
Strong effort	good use of class time, 100% efficient	Okay use of class time. On task most of the time	Occasionally off task	Frequently off task	Off task, poor use of time
Presentation is clear and complete	Stated title, clear description of topic and discussion. Ask for questions	Stated title, clear description of topic and discussion	Good description of topic.	Described topic, poor description or rushed	Poor description of topic, missing components
Everyone participated	All members speak or explain examples	Most members speak	two members speak	Only one member speaks	Only one member speaks. Obvious lack of participation in group

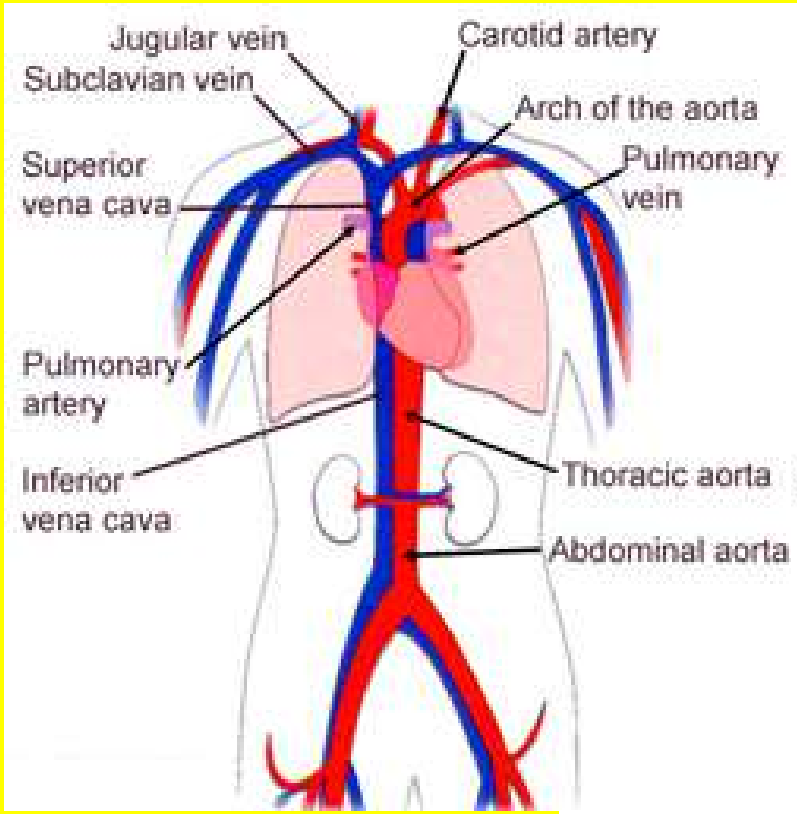
Cardiovascular System (Take notes p. 39/41NB)

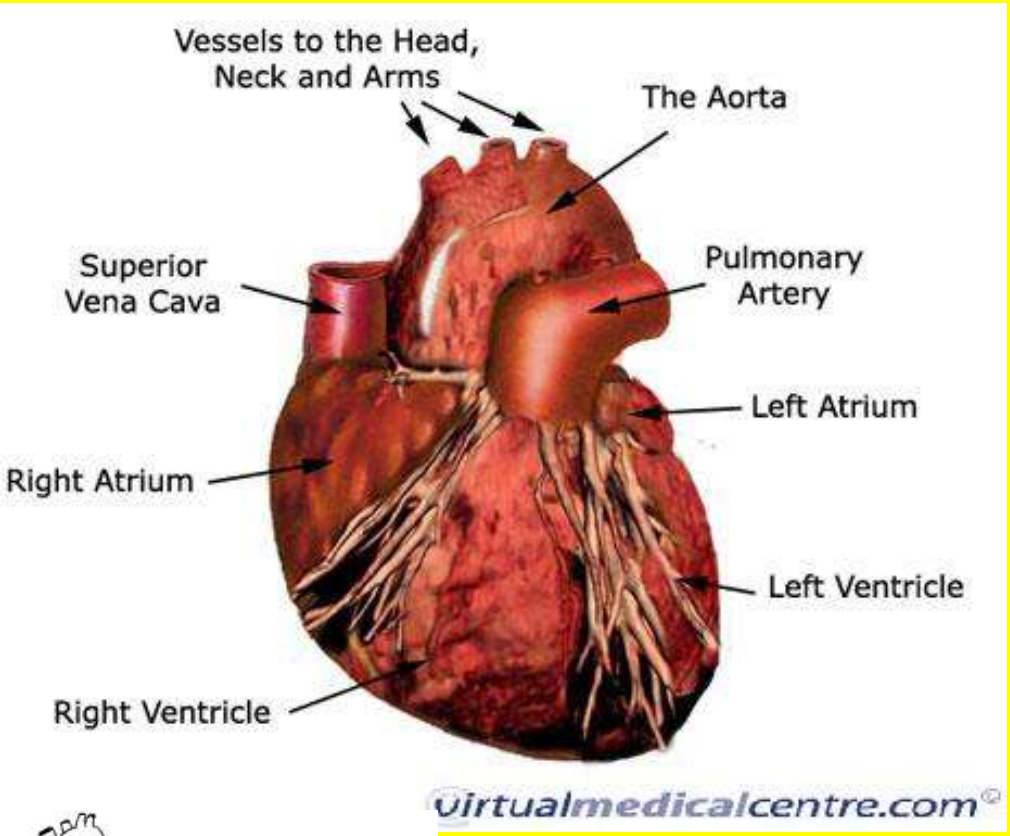
- Function: permits blood to circulate and **transports** gases (O_2, CO_2), waste, and nutrients to and from cells in the body; provides nourishment; helps in fighting diseases, stabilizes temp and pH
- Organs: endothelium, arteries, heart

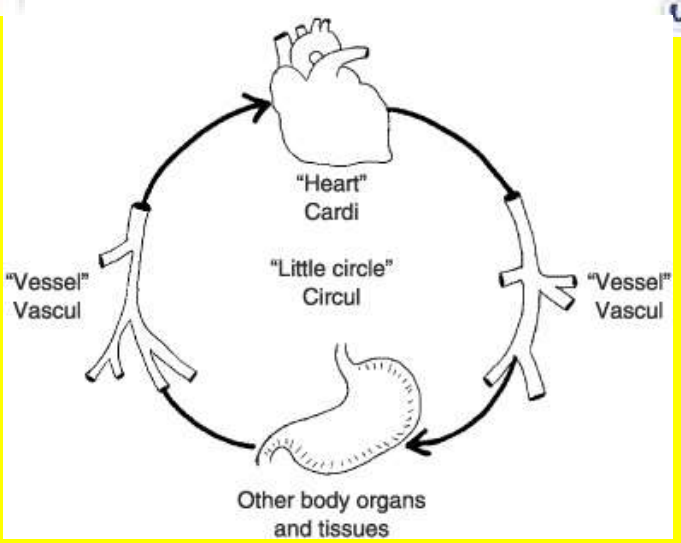






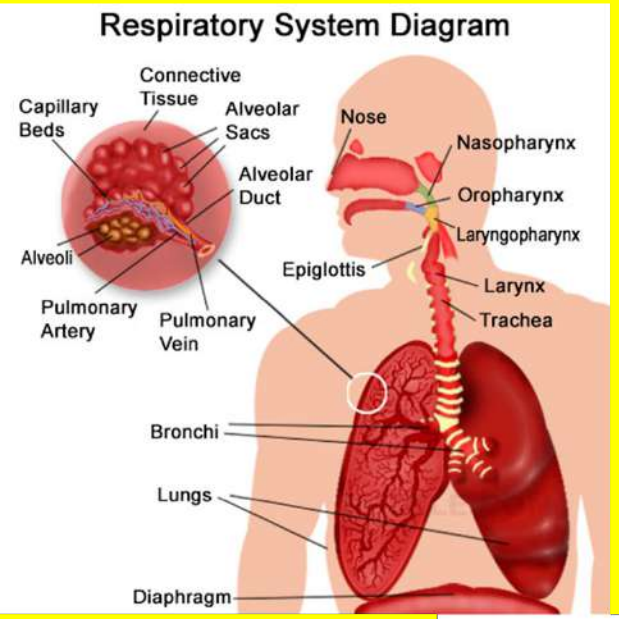

Jugular vein
Subclavian vein
Carotid artery
Arch of the aorta
Superior vena cava
Pulmonary vein
Pulmonary artery
Inferior vena cava
Thoracic aorta
Abdominal aorta

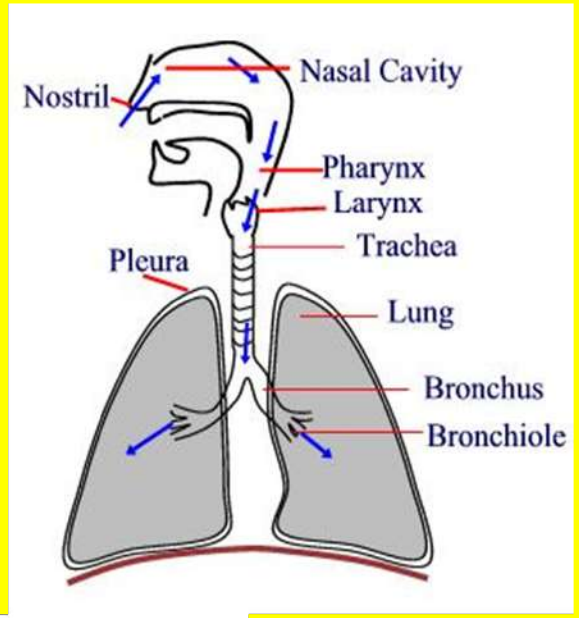

Vessels to the Head, Neck and Arms
The Aorta
Superior Vena Cava
Pulmonary Artery
Left Atrium
Right Atrium
Left Ventricle
Right Ventricle
virtualmedicalcentre.com©

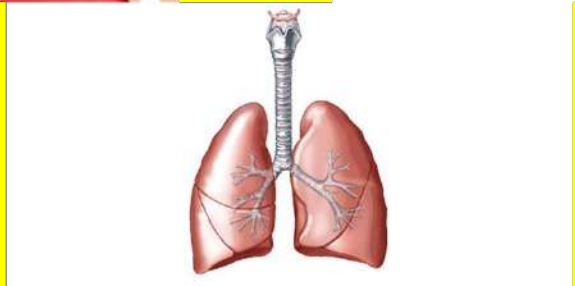

"Heart"
Cardi
"Little circle"
Circul
"Vessel"
Vascul
"Vessel"
Vascul
Other body organs and tissues

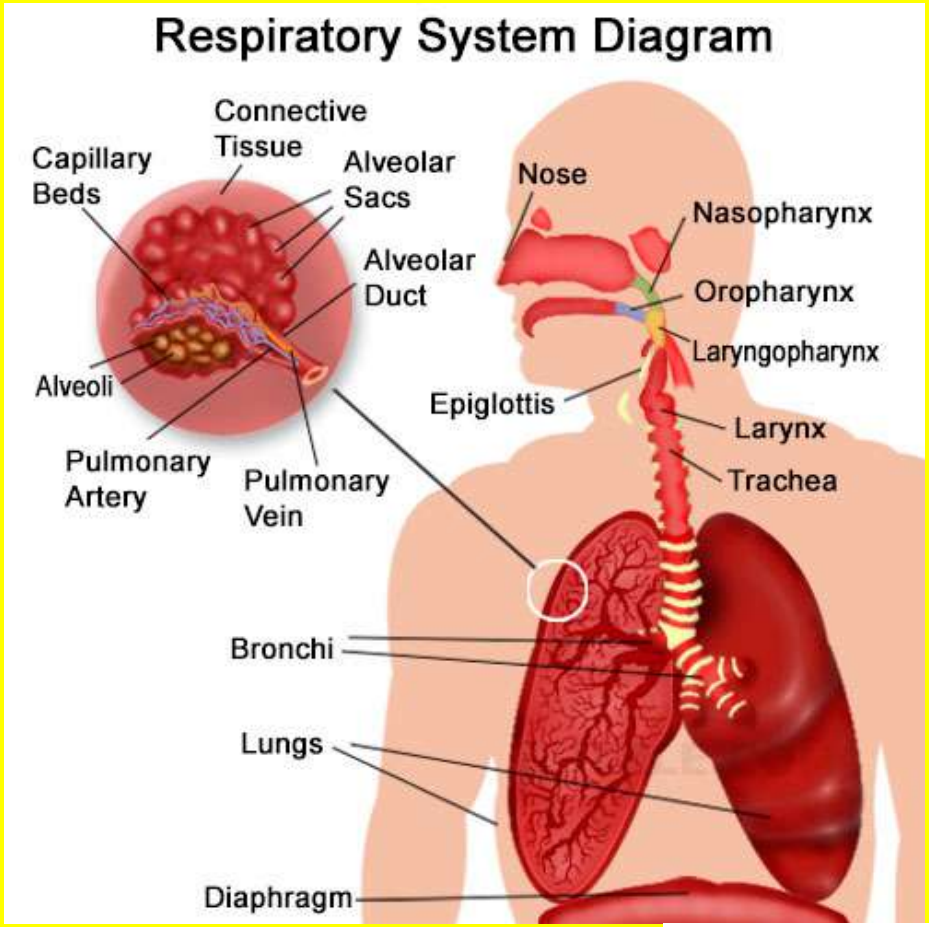
Respiratory

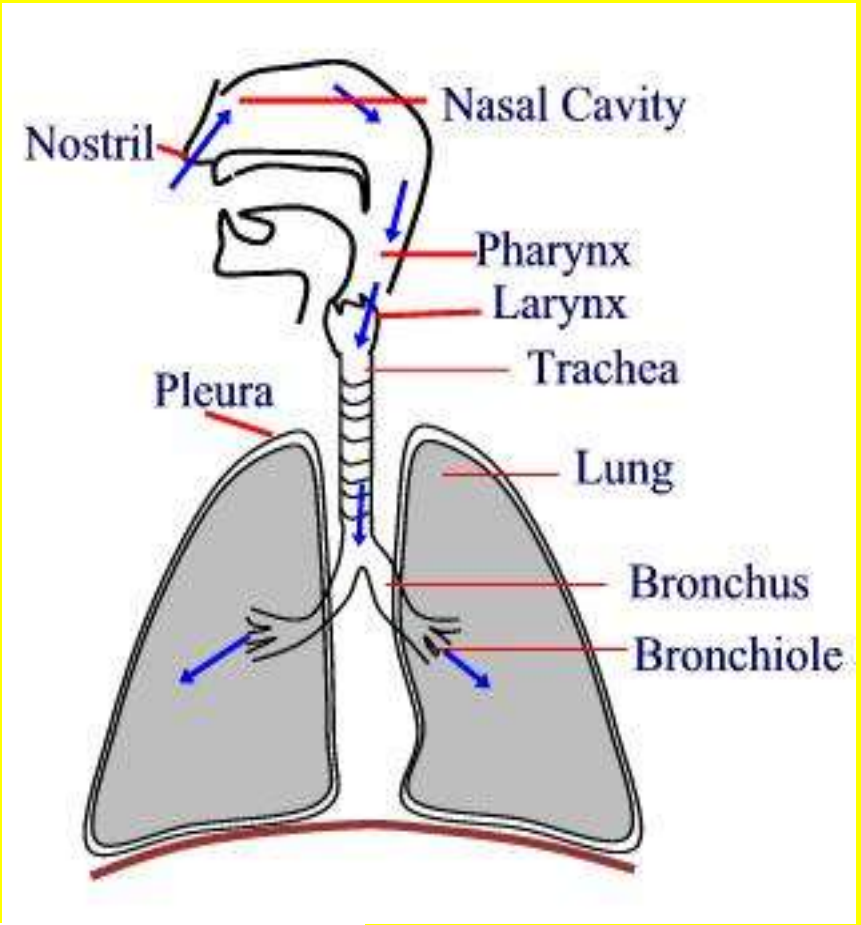
- Function: warms, moistens, & purifies air; inhaling and exhaling gases; helps body maintain stable pH by exhaling excess CO_2, alveoli is where it is exchanged
- Organs: trachea, bronchi, lungs, nose

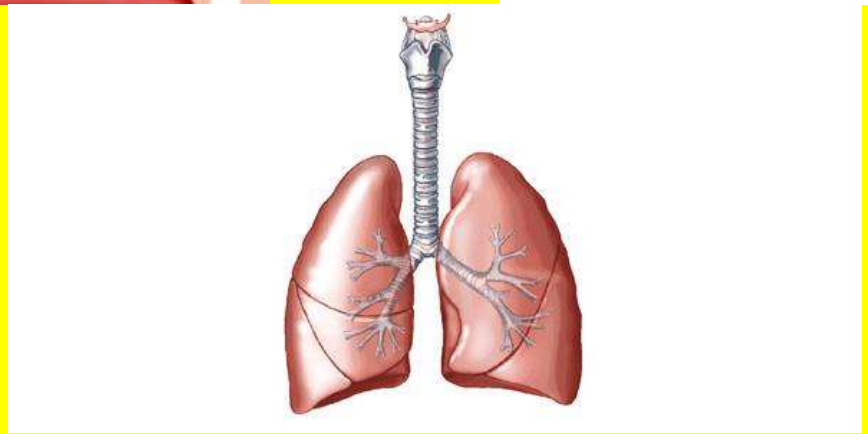






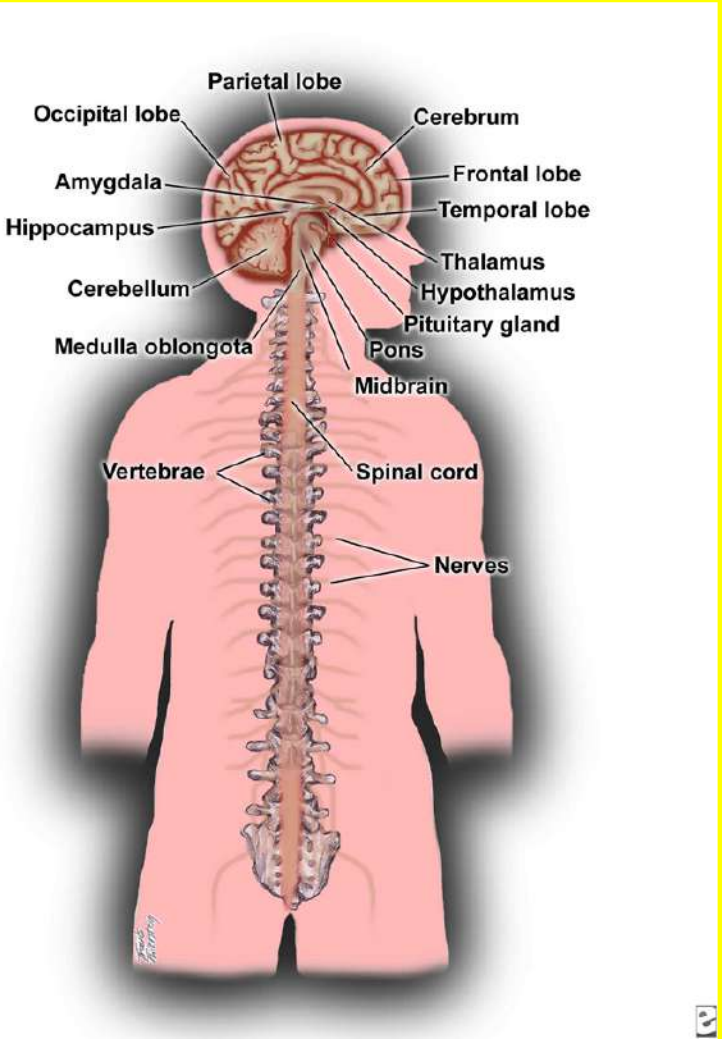

Respiratory System Diagram
Connective Tissue
Capillary Beds
Alveolar Sacs
Alveolar Duct
Alveoli
Pulmonary Artery
Pulmonary Vein
Nose
Nasopharynx
Oropharynx
Laryngopharynx
Epiglottis
Larynx
Trachea
Bronchi
Lungs
Diaphragm

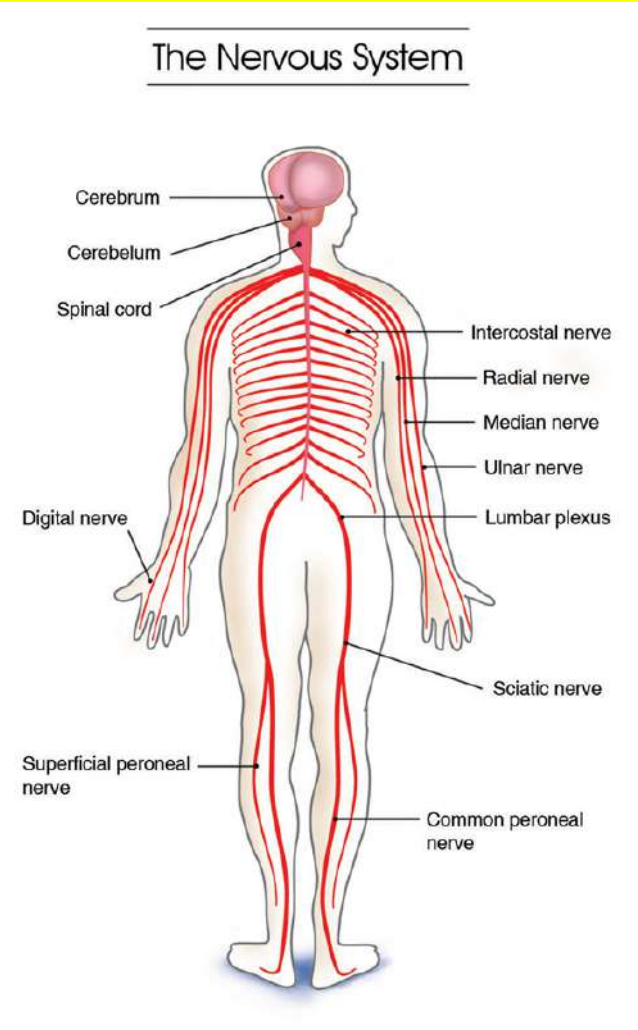

Nostril
Nasal Cavity
Pharynx
Larynx
Trachea
Pleura
Lung
Bronchus
Bronchiole

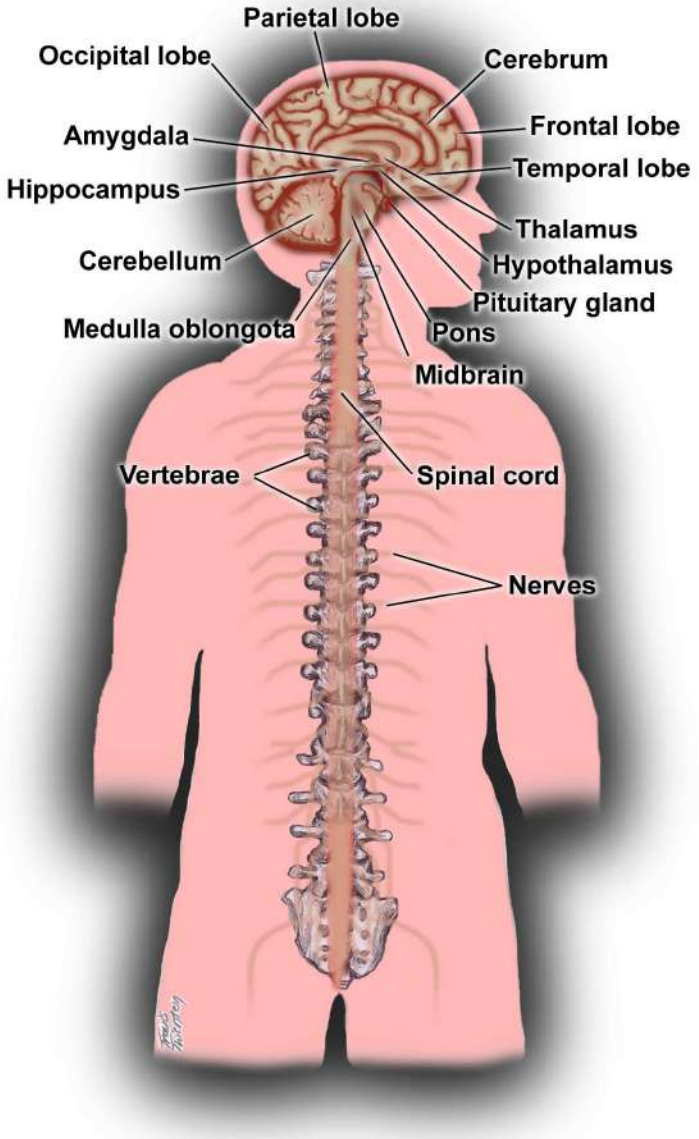


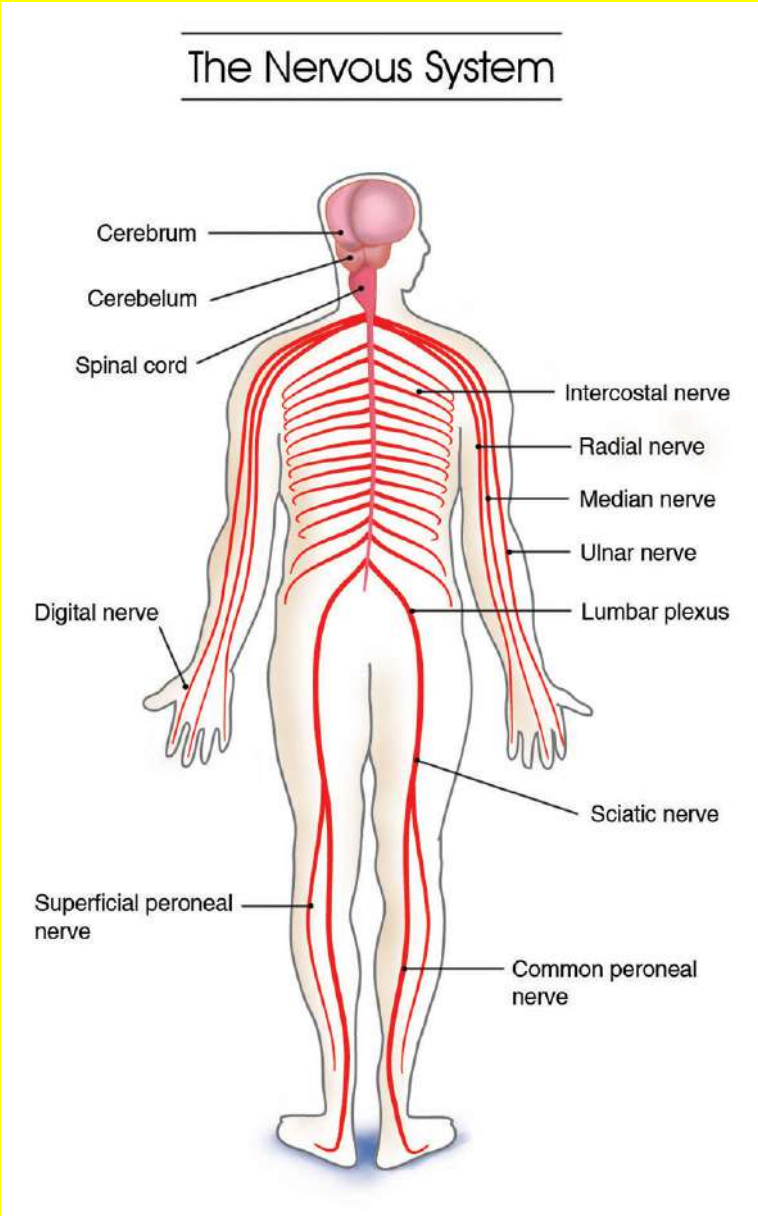
Nervous

- Function: responsible for voluntary and involuntary control of the body and communication of all its parts
- Organs: brain, spinal cord, sensory nerves



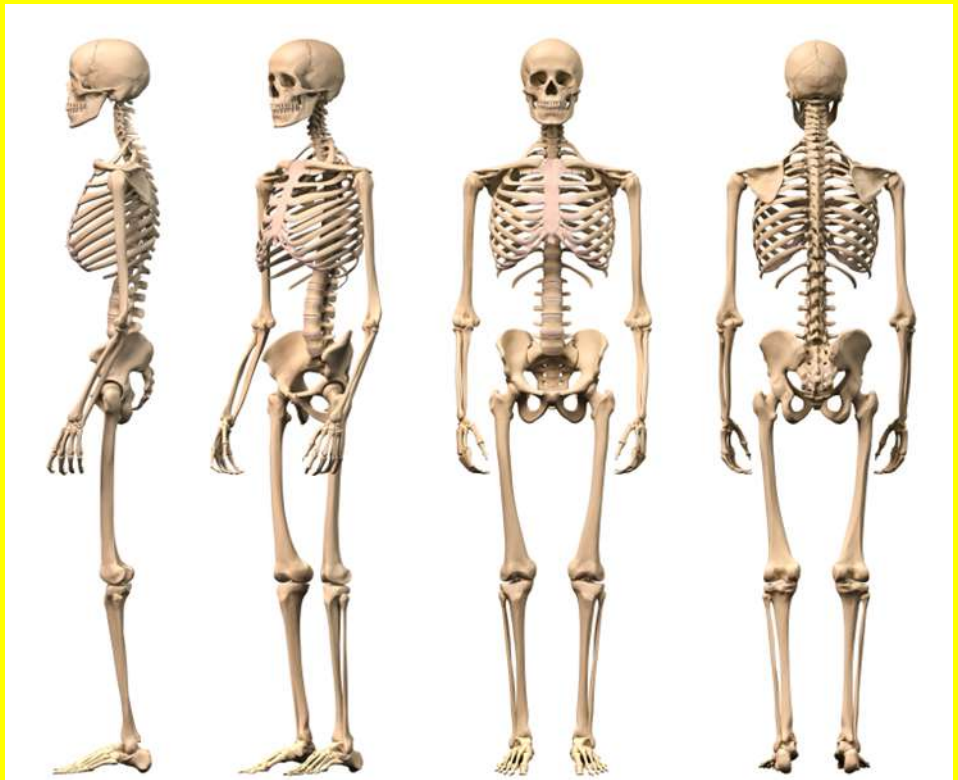


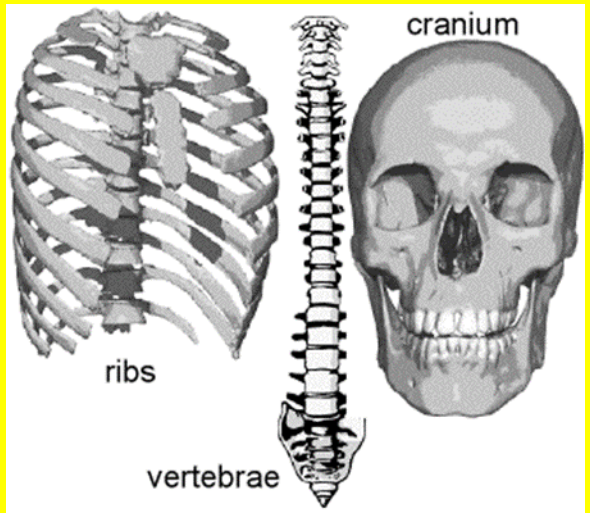

Parietal lobe
Occipital lobe
Cerebrum
Amygdala
Frontal lobe
Temporal lobe
Hippocampus
Thalamus
Hypothalamus
Cerebellum
Pituitary gland
Medulla oblongota
Pons
Midbrain
Vertebrae
Spinal cord
Nerves

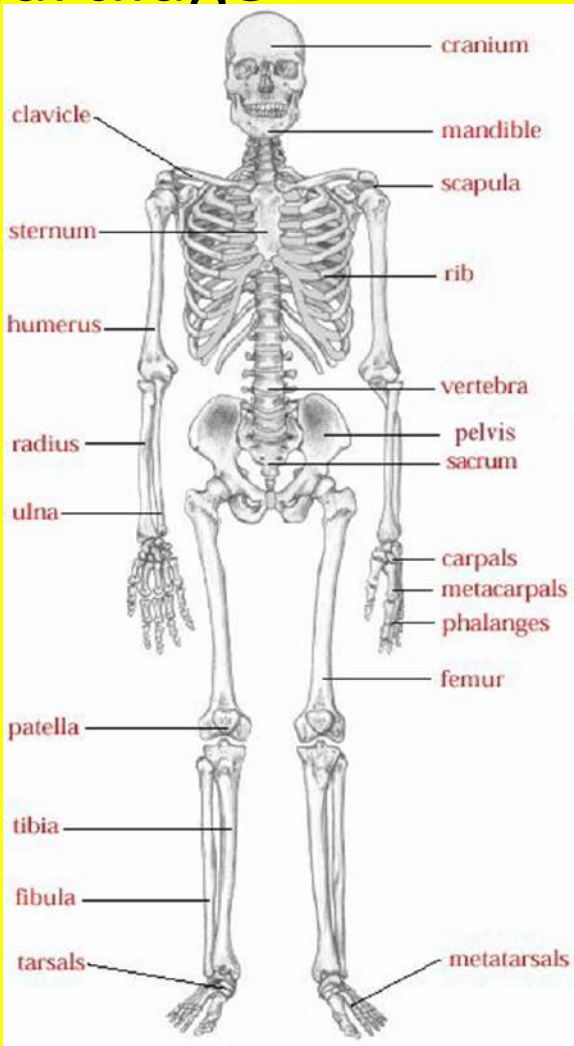

The Nervous System
Cerebrum
Cerebelum
Spinal cord
Intercostal nerve
Radial nerve
Median nerve
Ulnar nerve
Digital nerve
Lumbar plexus
Sciatic nerve
Superficial peroneal nerve
Common peroneal nerve

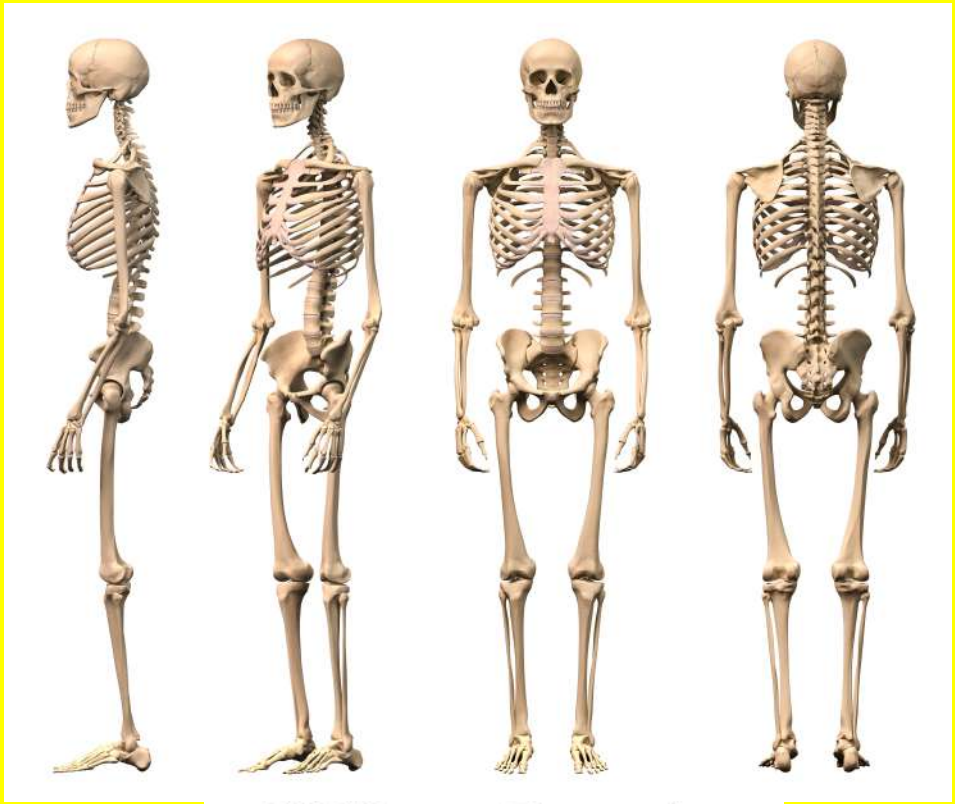
Skeletal

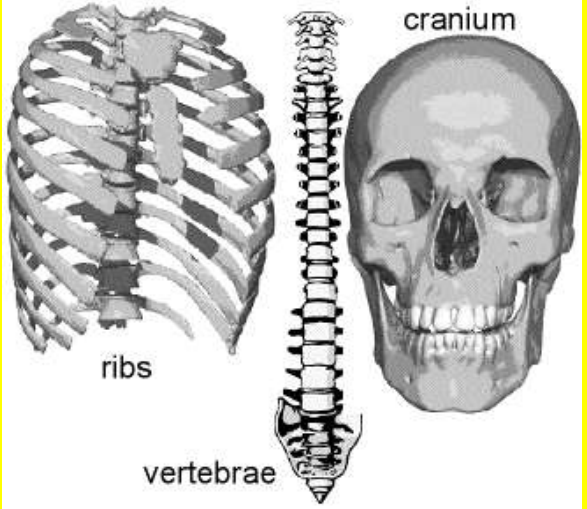
- Function: support, movement, protection, blood cell and immune cell production, calcium storage, endocrine regulation.
- Organs: bones, ligaments, tendons, cartilage

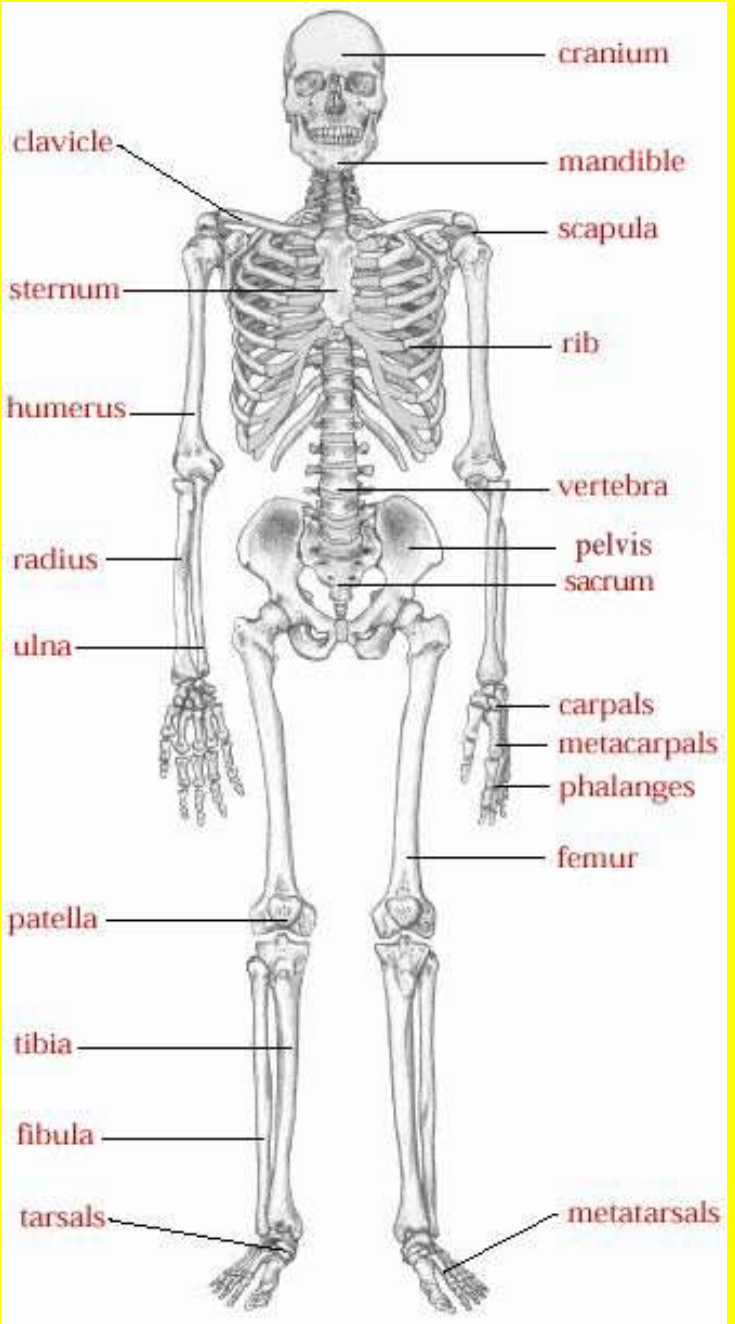






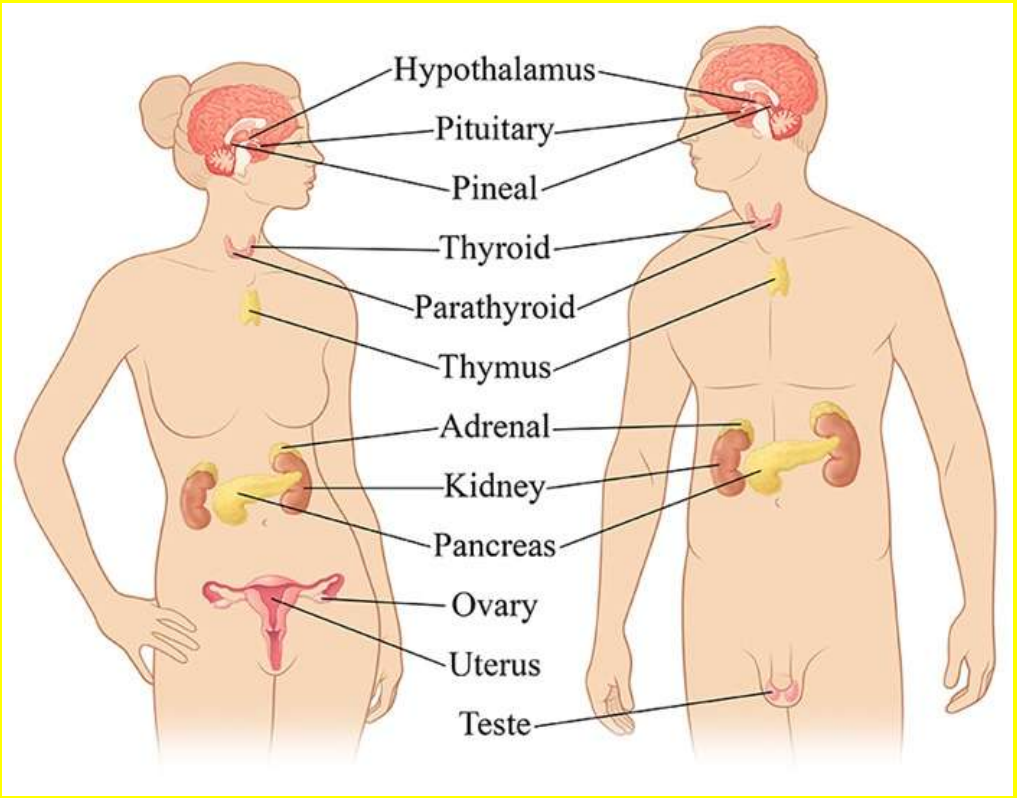


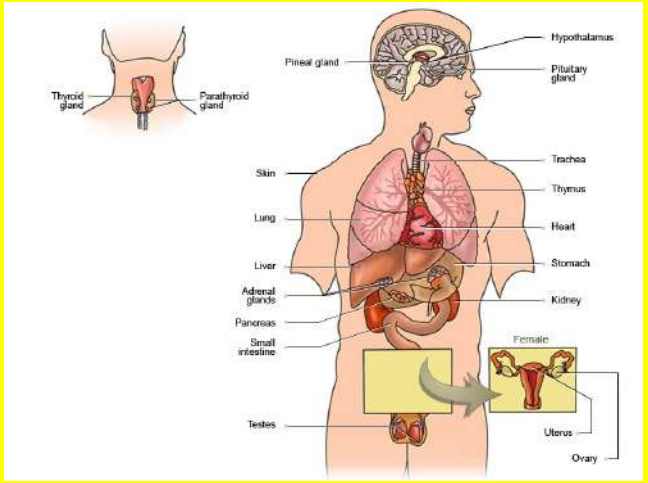

cranium
ribs
vertebrae

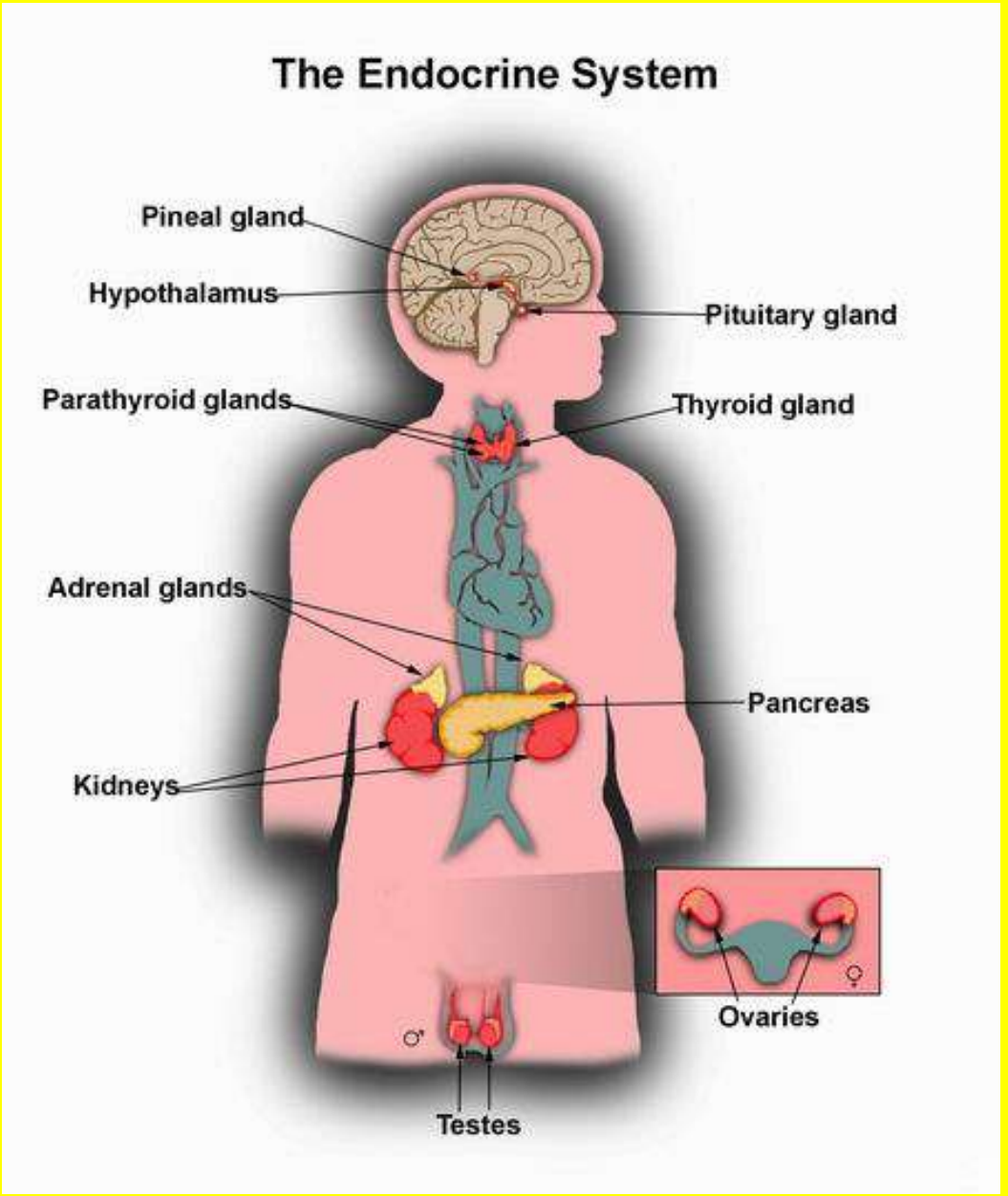

cranium
clavicle
mandible
scapula
sternum
rib
humerus
vertebra
pelvis
radius
sacrum
ulna
carpals
metacarpals
phalanges
femur
patella
tibia
fibula
tarsals
metatarsals

Endocrine

- Functions: produce and secrete hormones that regulate growth, metabolism, reproduction, sleep, and mood.
- Organs: pituitary, thyroid, parathyroids, adrenals


Hypothalamus
Pituitary
Pineal
Thyroid
Parathyroid
Thymus
Adrenal
Kidney
Pancreas
Ovary
Uterus
Teste

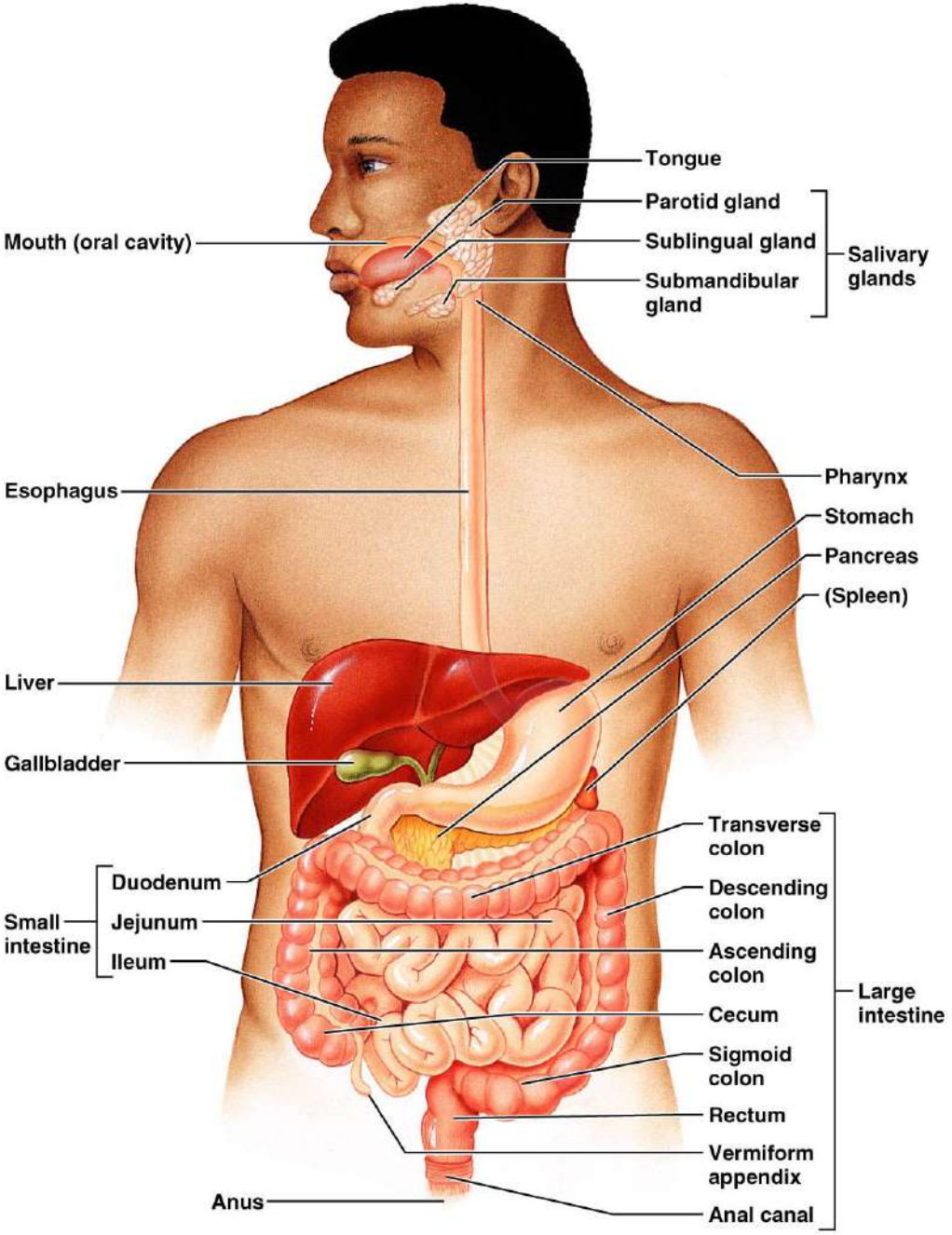

Thyroid gland
Parathyroid gland
Pineal gland
Hypothalamus
Pituitary gland
Skin
Trachea
Thymus
Lung
Heart
Liver
Stomach
Adrenal glands
Kidney
Pancreas
Small intestine
Female
Testes
Uterus
Ovary


The Endocrine System
Pineal gland
Hypothalamus
Pituitary gland
Parathyroid glands
Thyroid gland
Adrenal glands
Pancreas
Kidneys
Ovaries
Testes

Digestive

Functions: Physical and chemical breakdown of food into molecules that are absorbed; water absorption; eliminates waste

Organs: mouth, stomach, intestines, liver



THE DIGESTIVE PROCESS

KIDS DISCOVER

Everything you eat – from a healthy salad to a slice of pizza – goes through the same basic process once you eat it. That process provides your body with the energy and nourishment it needs to survive. How does it work?

HOW DOES THE BODY USE NUTRIENTS?

Most digested food particles, including what you drink, are absorbed through the small intestine. But your body doesn't use every single nutrient in the same way.

Carbohydrates

Produce energy

Fibers

Stabilize blood sugar, promote a healthy digestive system

Proteins

Produce energy and provide stamina, build and repair body tissues, produce enzymes, hormones, and other elements the body needs

Fats

Produce energy, lubricate joints, protect nerve tissue, and cushion vital organs

Vitamins & Minerals

Build strong bones and teeth, support the immune system, prevent deficiencies that can cause fatigue or lead to organ damage

Digestion starts in the mouth with chewing and swallowing of food. Your salivary glands produce an enzyme that begins digesting the carbohydrates from food into smaller molecules.

Swallowed food travels down the esophagus and into the stomach.

The stomach has three jobs: storing swallowed food and liquid; breaking down the food and liquid and mixing it with digestive juices; and emptying the contents into the small intestine.

How long does food stay in the stomach?

Food stays in the stomach for two to four hours. Carbohydrates stay for the least amount of time, while proteins and fats stay longer.

Food passes from the stomach to the small intestine, which is where the nutrients are absorbed and transported throughout the body. Anything that can't be absorbed goes into the colon as waste matter.

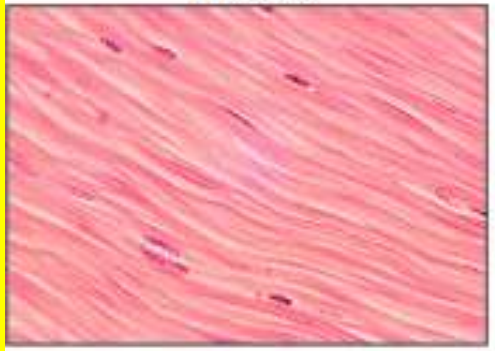
SOURCE: U.S. Department of Health and Human Services

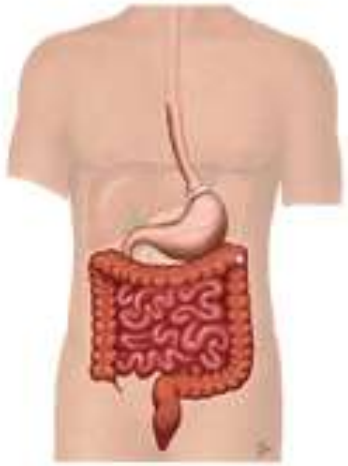
Muscular

Functions: movement of the human body; parastalsis (muscle contractions on tubular smooth muscle, i.e. the digestive system) thermoregulation; maintain posture

Organs: Types - Cardiac, Smooth, Skeletal

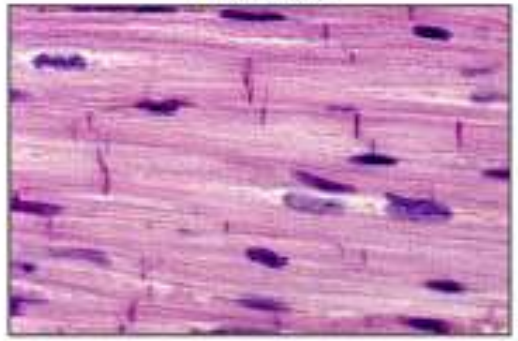
Smooth Muscle Tissue





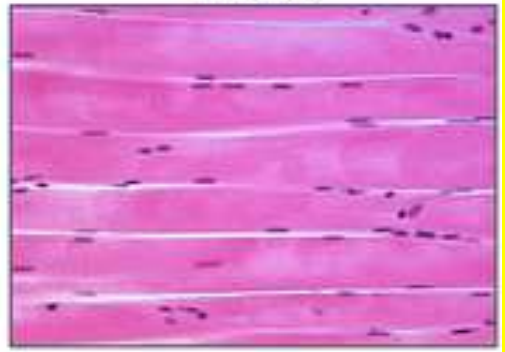
Involuntary Control

Cardiac Muscle Tissue



Involuntary Control

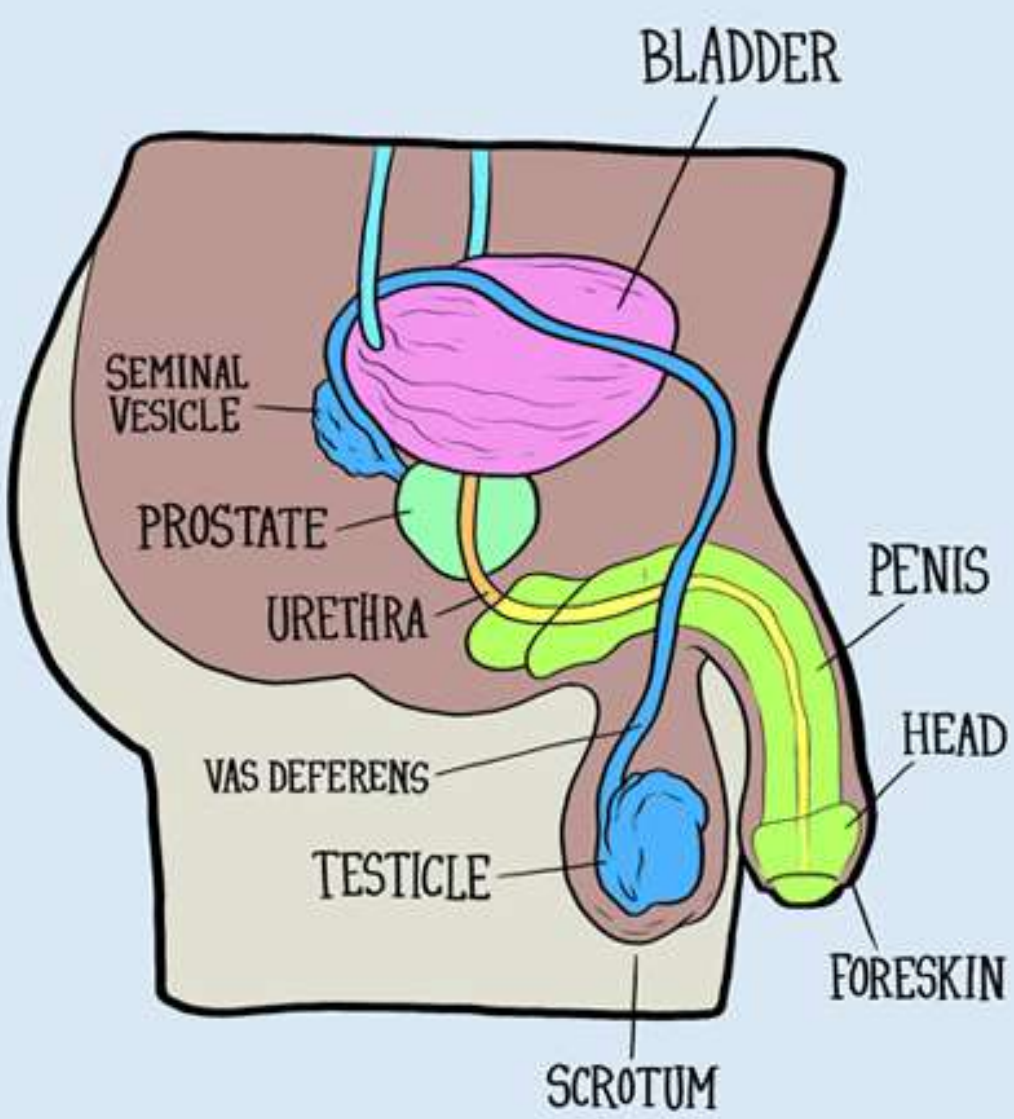
Skeletal Muscle Tissue

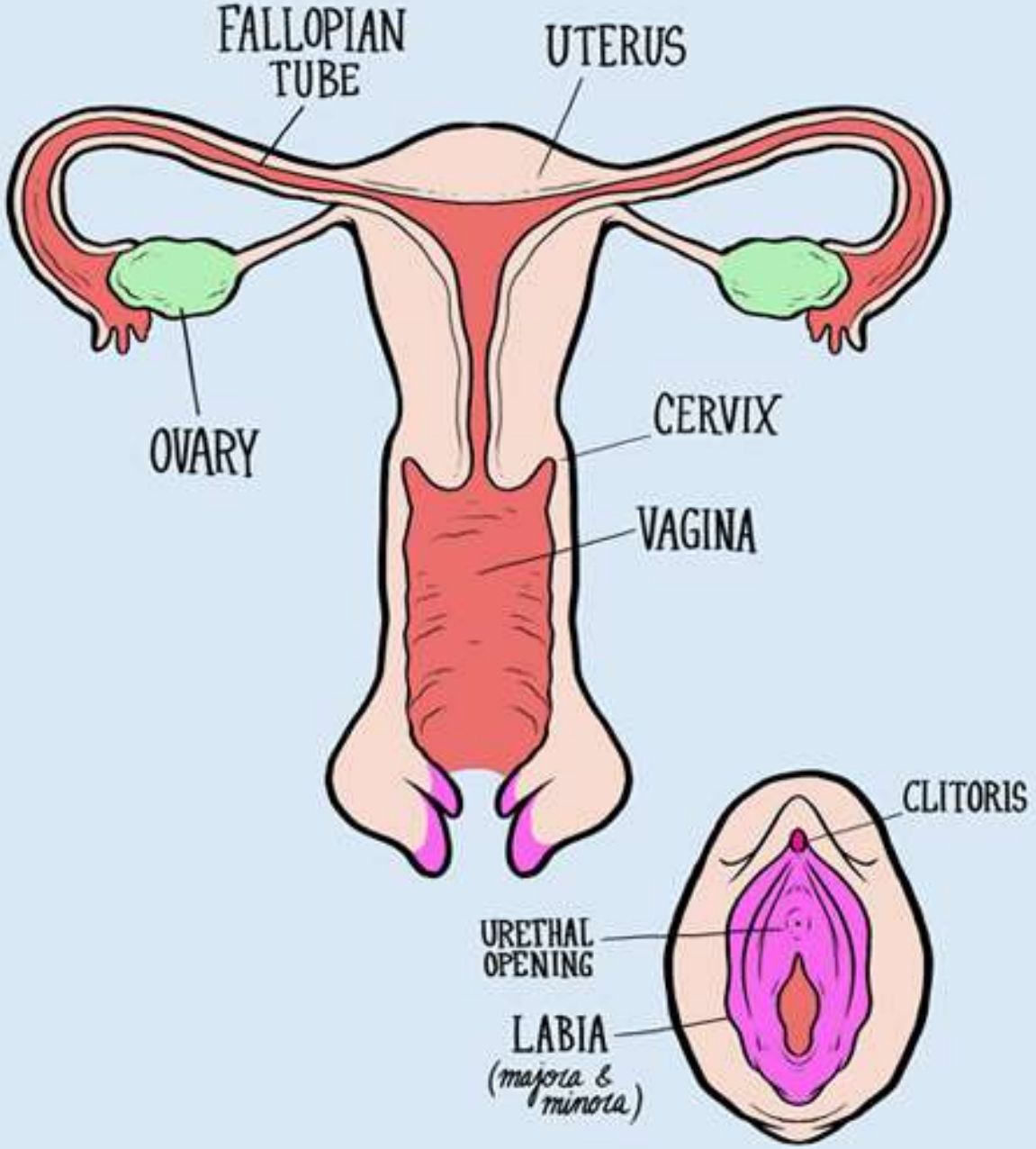


Voluntary Control

Reproductive

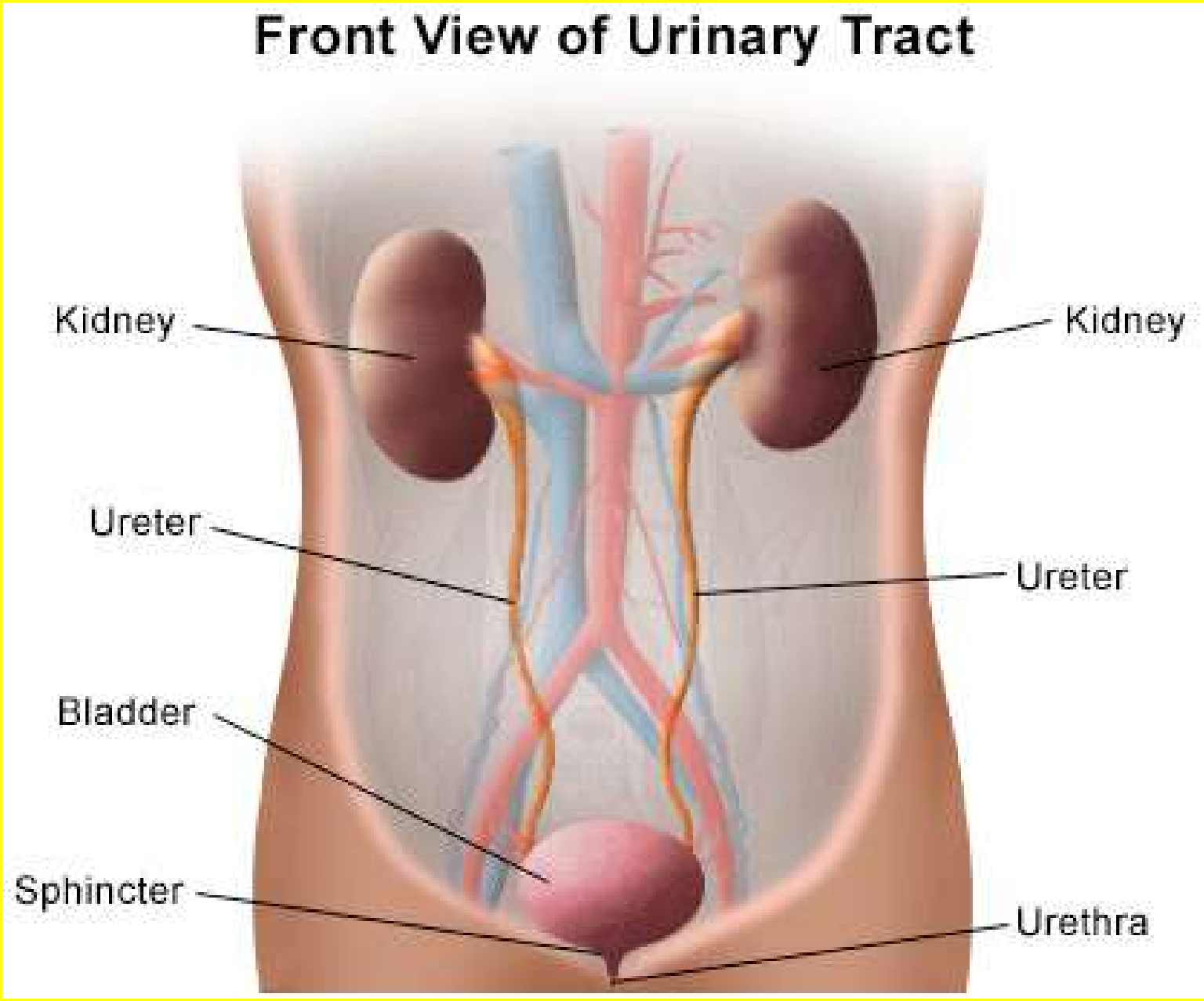
Functions: produce offspring; gonads produce hormones that aid in growth and development
Organs: Female-ovaries, uterus
Male-testis, penis


BLADDER
SEMINAL VESICLE
PROSTATE
URETHRA
PENIS
HEAD
VAS DEFERENS
TESTICLE
FORESKIN
SCROTUM


FALLOPIAN TUBE
UTERUS
OVARY
CERVIX
VAGINA
CLITORIS
URETHAL OPENING
LABIA
(majora & minora)

Urinary

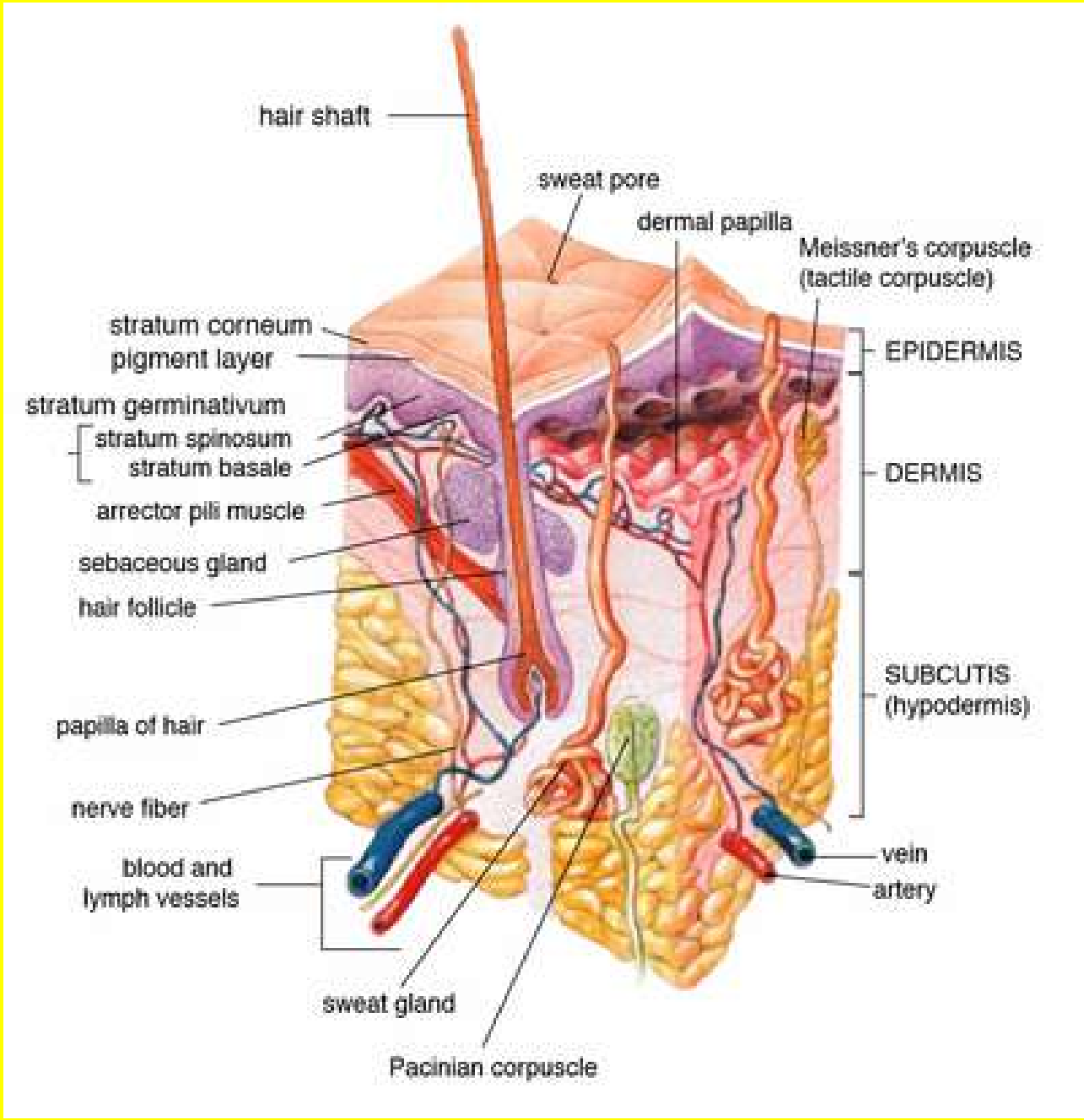
Functions: filters blood to produce, store, and eliminate urine
Organs: kidneys, ureters, bladder


Front View of Urinary Tract
Kidney
Kidney
Ureter
Ureter
Bladder
Sphincter
Urethra

Integumentary

Functions: protection, thermoregulation, excrete wastes, sensory receptor, vitamin D production

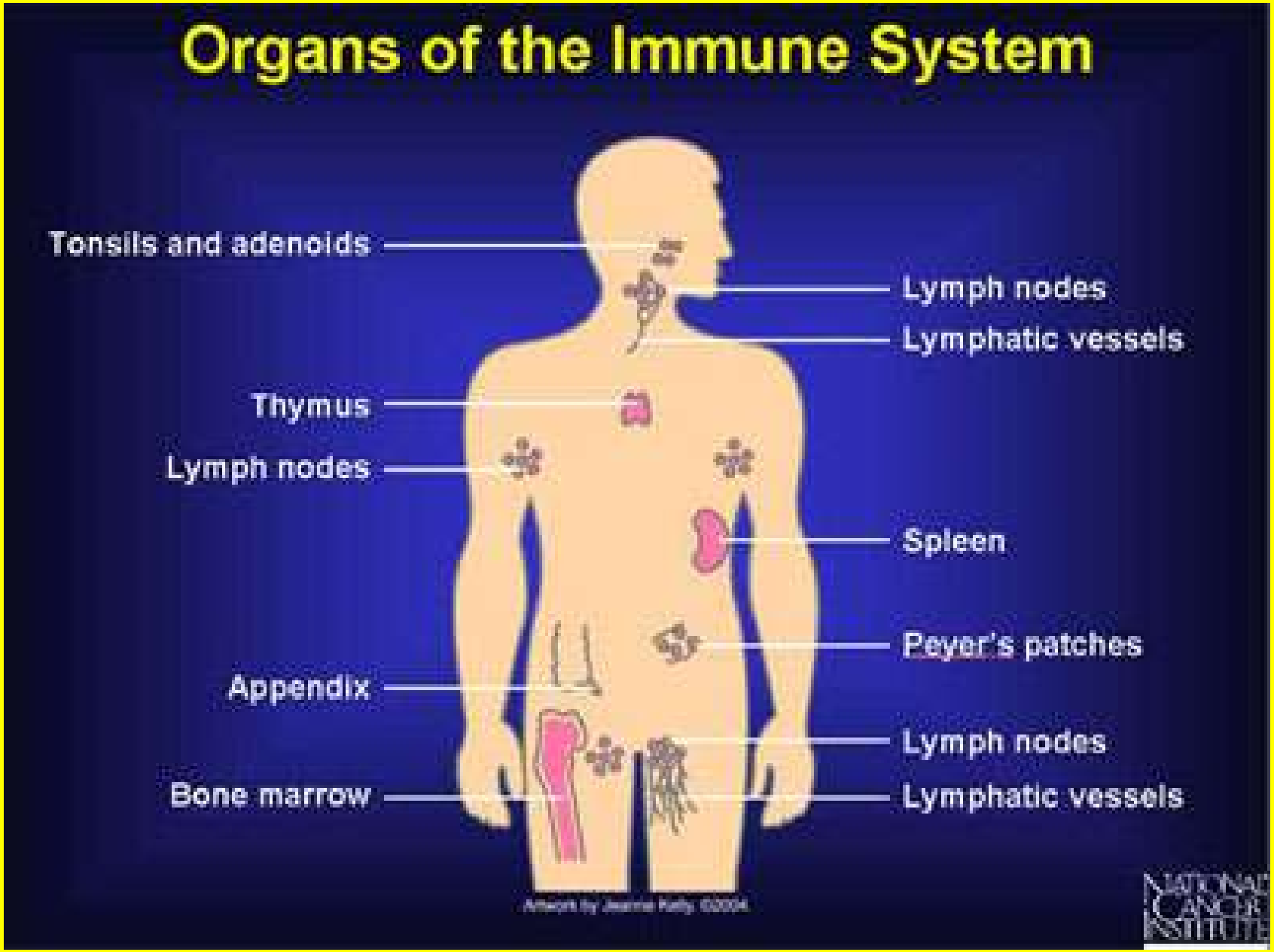
Organs: skin, hair, nails


hair shaft
sweat pore
dermal papilla
Meissner's corpuscle
(tactile corpuscle)
stratum corneum
pigment layer
EPIDERMIS
stratum germinativum
stratum spinosum
stratum basale
DERMIS
arrector pili muscle
sebaceous gland
hair follicle
SUBCUTIS
(hypodermis)
papilla of hair
nerve fiber
blood and
lymph vessels
vein
artery
sweat gland
Pacinian corpuscle

Immune

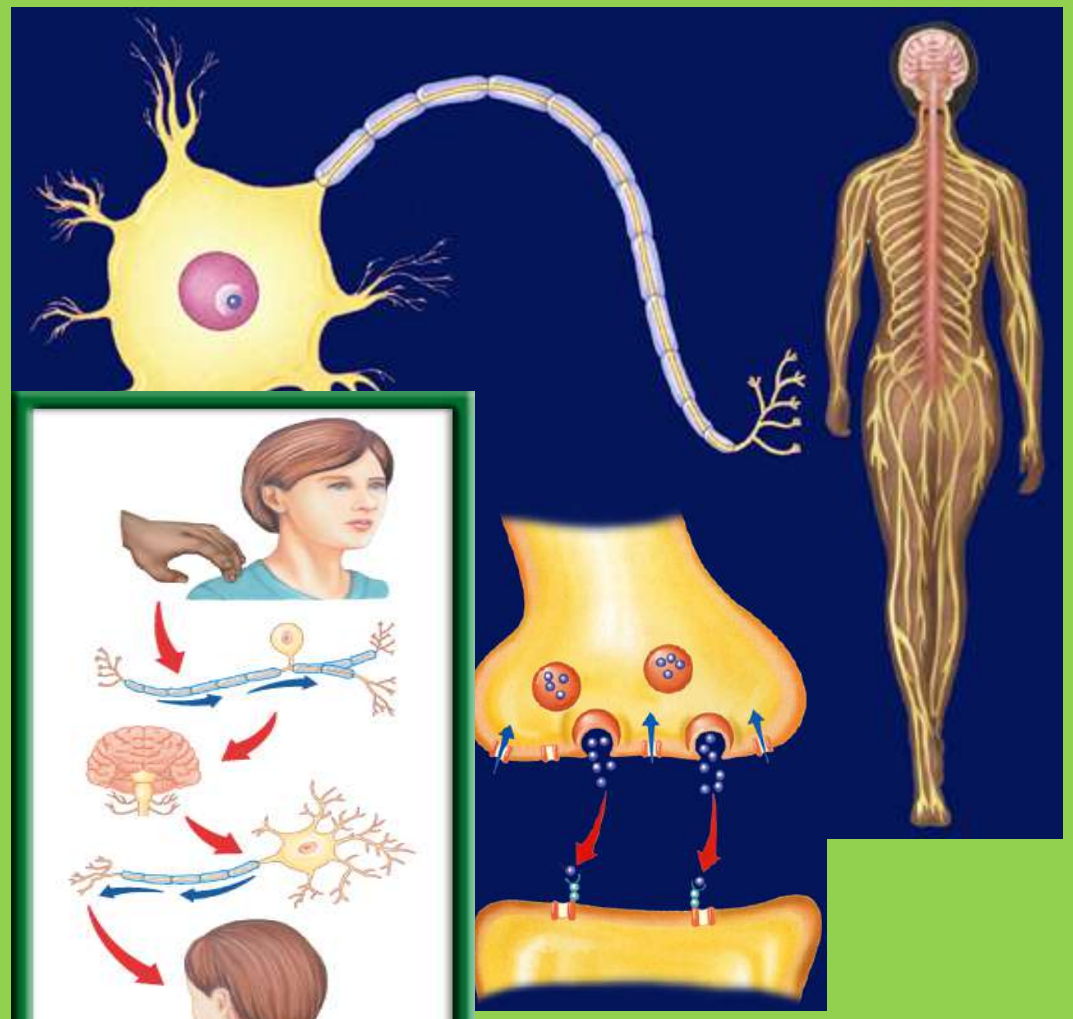
Functions: defends the body against “foreign” invaders (like bacteria, viruses, and parasites), removes dying or damaged cells.

Organs: tonsils, lymph vessels, spleen, bone marrow


Organs of the Immune System
Tonsils and adenoids
Lymph nodes
Lymphatic vessels
Thymus
Lymph nodes
Spleen
Peyer's patches
Appendix
Lymph nodes
Bone marrow
Lymphatic vessels
NATIONAL CANCER INSTITUTE

1/24 Nervous System 36.1

Obj. TSW explain the roles of the sensory neurons, interneurons, and motor neurons in sensation, thought and response by doing a lab on reaction response. P.14 NB



1. Describe, draw, and label a neuron.
2. Explain the functions of each type of neuron: sensory, interneuron, and motor.
3. What is a reflex, write an example?

White Board Body Systems Chart Gallery Walk

- On your white board:

1. Draw your Body System
    1. Show a cell, tissue and organ for that system
2. Label all the major organs
3. List 2 – 3 functions of that system
4. List 1 fact

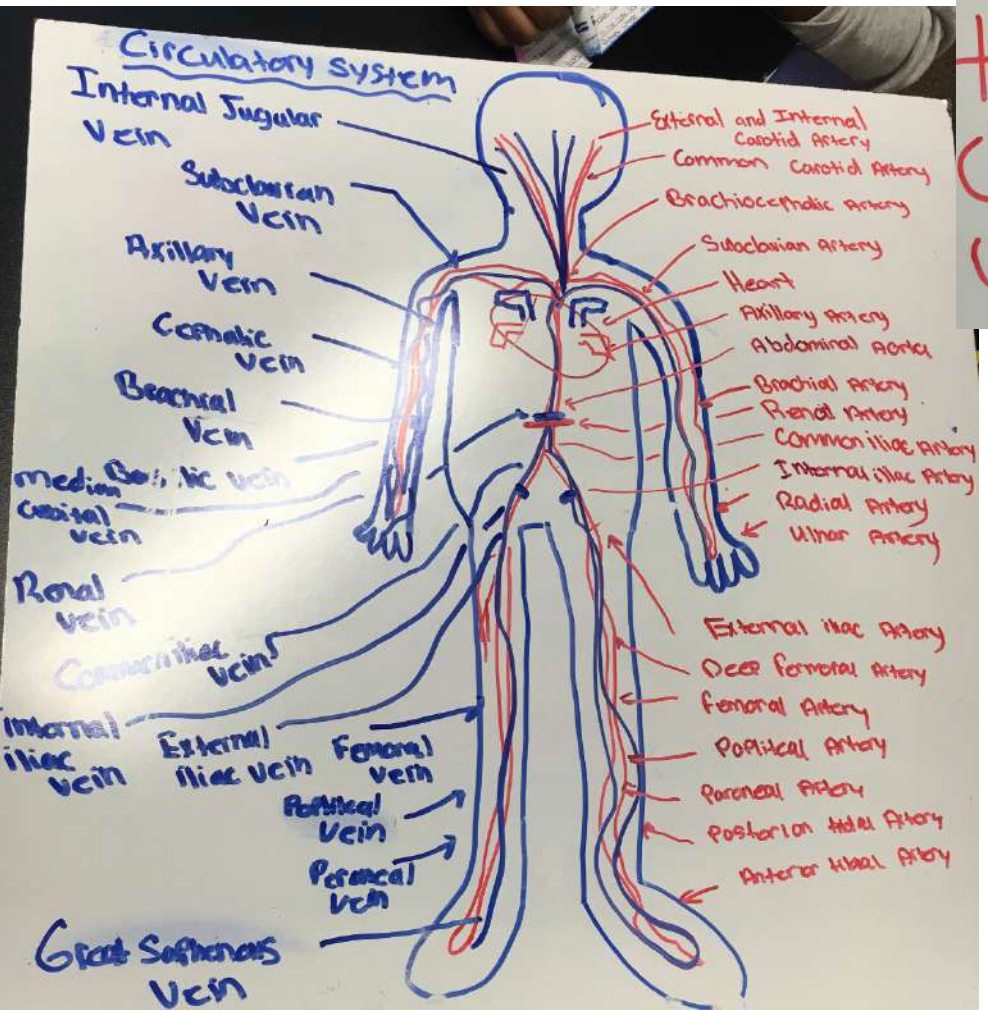
Make sure your Body Systems Chart is finished by the end of class.

Body Systems Chart Worksheet P. 13 NB

1/25 Distraction/ Reaction Lab CH 36

Obj. TSW calculate reaction times under different conditions. P. 16 NB

1. What type of neurons will you use in the distraction/ reaction lab tomorrow?
2. Is this lab an example of a reflex reaction? Why or why not?
3. What other body systems work together with your nervous system to help you catch the meter stick?



facts

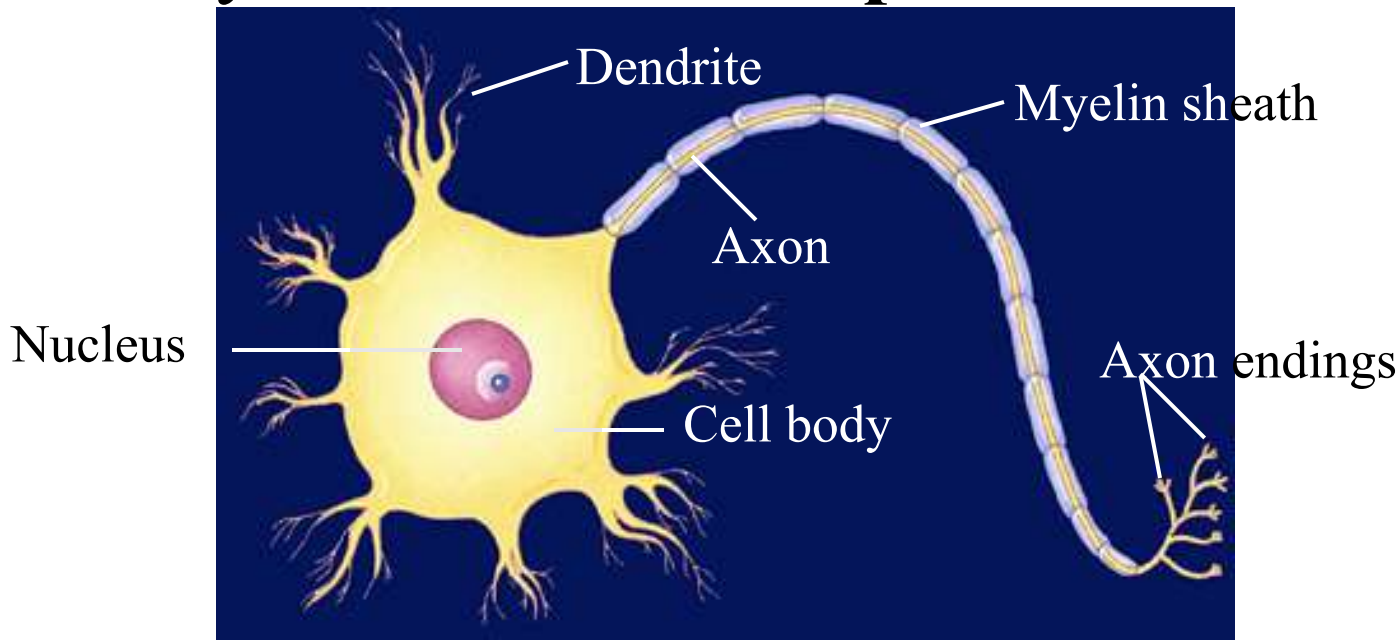
- over half of your blood is liquid plasma the rest is made of cells the plasma is most water

Functions

- Transports O_2 and CO_2
- Distribution of Nutrients and transport of waste
- Maintenance of body temperature

#1. Neurons: Basic Units of the Nervous System

- Neurons conduct impulses throughout the nervous system. **Draw this picture**



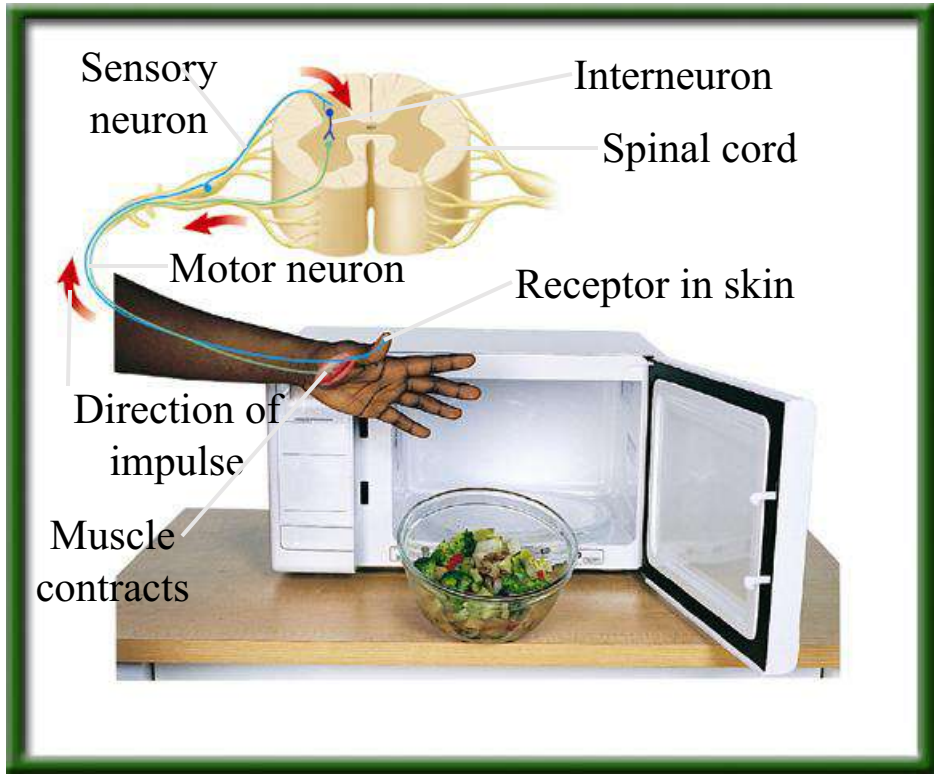
#2.Neurons: Basic Units of the Nervous System

- Neurons fall into three categories: sensory neurons, motor neurons, and interneurons.

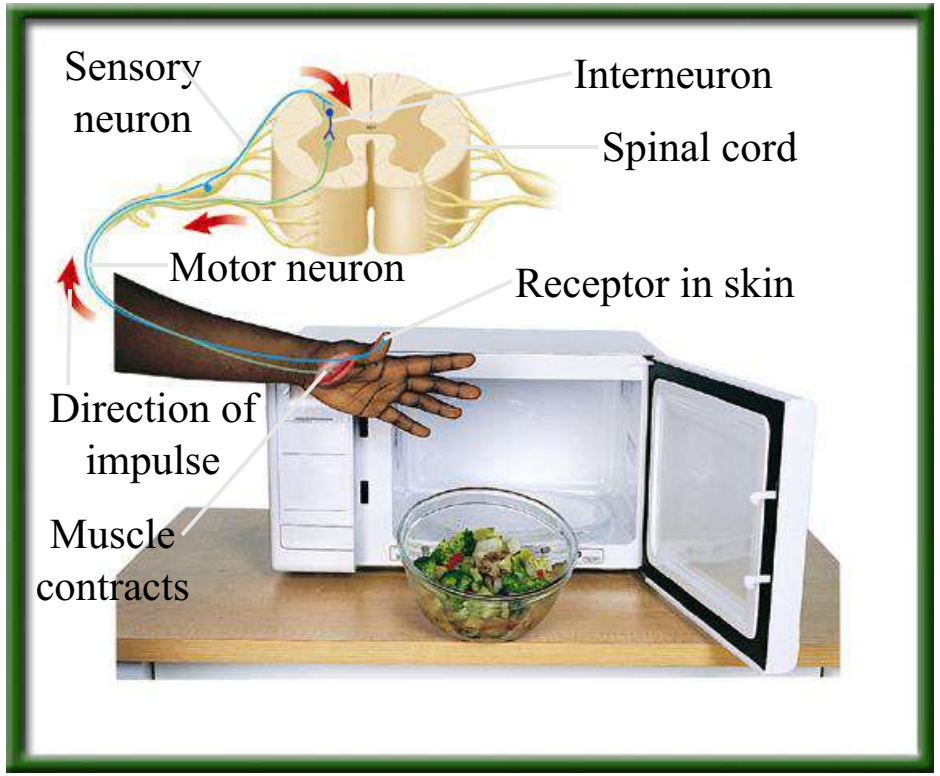
- Sensory neurons carry impulses from the body to the spinal cord and brain.

Neurons: Basic Units of the Nervous System

- Interneurons are found within the brain and spinal cord.

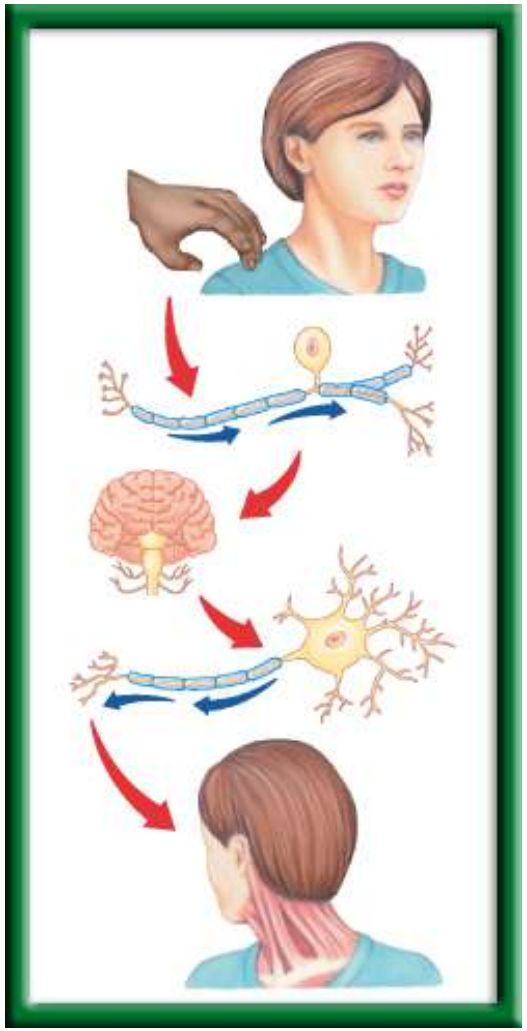


Neurons: Basic Units of the Nervous System



- Motor neurons carry the response impulses away from the brain and spinal cord to a muscle or gland.

How the Central Nervous System Works



Sensory Neuron
-You sense the touch

Interneuron
-The brain processes that you have been touched.

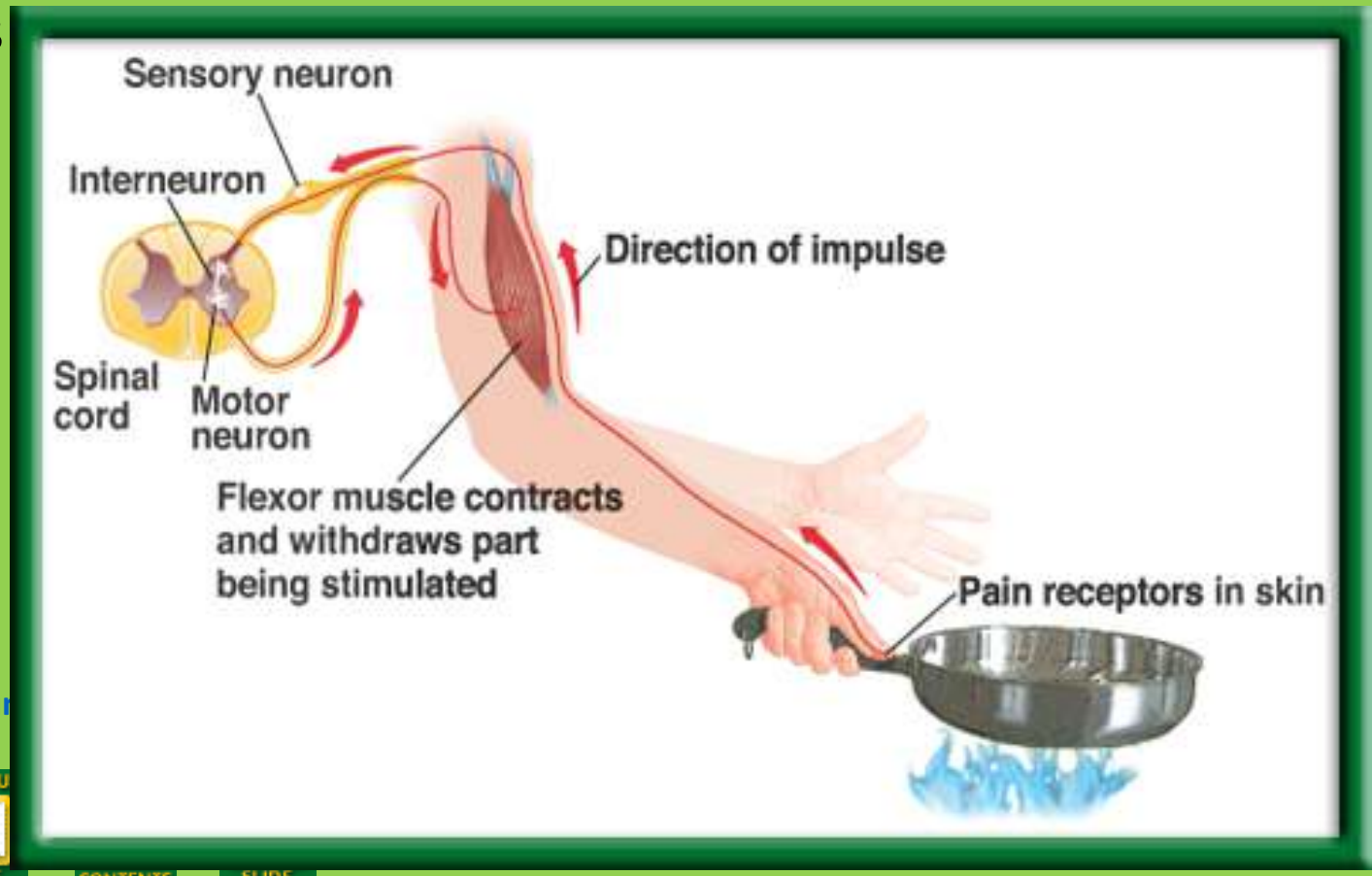
Motor Neuron
-You turn your head to see who touched your shoulder

1/26 Simple Reflex CH 36.1

Obj. TSW apply what they have learned about the nervous system

To the Distraction Reaction Lab. P. 18 NB

1. Explain a reflex reaction using the names of the three types of neurons.
2. Name a body systems besides the muscular system that works with the nervous system, explain how it works?
3. How does a reflex protect you?



To return to the chapter su

PREVIOU
SLIDE
CONTENTS
SLIDE

Answers to Warm Up 1/26
A Simple Reflex

1. Pain receptors in the hand send an impulse through the sensory neuron to the spinal cord where the interneuron send the impulse to the motor neuron that ends in the muscle . The reflex causes the muscle to contract and the hand to move away.
2. The digestive system helps/ works with the nervous systems to supply energy for the impulse
3. A reflex protect you by preventing further damages from being done.

Body Systems Interactive Worksheet

- Fill in 5 examples of how two Body Systems work together to maintain homeostasis.
- Then fill yours in on the board.
- Copy down the one’s you do not have.
- If you have any blanks, they are homework.

Systems p. 15 NB	Cardiovascular	Nervous	Immune	Endocrine	Muscular
Cardiovascular	XXXX				
Respiratory					
Nervous		XXXX			
Skeletal					
Endocrine				XXXX	
Digestive					
Muscular					XXXX
Reproductive					
Urinary/Excretory					
Integumentary					
Immune/Lymphatic			XXXX		

Name Date Class

MiniLab 36.1

Experimenting

Distractions and Reaction Time

Have your ever tried to read while someone is talking to you? What effect does such a distracting stimulus have on your reaction time?

Procedure

1. Work with a partner. Sit facing your partner as he or she stands.
2. Have your partner hold the top of a meterstick above your hand. Hold your thumb and index finger about 2.5 cm away from either side of the lower end of the meterstick without touching it.
3. Tell your partner to drop the meterstick straight down between your fingers.
4. Catch the meterstick between your thumb and finger as soon as it begins to fall. Measure how far it falls before you catch it. Practice several times.
5. Run ten trials, recording the number of centimeters the meterstick drops each time. Average the results.
6. Repeat the experiment, this time counting backwards from 100 by fives (100, 95, 90, . . .) as you wait for your partner to release the meterstick.

Analysis

1. Did your reaction time improve with practice? Explain.

2. How was your reaction time affected by the distraction (counting backwards)?

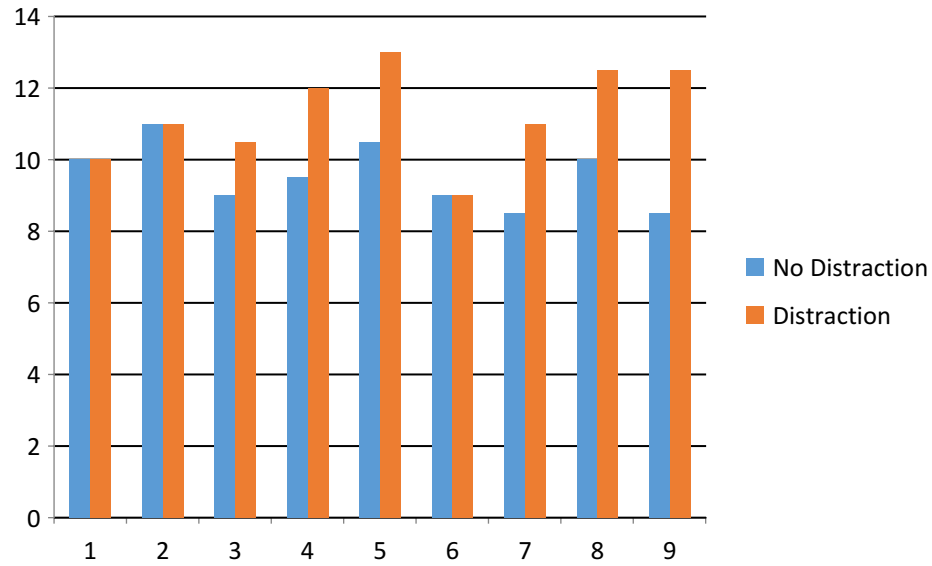
3. What other factors, besides distractions, would increase reaction time?

Copy this table on page 17NB. p.948BB

Trials	Without Distraction (cm)	With Distraction (cm)	Opposite hand (cm)
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
Average			

Mini Lab 36.1 Distractions & reaction Time

P. 948BB P. 17NB

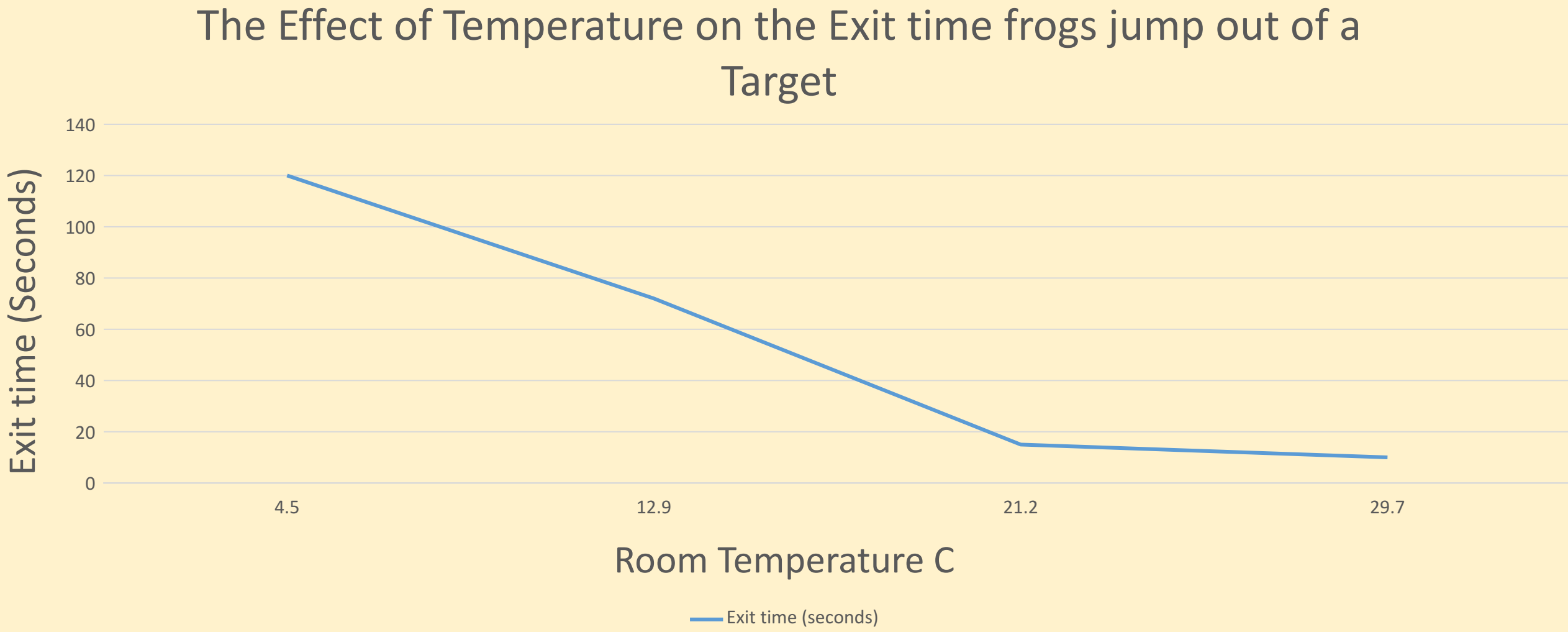


1. Your reaction time should improve with time due to muscle memory.
2. The distraction of counting backwards probably increased your reaction time and measurement.
3. Other factors besides your distraction that may increase your reaction time are: being sick, overly tired, sound, motivation, looking away & hungry.

Experimental Design Practice p. 17 NB

- #1
- The independent variable (What Margaret changed) is the amount of moisture.
- The dependent variable (What she measured) is the number of worms.
- The correct X axis label for a graph of Margaret's data is the "Amount of Moisture, (mL)"
- The correct Y axis label for a graph Margaret's data would be " The number of Worms present".
- The Correct title for Margaret's graph would be," The Effect of Moisture on the Number of Worms Present".

Winnie & the Worms

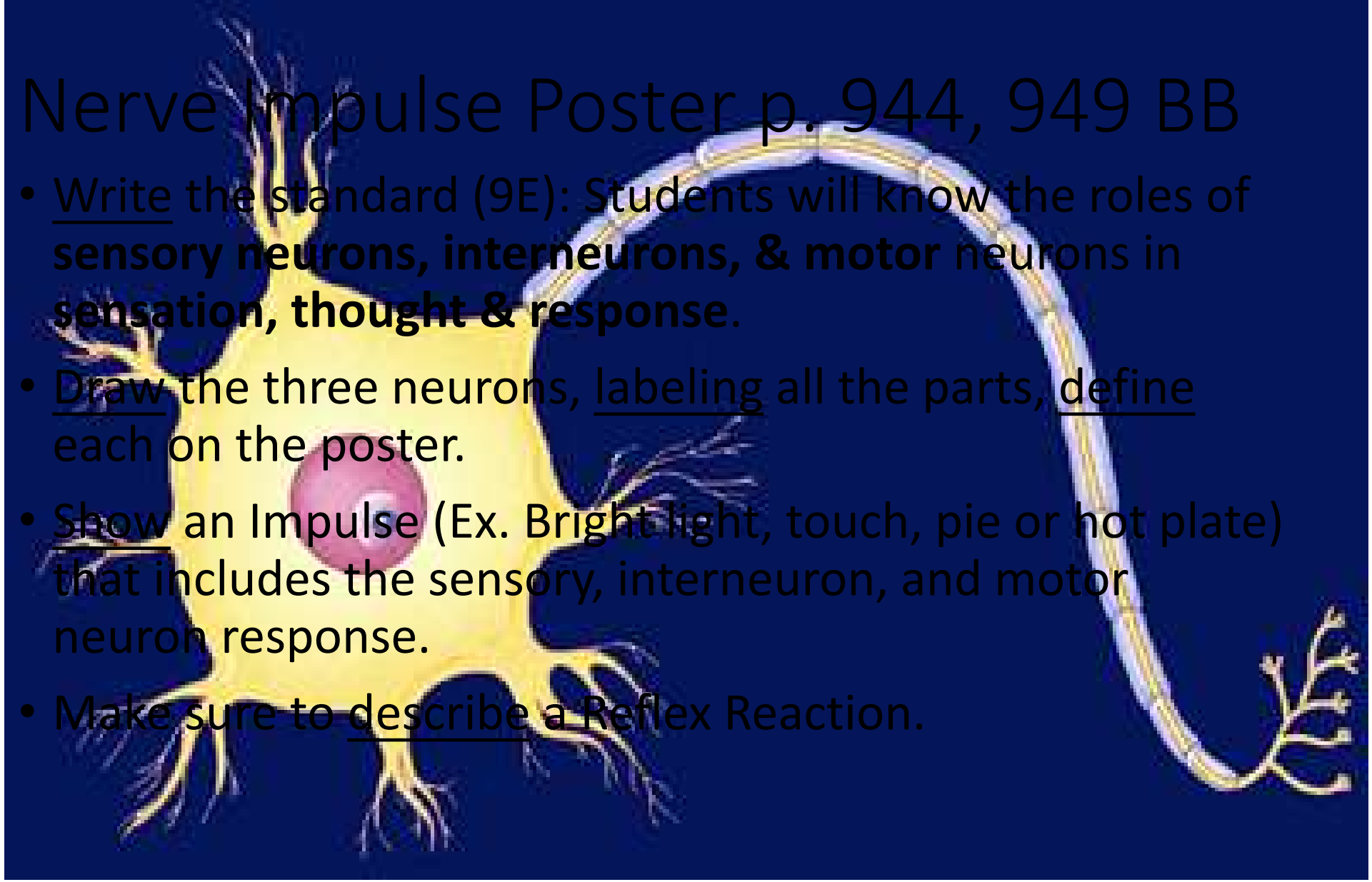


Distraction Reaction Lab

- Title
- Hypothesis (both people)
- Materials
- Procedure
- Data:
- Table 1 with Explanation (10 font)
- Graph 1 with Explanation (10 font)
- Data Analysis P. 948

Nerve Impulse Poster p. 944, 949 BB

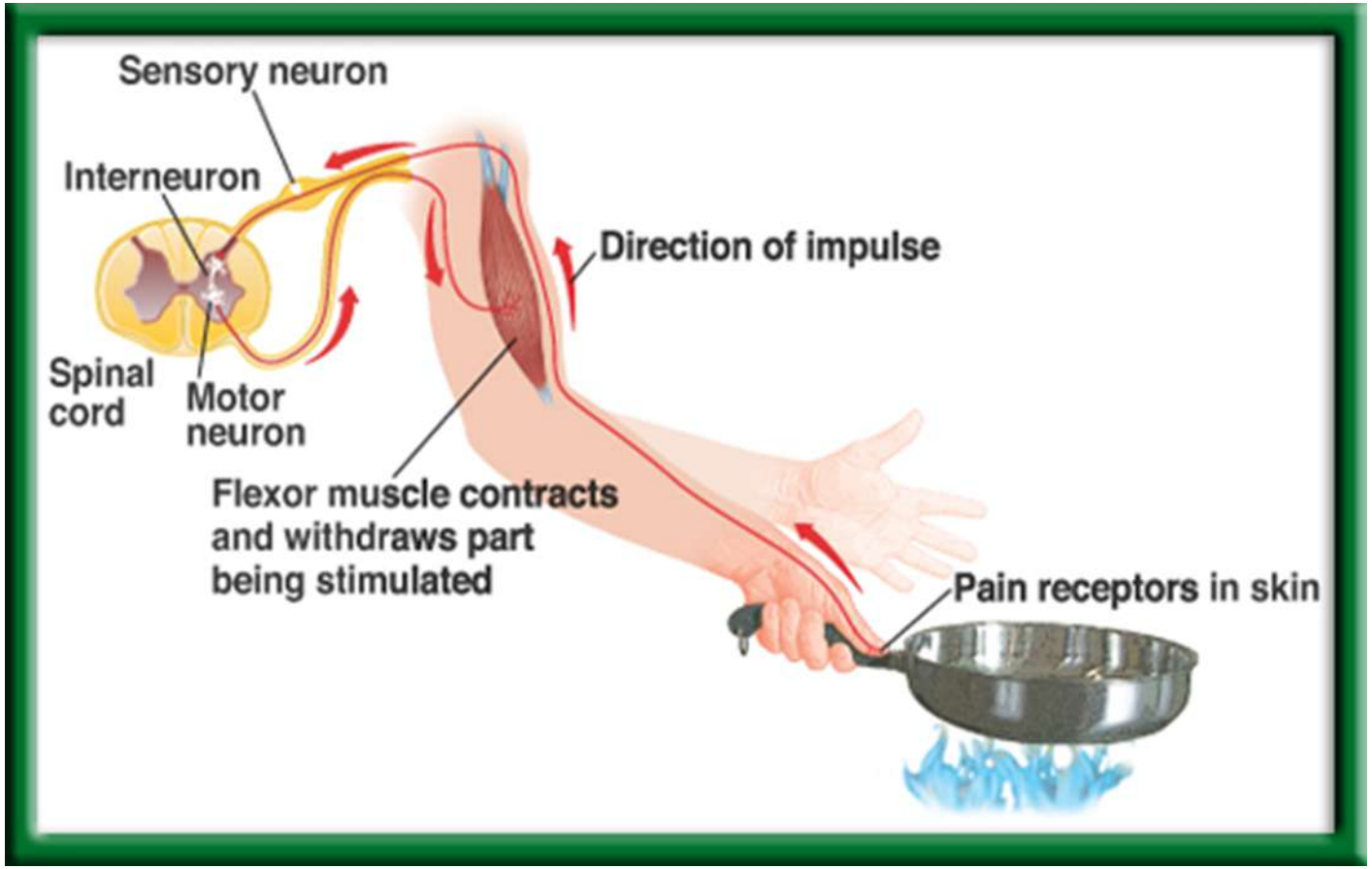
- Write the standard (9E): Students will know the roles of **sensory neurons, interneurons, & motor** neurons in **sensation, thought & response**.
- Draw the three neurons, labeling all the parts, define each on the poster.
- Show an Impulse (Ex. Bright light, touch, pie or hot plate) that includes the sensory, interneuron, and motor neuron response.
- Make sure to describe a Reflex Reaction.



1/30 Physiology P. 1048

Obj. TSW show what they have learned about each of the body systems through a Gallery Walk. P. 20 NB

1. Describe the word physiology.
2. Explain the function of three body systems.
3. Explain how 2 of those body systems work together to maintain homeostasis.


Sensory neuron
Interneuron
Direction of impulse
Spinal cord
Motor neuron
Flexor muscle contracts and withdraws part being stimulated
Pain receptors in skin

Circulation