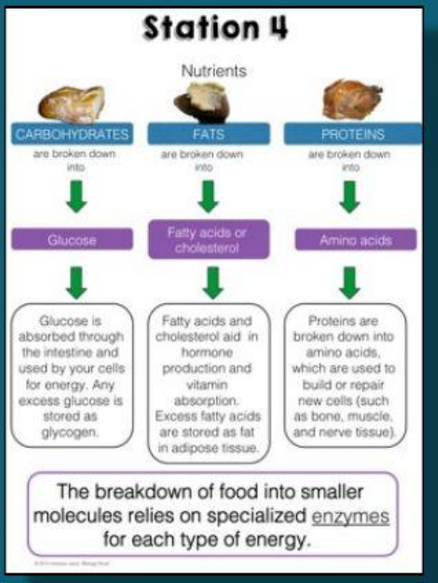
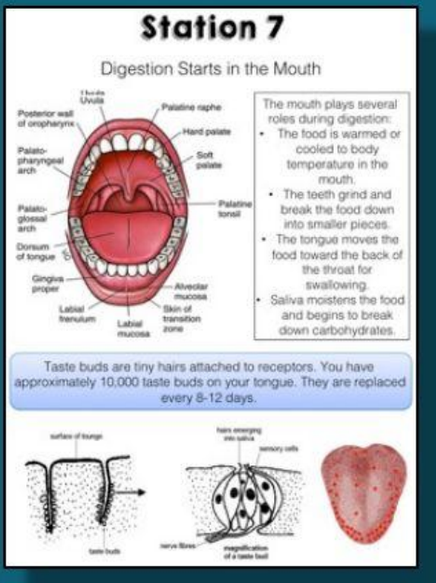
human body systems *stations*

- These stations are *versatile* and can be used to replace lecture; as an **introduction** to each body system; part of your **main lessons**; or as **review**.
- Require **minimal set up** and can be used year after year!
- Completely **student-lead**. The students will be engaged with the stations while you *catch up* on tasks.
- BOTH the student answer sheet and stations are *editable* so you can **edit** them to your liking.

"I used this resource with my biology students as an exploration activity before introducing the digestive system. Students stayed engaged the entire class period."– *Sarida H.*





human body systems *stations*

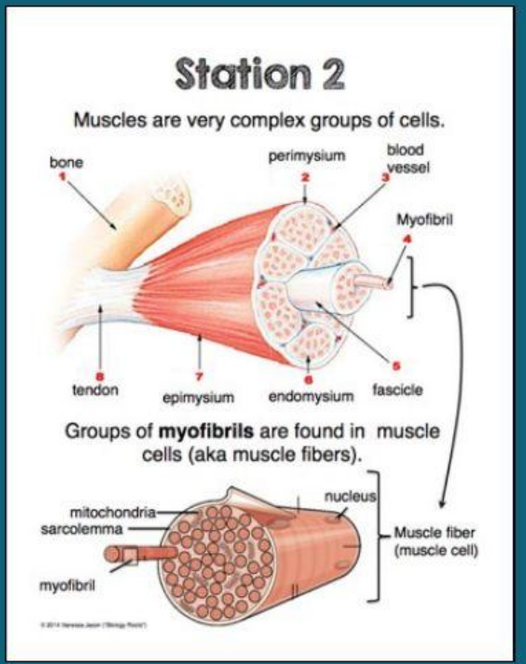
Body systems included (11):

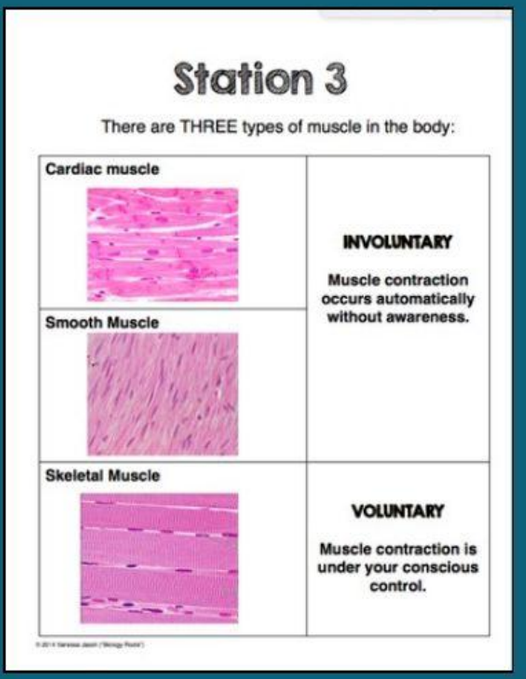
- Circulatory
- Digestive
- Endocrine
- Excretory
- Immune
- Integumentary
- Muscular
- Nervous
- Reproductive
- Respiratory
- Skeletal

"My students loved this resource. Recommend for higher order thinking and critical thinking. Students were actively engaged."– *Kristin M.*

Examples of stations included:

- **Informative** (organs; functions)
- **Illustrative** (labeling, sketching, coloring diagrams)
- **Mini Lab stations** (found in appropriate body system topics; requires minimal set up.)
- **…plus more!**

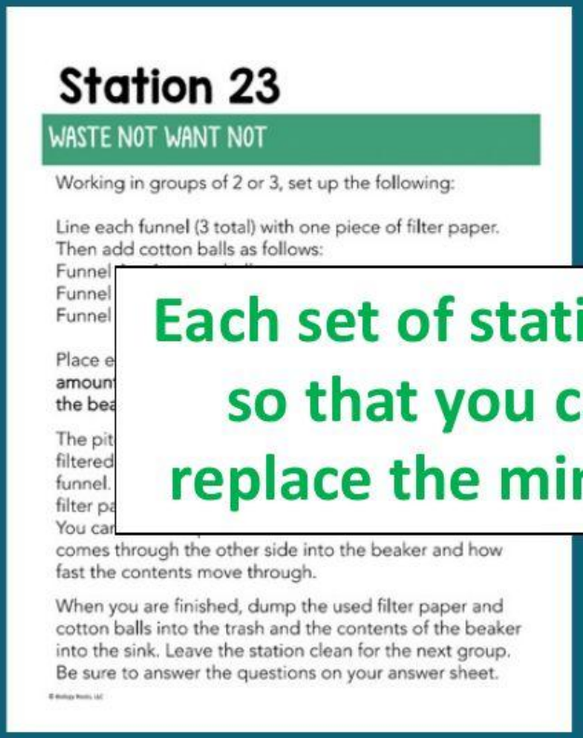


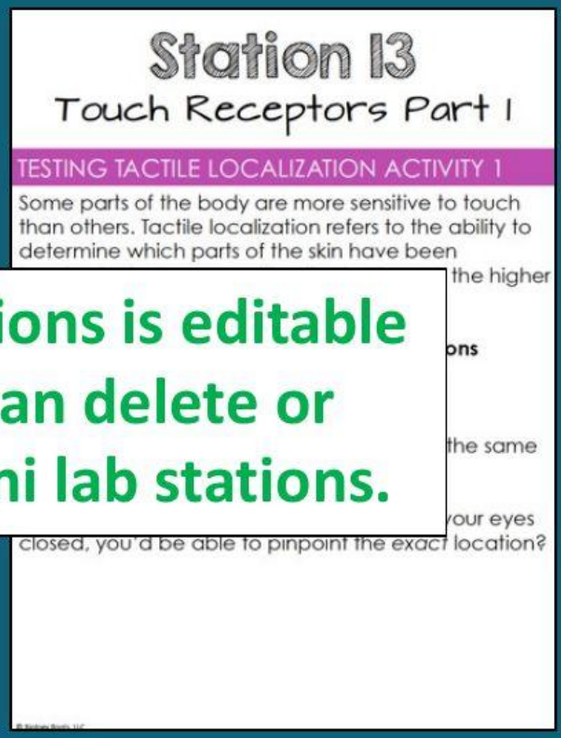


human body systems *stations*

Mini Lab Stations are found in the following body systems:

- Circulatory
- Digestive
- Excretory
- Immune
- Integumentary
- Muscular
- Skeletal





Each set of stations is editable so that you can delete or replace the mini lab stations.

The mini lab stations may be as simple as an observation or as elaborate as a simulation. Detailed instructions are included in the download.

If you do not have the materials or time, no problem! You may skip, alter, or delete the stations. They are editable!

human body systems *stations*

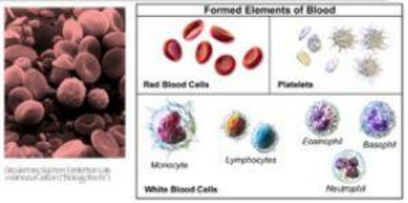
Station 4

BLOOD: FORMED ELEMENTS

Red blood cells (RBCs) carry oxygen, carbon dioxide, and enzymes throughout the bloodstream.

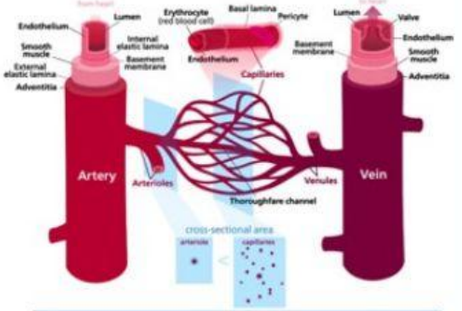
White blood cells (WBCs) work together to fight infection. The blood carries white blood cells to parts of the body that might contain pathogens.

Platelets- "sticky" proteins that prevent blood loss by forming plugs in blood vessels.



Station 5

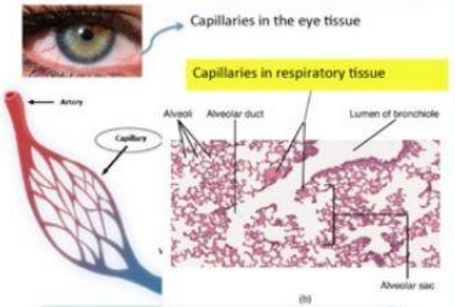
BLOOD VESSELS



Arteries carry blood away from the heart.

Station 6

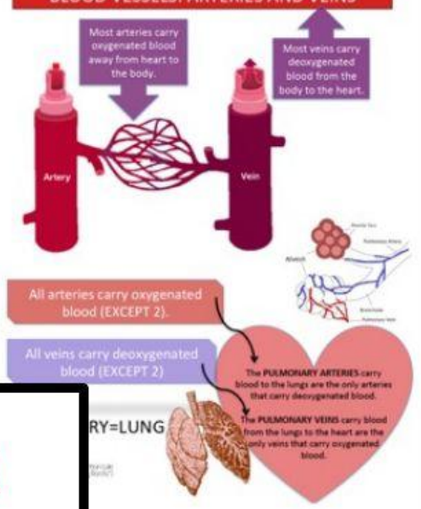
BLOOD VESSELS: CAPILLARIES



Capillaries are bridged between the arteries and veins.
Capillaries are the tiniest blood vessels.
Capillaries can carry oxygenated blood and

Station 7

BLOOD VESSELS: ARTERIES AND VEINS

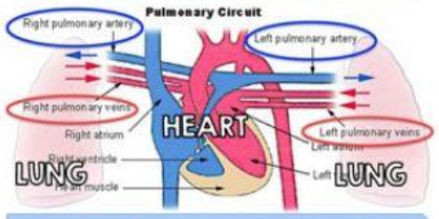


circulatory system

28 total stations

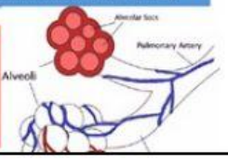
Station 8

BLOOD VESSELS: PULMONARY



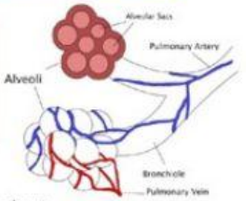
PULMONARY ARTERIES- carry deoxygenated blood AWAY FROM THE HEART, TO the lungs. (All other arteries carry oxygenated blood away from the heart to the body).
PULMONARY VEINS- carry oxygenated blood TO THE HEART, FROM the lungs. (All other veins carry deoxygenated blood to the heart, from the body).

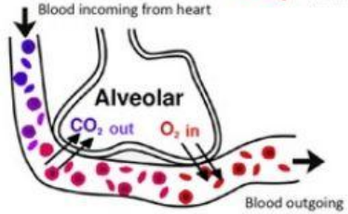
Exchange of oxygen and carbon dioxide occurs at the alveoli of the lungs. Pulmonary arteries deliver deoxygenated blood to the lungs, where carbon dioxide is released and exhaled. Pulmonary veins take freshly oxygenated blood from the lungs and bring it to the heart for circulation.



GAS EXCHANGE AT THE LUNGS

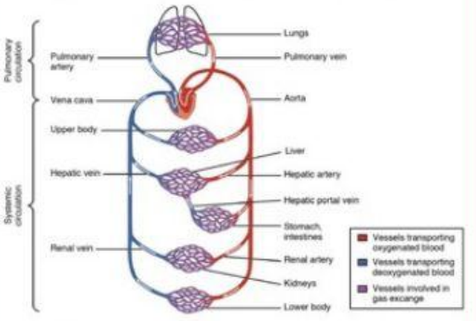
Gas exchange is the exchange of oxygen and carbon dioxide. Gas exchange occurs in the lungs, across the alveolar membrane.





The gases simply diffuse across the alveolar membrane!

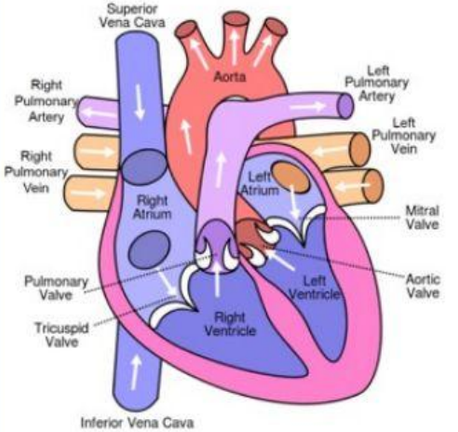
BLOOD FLOW



The heart is a double pump!
This is because one half of the heart (the right ventricle) sends blood through the lungs; and the other half of the heart (the left ventricle) sends blood through the body.
The right ventricle contains deoxygenated blood and the left ventricle contains oxygenated blood.

Station II

HEART PARTS

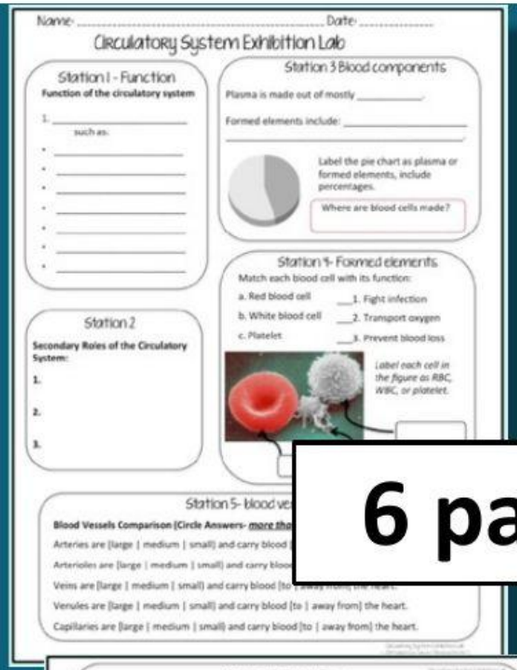


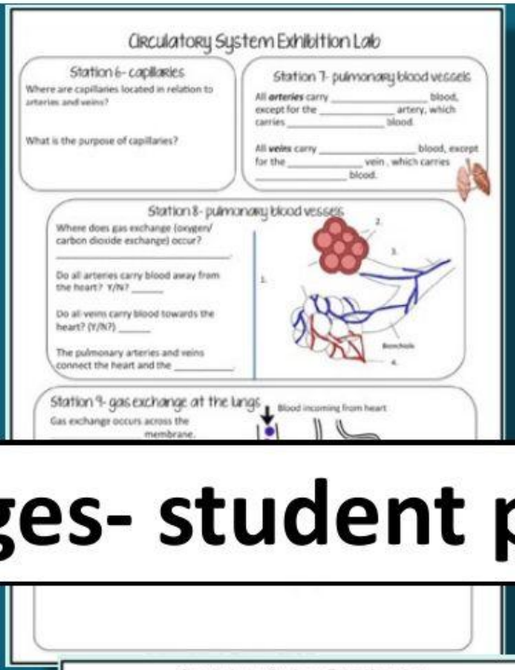
✓ **Editable**

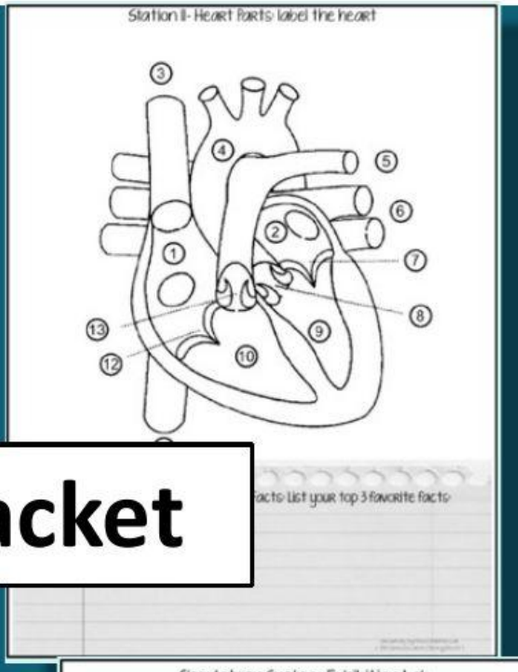
Zoom to read

human body systems *stations*

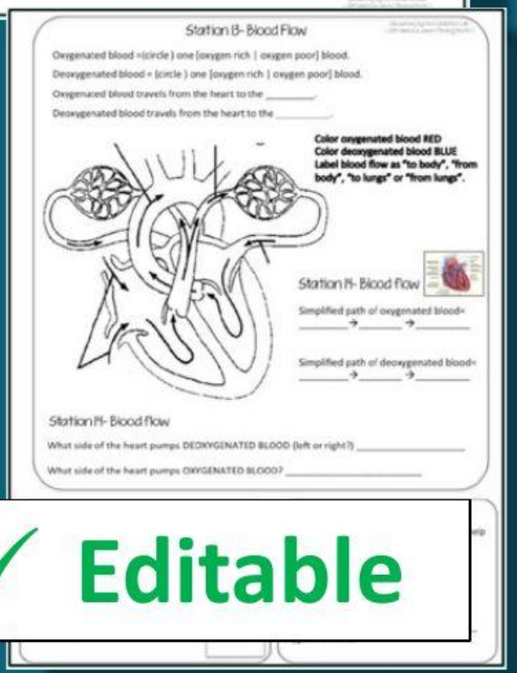
circulatory system

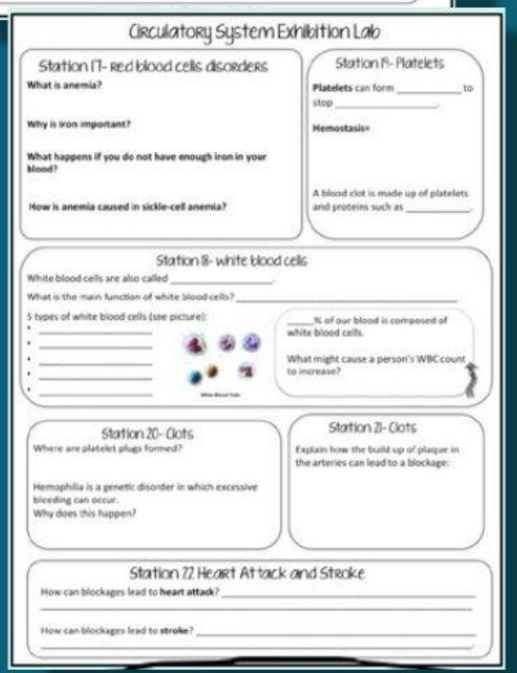


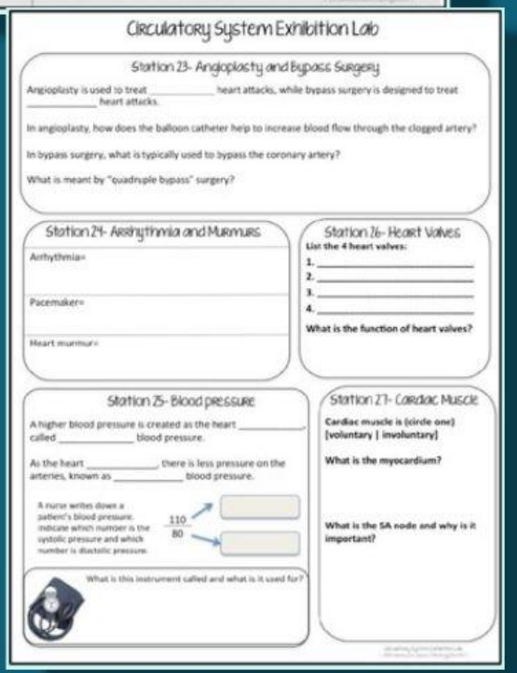




6 pages- student packet







✓ **Editable**

human body systems

circulatory system stations

Station 28

MICROSCOPE

View the cardiac muscle through the microscope. Please do not touch the knobs.



Station 29

HEART RATE | PULSE

Heart rate is measured as beats per minute. Pulses are the sensations you can feel from your heart beating and are used to measure your heart rate.

the number of beats over a minute.



Compare your heart rate to at least two others in the class!

Mini lab stations: observation stations- microscope and heart rate

human body systems *stations*

digestive system

18 total stations

Digestive System Exhibition Lab
Task Cards

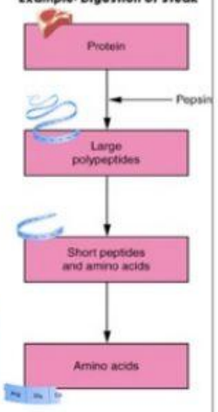
Station I

Function

The function of the digestive system is 1) **Digestion:** breaking down food into very small molecules;

2) **Absorption**: absorbing the small molecules into our bloodstream

Steak must be broken down into smaller molecules before it can be absorbed by the body!



Digestive System Exhibition Lab
Task Cards

Station 2

Two Major Parts

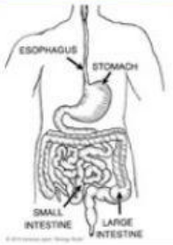
The Digestive System

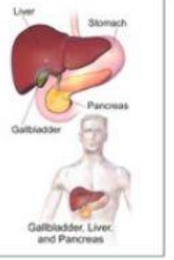
The Alimentary Canal (aka Digestive Tract)

A continuing tube in the body that begins at the mouth and ends at the anus.

Accessory Organs

Salivary glands, liver, gallbladder and pancreas.





Digestive System Exhibition Lab
Task Cards

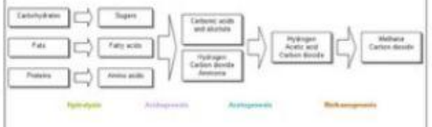
Station 3

Mechanical Digestion vs. Chemical Digestion

Mechanical digestion is the physical breakdown of food. It occurs in the mouth as you chew your food. The chewing and crushing of food is known as **mastication**- it is the first step in the digestion process.

Another form of mechanical digestion are the smooth muscle contractions, called **peristalsis,** that occur as the food is passed along the digestive tract. These contractions occur in the esophagus, the stomach, and the intestines.

Chemical digestion is the chemical breakdown of food into simpler nutrients that can be absorbed. This is done with the aid of enzymes. Chemical digestion begins in the mouth when enzymes in saliva begins to break down food .

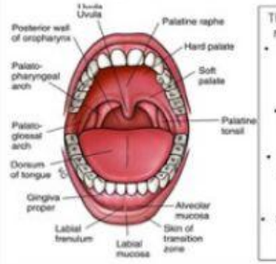


Digestive System Exhibition Lab

Digestive System Exhibition Lab
Task Cards

Station 7

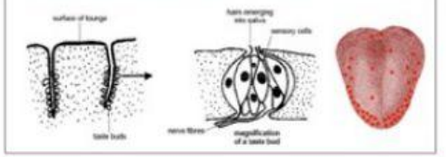
Digestion Starts in the Mouth



The mouth plays several roles during digestion:

- The food is warmed or cooled to body temperature in the mouth.
- The teeth grind and break the food down into smaller pieces.
- The tongue moves the food toward the back of the throat for swallowing.
- Saliva moistens the food and begins to break down carbohydrates.

Taste buds are tiny hairs attached to receptors. You have approximately 10,000 taste buds on your tongue. They are replaced every 8-12 days.



Station II

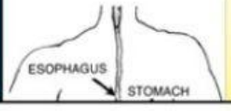
Heartburn

Heartburn is a burning sensation in the chest that is caused by the regurgitation of acid from the stomach into the esophagus. (It has nothing to do with your heart, though long ago people thought so). **Normally, a muscle known as a sphincter** located at the end of the esophagus will open to allow food into the stomach, and close after the food has been completely swallowed.
If the muscle weakens, it may not close completely, which allows some of the stomach acid to seep up into the esophagus.



Some people may experience heartburn even if the sphincter muscle is not weak, usually from eating particularly spicy foods.

Pregnant women are also more susceptible to heartburn, but that is because hormones are released to relax the smooth muscle of the uterus, but it also effects other smooth muscles, such as the esophagus.



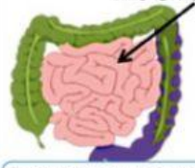
Medication such as TUMS and Rolaids are known as "antacids". They offer temporary relief from heartburn by using *calcium carbonate*, which neutralizes the stomach acid.

✓ **Editable**

Digestive System Exhibition Lab
Task Cards

Station I2

The Small Intestine



The small intestine is the longest part of the alimentary canal (digestive tract). It is approximately 20 feet (5m) in length!
Called the "small" intestine because it is smaller in diameter.

The small intestine uses its own enzymes, as well as enzymes from the pancreas and bile produced in the liver to further break down nutrients. The role of the small intestine is to absorb nutrients.





Villi are finger-shaped folded projections from the wall of the small intestine. They are where nutrients are transferred to the bloodstream. Villi also increase the surface area of the small intestine so that it can absorb more

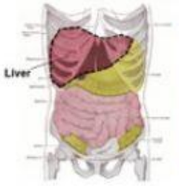
The Basic Nutrients are:

Simple sugars
Fatty acids
Amino acids

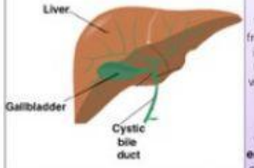
Digestive System Exhibition Lab
Task Cards

Station I3

The Liver and Gallbladder



The liver produces **bile**, which is a greenish-brownish fluid that aids in digestion.
Bile helps to break down fat into smaller components in a process known as **emulsification.**



The bile is stored in the **gall bladder.**
The bile travels through ducts from the gallbladder to the small intestine. The digested food in the small intestine has a large water content from the food you eat or liquid you drink.

Usually, fats do not mix with water (like oil and water). **Bile emulsifies fats,** which alters the chemical composition of fats so that they can be mixed with water. This makes them easier for enzymes to break fats down into fatty acids.

The liver also has several other roles. The liver stores vitamins, breaks down toxins from the body, breaks down old cells, produces proteins, and stores glycogen for energy.

Digestive System Exhibition Lab
Task Cards

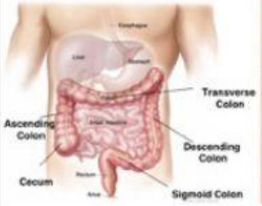
Station I7

The Colon

The large intestine is also known as the colon.

Food that cannot be further digested moves from the small intestine to the colon (large intestine).

The colon absorbs water and vitamins into the bloodstream. What is left over is called feces. The feces travels the rectum from the small intestine. The rectum has many nerve bundles so you know when it's time "to go!"

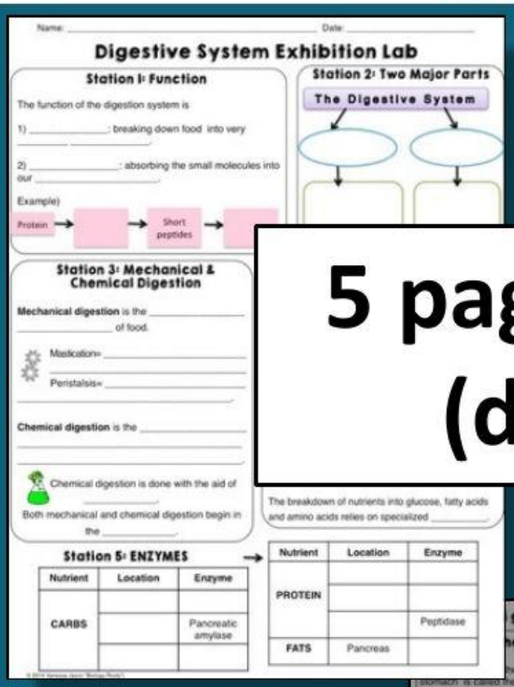


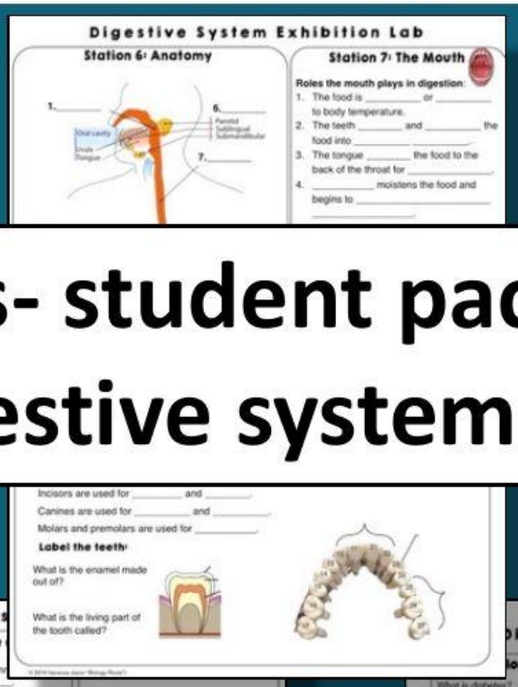
The colon is categorized into five sections:
The cecum is a small pouch that connects to the ileum of the small intestine.
The ascending colon (right side)
The transverse colon (across)
The descending colon (left side)
The sigmoid colon is a short, curved section that connects to the rectum.

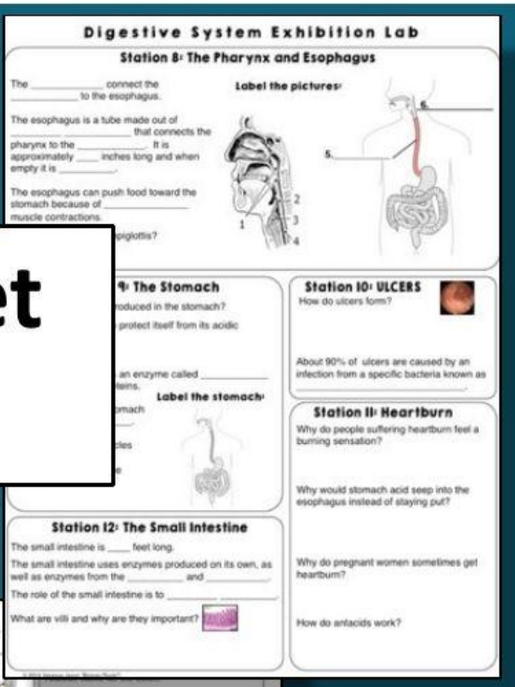
The final stop of the alimentary canal (digestive tract) is the rectum. From there, peristaltic muscle waves force the feces

human body systems *stations*

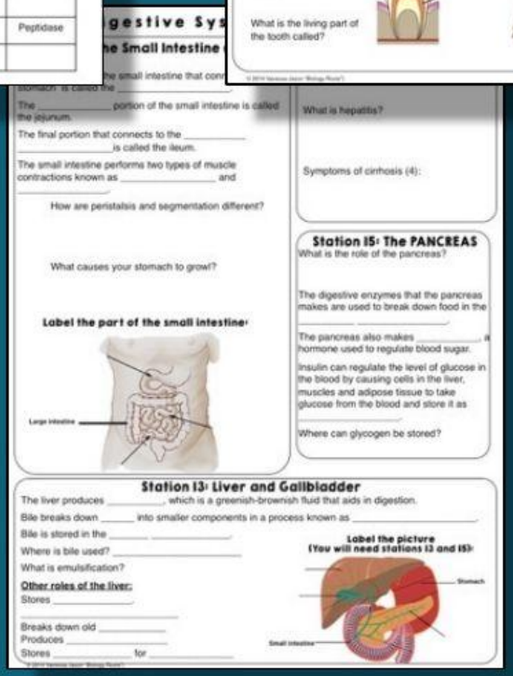
digestive system







5 pages- student packet (digestive system)





✓ Editable

human body systems

digestive system stations



Mini lab or observation stations are always **optional**.

Depending on the materials available, and the needs of your students, you may need to alter the station.

One idea is to replace the observation stations with video stations and adjust the station accordingly.

✓ Editable

human body systems stations

Endocrine system

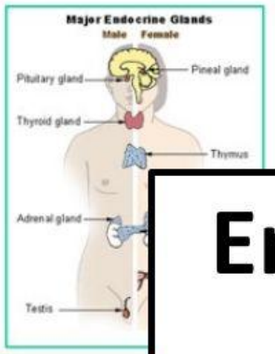
STATION 1

FUNCTIONS OF THE ENDOCRINE SYSTEM

The endocrine system is a series of glands that release hormones into the bloodstream to help control your organs. We need our endocrine system to maintain homeostasis, grow and reproduce.

The hormones are used to regulate the following:

- Metabolism
- Growth and Development
- Sexual function
- Sleep
- Mood
- Stress
- Response to Injury



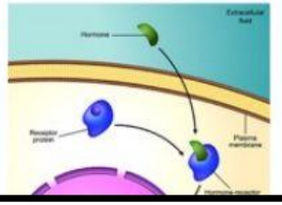
STATION 2

HORMONES

The chemicals produced by glands are called hormones. Hormones are specific to certain "target tissues" or cells.

Hormones are typically released in one part of the body and travel to the bloodstream to another. The part of the body that is affected by the hormone is called its "target tissue".

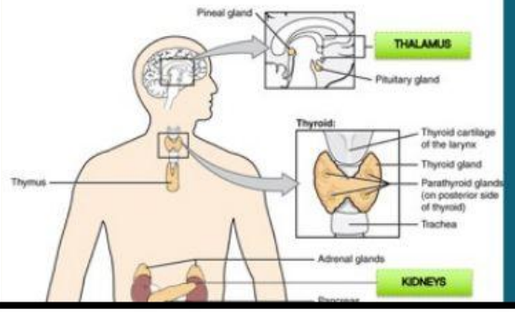
The hormones are able to influence the cells of the target tissue by attaching to specific receptors found on the plasma membrane or nuclei.



STATION 6

ORGANS with ENDOCRINE FUNCTION

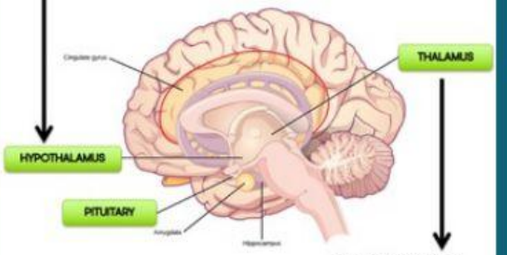
The endocrine system contains many glands, but also relies on organs that have a secondary endocrine function.



STATION 9

HYPOTHALAMUS

The hypothalamus' primary function is to maintain homeostasis in the body.



The thalamus is an important part of the brain that plays a role in sleep and sensory interpretation.

...ween the thalamus and the ...within the brain.

Endocrine 27 stations- higher level

21 stations- shortened version

STATION 12

HORMONES PRODUCED BY THE PITUITARY GLAND

The pituitary gland secretes nine hormones that directly regulate many body functions and controls the actions of other endocrine glands.

Pituitary	Hormone Secreted	Effect
Posterior pituitary	Anti-diuretic (ADH)	Simulates the kidneys to reabsorb water.
	Oxytocin	Simulations contractions of the uterus during childbirth; stimulates the release of milk
Anterior pituitary	Follicle stimulating hormone (FSH)	Stimulates the production of eggs and sperm
	Luteinizing hormone	Stimulates cells to make estrogen and testosterone.
	Thyroid stimulating hormone (TSH)	Stimulates the production of thyroxine from thyroid gland
	Adrenocorticotropic	Stimulates the release of
		hormone (MSH)
		produce melanin (skin pigment)

✓ Editable

STATION 3

FEEDBACK MECHANISM: WATER BALANCE

Why does exercising cause you to feel thirsty?

Hypothalamus senses that body is dehydrated → Hypothalamus stimulates pituitary to release ADH (antidiuretic hormone).

The target tissue for the ADH hormone is the kidneys. It binds to receptors on the kidneys and causes the kidneys to retain water instead of releasing it as waste. This causes you to feel thirsty so that you replenish any lost water.

As the water in the blood reaches a more normal state, the hypothalamus stops the pituitary from making more ADH.



STATION 4

HYPERTHYROIDISM

PREFIX	MEANING
Hypo	Low
Hyper	High

Hyperthyroidism

Hyperthyroidism is an overactive thyroid- your thyroid secretes too much of the thyroid hormones.

Symptoms of Hyperthyroidism:

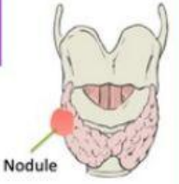
Weight loss, increased heart rate, irritability, warm skin, muscle tremors, restlessness

There many causes of hyperthyroidism, including an autoimmune disease called Graves disease, which produces antibodies that cause the thyroid to produce more hormones.

Other Causes:

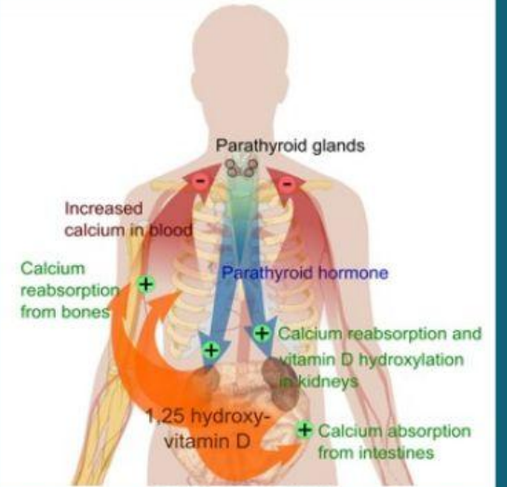
Hyper functioning thyroid nodules, thyroiditis, or cancer.

Nodules are commonly associated with hyperthyroidism, because they can start to produce their own thyroid hormones. However, nodules are fairly common and most are harmless and not related to hyperthyroidism.



STATION 5 CONTINUED

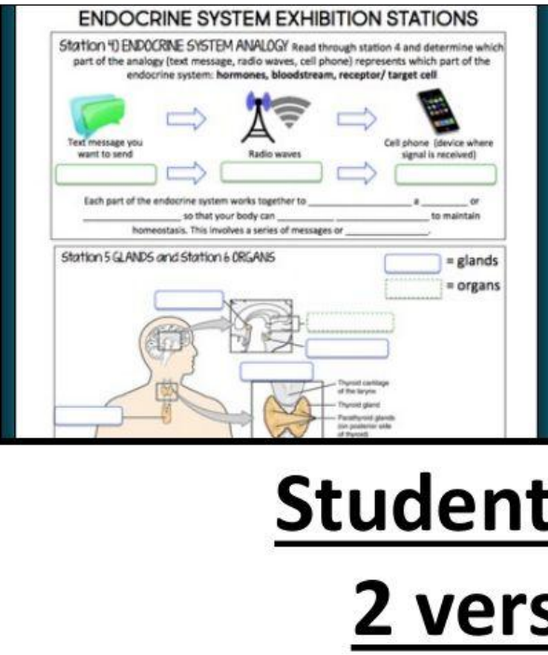
The hypothalamus can sense low calcium levels and stimulate the parathyroid glands to produce PTH. PTH causes calcium to be released from the kidneys and bones, where it is stored, and released into the blood. This is known as reabsorption. Calcium is replaced from the calcium in your diet.

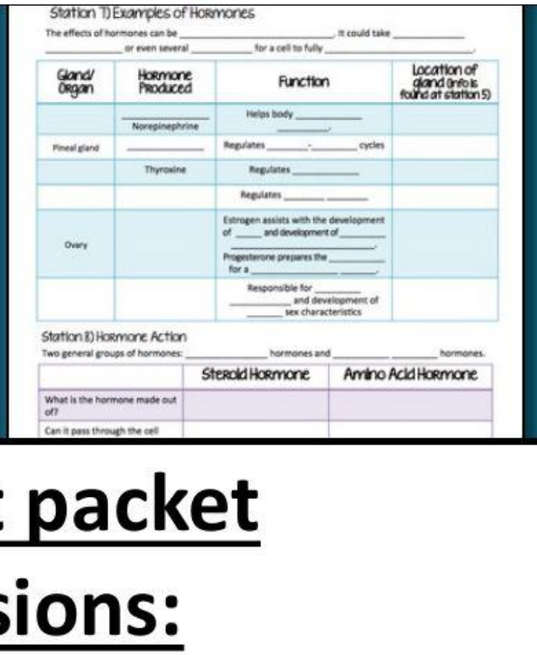


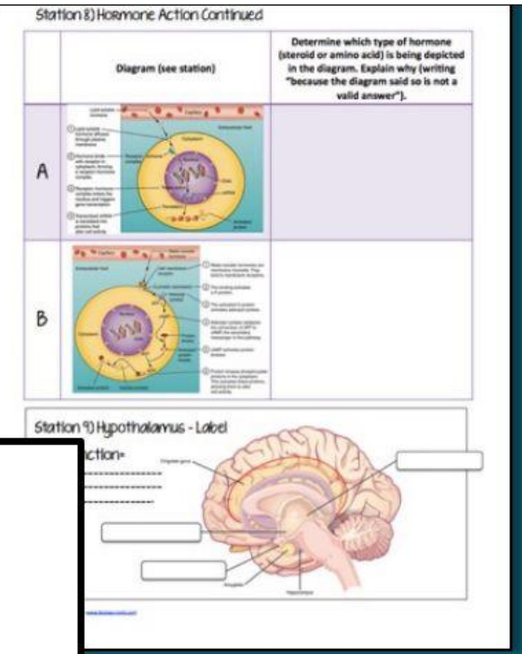
human body systems stations

Endocrine system







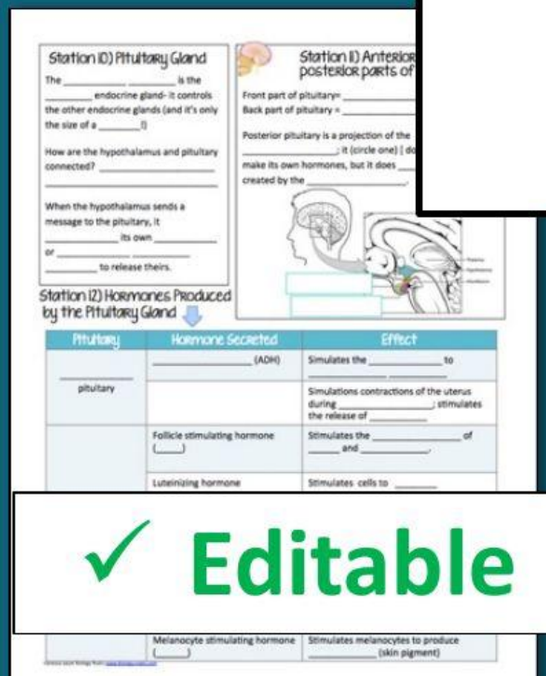


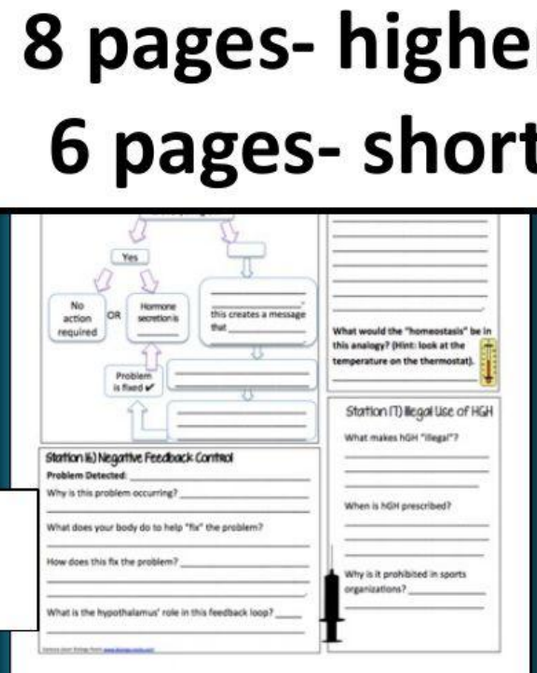
Student packet

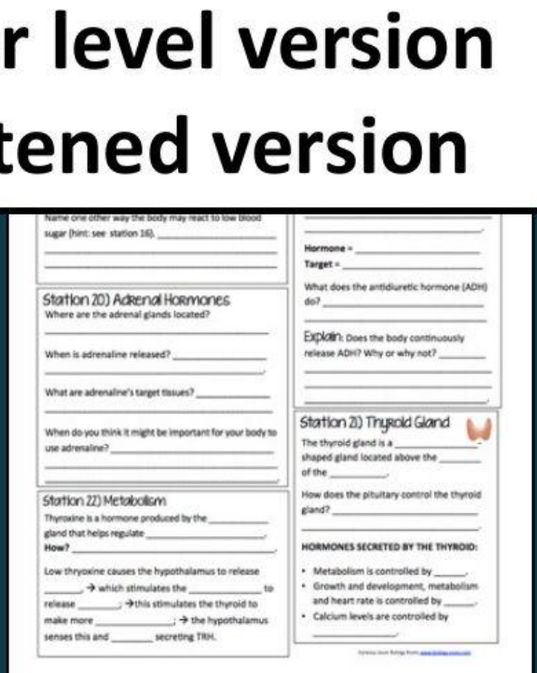
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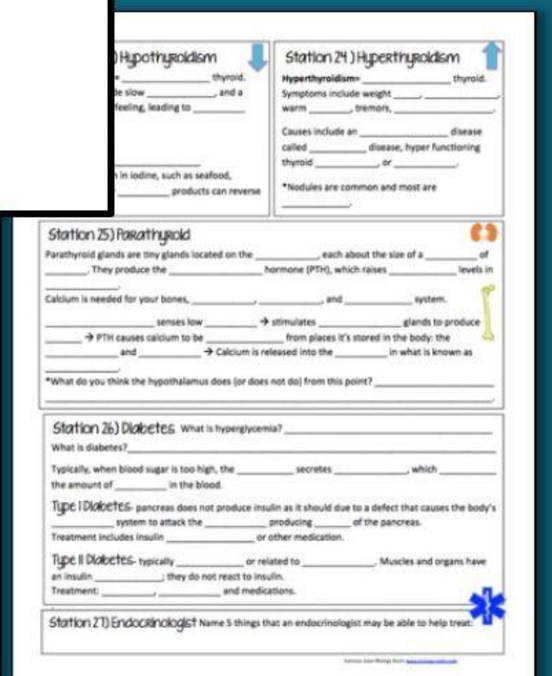
8 pages- higher level version

6 pages- shortened version









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human body systems *stations*

Excretory system

24 total stations

Station 1

EXCRETION

What is excretion?

Excretion is the process of removing wastes and excess water from the body.

ORGANS INVOLVED WITH EXCRETION

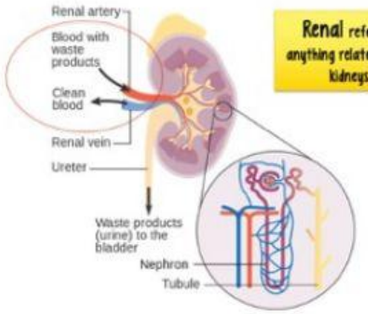
ORGAN	EXCRETION
SKIN	SWEAT
LUNGS	CARBON DIOXIDE
INTESTINES	FECES
KIDNEYS	URINE

Excretion is a crucial part of **homeostasis**; it involves removing any metabolic wastes from the body.

Station 3

THE KIDNEYS as a FILTER

The main organs of the excretory system are the kidneys- they filter the blood from MANY substances.



Renal refers to anything related to the kidneys.

The kidneys are connected to the circulatory system through the **renal artery and vein.** They filter blood that

Station 5

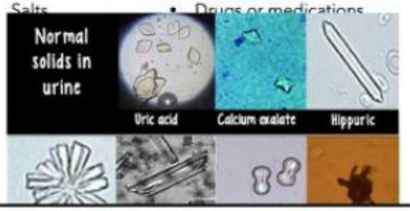
WHAT IS FILTERED?

Your **metabolism** is an ongoing process of all the chemical reactions in your body.

Every chemical reaction creates a product. Some of the products we can use, but the ones that we can't are considered waste.

Examples of waste that is filtered from the blood:

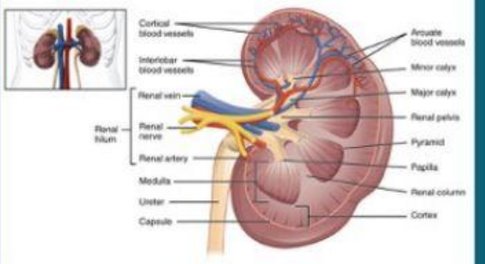
- Extra water
- Bicarbonate
- Urea
- Some amino acids
- Salts
- Drugs or medications



Station 7

KIDNEY ANATOMY

There are two kidneys in the body each about the size of a clenched fist. The kidneys are located towards the lower back on either side of the spine.



When viewing a cross section of the kidney, there is an outer region and an inner region.
The outer shell is called the **renal cortex**, and the center is the **renal medulla**.

Excretory system- 24 stations

Station 9

URINE

Many waste products of the cell are rich in nitrogen and must be filtered from the bloodstream.
Examples of these include urea, uric acid, and creatinine.

WHAT's IN IT?

Urine is 90%-95% water
Remaining 5%-10% is usually made of solutes such as urea, uric acid, ammonia, hormones, dead blood cells, salts, minerals, and can also contain toxins.

Outside of water, the stuff your urine is made up of can depend on what you've drank, eaten, consumed, or even absorbed through your skin!

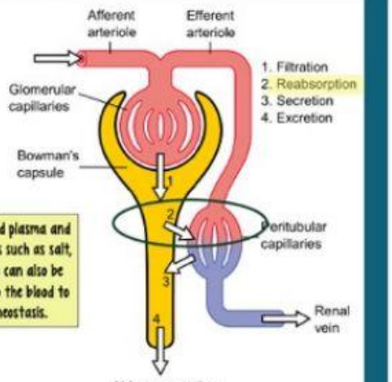


Station 13

REABSORPTION

Reabsorption- Nephrons to Bloodstream

Reabsorption is the process of returning the clean, filtered plasma back into the circulatory system. The concentrated fluid that remains after reabsorption is the urine.



Along with filtered plasma and water, substances such as salt, ions and glucose can also be returned back to the blood to maintain homeostasis.

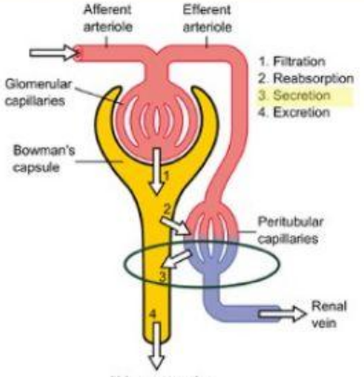
Excretion = Filtration – Reabsorption + Secretion

Station 14

SECRETION

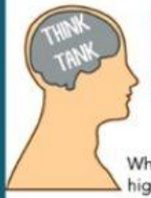
Secretion- Bloodstream to Nephrons

Secretion is the opposite of reabsorption. Materials that are secreted into the nephrons from the blood vessels are waste products, such as ions, some types of hormones, and drugs.



Excretion = Filtration – Reabsorption + Secretion

Station 17



CELL TRANSPORT & HOMEOSTASIS

Think tank station

WATER BALANCE

When the water level of our blood plasma is high, less water is reabsorbed back into the bloodstream, and the urine is more dilute.

When the water level of our blood plasma is low, more water is reabsorbed back into the bloodstream and the urine is more concentrated.



✓ **Editable**

human body systems *stations*

Excretory system

Name: _____ **Date:** _____

EXCRETORY SYSTEM EXHIBITION LAB

Station 1- Excretion

- Excretion is the process of _____ _____ from the body.

ORGANS INVOLVED	EXCRETION
SKIN	
	FECES
KIDNEYS	

How is excretion crucial for homeostasis? _____

Station 2- The Kidneys

The main job of the kidneys is to _____ _____.

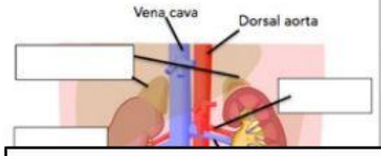
Secondary functions include maintaining correct _____ levels, salt and _____ levels in the blood, and _____ different _____ produce _____.

Station 3- The Kidneys as a [illegible]

The kidneys are the _____ of the excretory system because they filter the _____ from many substances.

- *How are the kidneys connected to blood supply?* _____
- *How are the kidneys like the lungs respiratory system?* _____

Station 4- Diagram Label





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Station 6- Kidney Stones

How can kidney stones form? _____

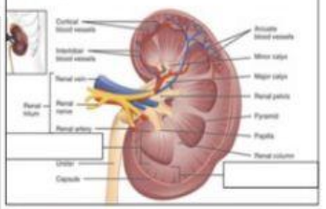
What are kidney stones usually made of? _____

Station 7- Kidney Anatomy

Kidneys are about the size of a _____ and located _____.

Outer region= _____

Inner region= _____



Station 9- Urine

Use the pie chart below to determine which chunk [illegible]

Station 11- STEPS OF URINE FORMATION:

1. _____
2. _____ (back to blood stream)
3. _____ (from blood stream into nephron).

Urine formation occurs in the _____.

Station 12- FILTRATION

Most filtration occurs in the _____. Naturally occurring blood _____ forces _____ into the _____ between the [illegible]

Station 14- SECRETION

Bloodstream → _____.

Secretion is the movement of materials into the nephrons and these may include ions, _____, and _____.

Station 15- Cell Transport within the kidneys

- Nephrons rely on _____ or _____ _____ _____ to filter the blood and form urine.
- The passing of fluids and solutes occurs across the cell _____ of the _____.
- Materials are transported between the nephrons and the _____ _____ to help maintain _____.
- Nephrons have very active _____ _____ pumps!

Review the diagrams at this station.

- What types of substances are being reabsorbed?
- What types of substances are being secreted?

(If you are unsure of reabsorption vs. secretion, please come back after you have visited stations 13 and 14).

Station 17- CELL TRANSPORT and HOMEOSTASIS

Read the station and provide an example of how cell transport assists in homeostasis. _____

What do you think happens if you are dehydrated? _____

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Station 18- Urine Samples

Urine tests can be used to detect _____, diseases such as _____, some _____ transmitted _____, _____ and drugs.

**How do these substances get into your urine?* _____

Station 19- Color of Urine

What can the color of urine tell you? _____

Note the colors are the chart for your own health.

Station 20- UTI

What causes a UTI or bladder infection? _____

How are UTIs treated? _____

How can you prevent UTIs? _____

Station 21 - Dialysis- a treatment that takes over your _____ _____ for patients that have kidney _____. Dialysis has been around since _____.

Station 23- Waste not, want not!

CAREFULLY READ ALL DIRECTIONS ON STATION BEFORE PROCEEDING. Record your data here.

Record the flow time in seconds. You can use this information to consider which beaker has the best results. Under "description of results" describe the time and the color of the water in the beaker after filtration.

Beaker	Flow Time (s)	Description of results
A		
B		
C		

Based on your results, which beaker do you think would represent the "best" or healthiest functioning kidney and why? _____

[illegible] to one of the water bottles. Observe what happens: _____

4 pages- student packet

✓ **Editable**

Zoom to read

human body systems stations

Excretory system

Mini lab or observation stations are always **optional**.

Station 23

WASTE NOT WANT NOT

Working in groups of 2 or 3, set up the following:

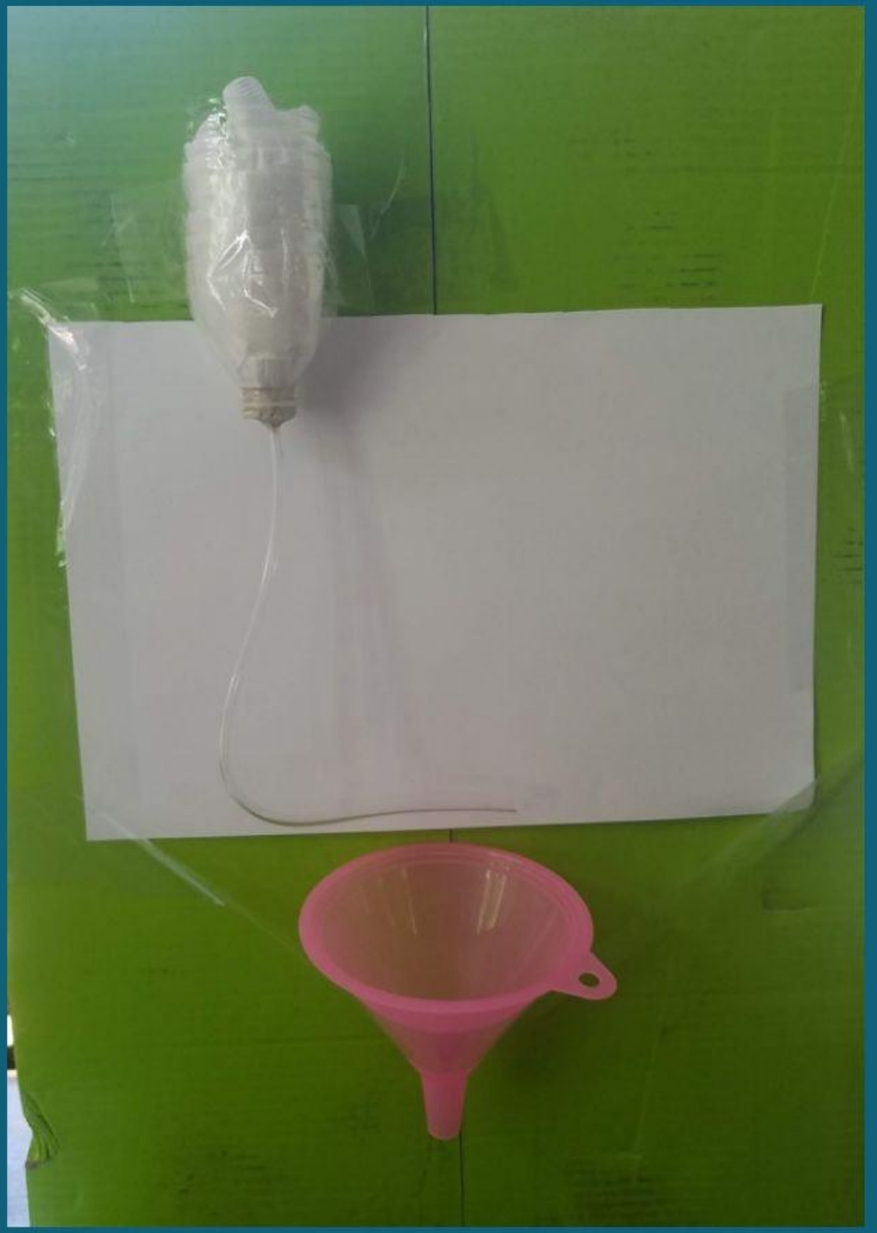
Line each funnel (3 total) with one piece of filter paper. Then add cotton balls as follows:

Mini lab: model station (more details and instructions in download.)

You can use the spare beaker to measure. Examine what comes through the other side into the beaker and how fast the contents move through.

When you are finished, dump the used filter paper and cotton balls into the trash and the contents of the beaker into the sink. Leave the station clean for the next group. Be sure to answer the questions on your answer sheet.

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human body systems stations

Immune system

23 total stations

Station 1

FUNCTION of the IMMUNE SYSTEM

The immune system is the body's defense system. It protects you from pathogens (**microorganisms** that can cause disease).

TYPES OF PATHOGENS

Bacteria

Prokaryotic cells; the most common pathogen; though most bacteria is not harmful. Examples include streptococcus, anthrax, E. Coli and Borrelia (Lyme disease).

Fungi

Can be unicellular or multicellular. Forms spores that can be transmitted through air or skin contact. Examples include mold, yeast, and ringworm.

Protozoan Parasites

Single celled eukaryotes. Many need multiple hosts throughout their life cycle. Examples include amoebas, Giardia, plasmodia (malaria)

Viruses

Viruses are made up of encapsulated RNA or DNA and protein; NOT cells. Not all viruses are harmful to humans. Examples include HIV, influenza, HPV, and shingles.

Station 2

PARTS of the IMMUNE SYSTEM

Tonsils + adenoids- create antibodies and specialized cells

Thymus- produces specific immune cells called "T" cells.

Bone marrow- creates white blood cells that help fight infection

Lymph nodes, tissues, and vessels- help trap and destroy foreign substances and filter them from the blood.

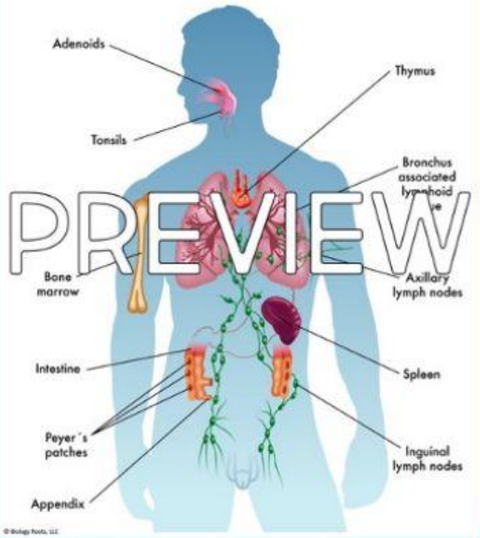
Spleen- filters pathogens from the bloodstream and produces antibodies

White blood cells-
Destroy pathogens

The skin also plays a part in defense!

Station 2 continued

Organs of the Immune System



PREVIEW

Station 3

THE SKIN- FIRST LINE OF DEFENSE

The skin is your body's first line of defense. Pathogens cannot penetrate the skin when it is in tact and healthy.

Epithelial tissue lining the nose and throat secretes mucus which can trap foreign invaders.

If your skin is broken, through a cut, scrape or splinter for example, then bacteria can get in. That requires a second line of defense.



Station 4

INFLAMMATORY RESPONSE

If a pathogen invades your body through a cut or scrape, you may notice it becomes red and swollen.

The swelling is caused by a rush of fluids coming towards the wound. This brings in more immune system cells to help fight the infection in what is known as an inflammatory response.

The chemical histamine causes inflammatory response. It is also present in



✓ Editable

Station 5

FEVER

A fever is not directly caused by germs, but rather your body trying to kill the germs.

Many pathogens can only thrive within a specific temperature window.

The immune system works with the endocrine system to increase your body temperature, called a fever. This slows down the replication of pathogens.



Normal body temperature=~98°F or 37°C

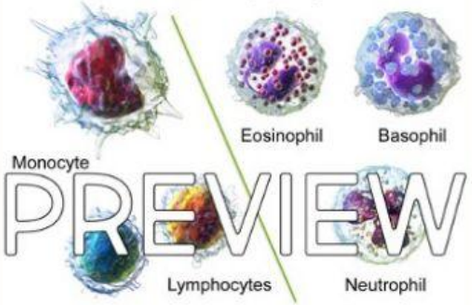
Low grade fever= between normal and 100.4°F

A temperature above 103°F can be concerning, as certain enzymes that your body need cannot function properly in high temps.

Station 6

WHITE BLOOD CELLS

White blood cells are designed to communicate with other cells and destroy pathogens.



PREVIEW

White blood cells can be categorized into 2 types:

mononuclear

Does not contain granules

Nucleus is in one piece

Granular

Contain granules with powerful infection-fighting **enzymes**

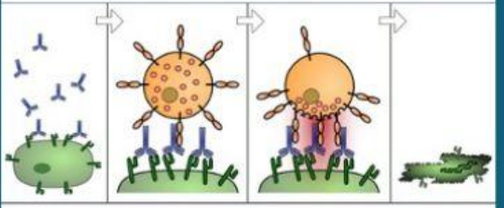
Nucleus is lobed or twisted

Station 12

ANTIBODIES

Antibodies are like specific tags to help T cells latch on and destroy them. The more antibodies produced, the more pathogens can be destroyed.

Antibodies are like a bridge that connects the pathogen with the killer T cells.



Once our body creates an antibody for a specific pathogen, we have it for life. This helps our bodies "memorize" the different pathogens that infect us. If the pathogen enters our body again, our body is quicker to fight it. This may lead to fewer reinfections.

human body systems stations

Immune system

Name:_____ Date:_____

Immune System Exhibition Stations

Station 1- FUNCTIONS OF THE IMMUNE SYSTEM

The immune system protects you from microorganisms that can cause disease, called _____.

TYPE OF PATHOGEN	DESCRIPTION	Examples
Bacteria	_____ cells; most _____ pathogen.	
Fungi	Forms _____ that can be transmitted through _____ or _____ contact.	
Protozoan Parasites	_____-celled eukaryotes. Typically need multiple _____.	
Viruses	Made up of encapsulated _____ or DNA and _____; NOT cells.	

Station 2- PARTS OF THE IMMUNE SYSTEM

Organs of the Immune System

PART (organ, tissue, or cell)	Contribution to the IMMUNE SYSTEM
Tonsils and Adenoids	Create _____ and specialized cells.
Thymus	Produces specific immune cells called _____.
Bone Marrow	Creates _____ _____ that help fight infection.
_____ nodes, tissues, and vessels	Help trap and destroy foreign substances and filter them from the blood.
Spleen	_____ pathogens from the bloodstream; produces _____.
White blood cells	

Station 3- THE SKIN

Why is the skin the first line of defense?

Epithelial tissue of the nose and throat secretes _____. How does this help prevent infection? _____

Bacteria and other pathogens can enter the body if the skin is _____.

Station 4- INFLAMMATORY RESPONSE

During the first signs of an infection, the area may become red or swollen. Is this caused by the bacteria or your own body? Explain:

This is called an _____ response, and it is caused by a chemical called _____. It can also occur during allergic reactions. (Mosquito bites become itchy and

Station 7- PHAGOCYTES

What are phagocytes? _____

Examples: •Neutrophils •_____ •_____

Greek prefix PHAGE means "_____"

One observation from video:

Station 8- INNATE VS ADAPTIVE IMMUNE SYSTEMS

INNATE IMMUNITY	• Born with innate immunity • Non-specific

Station 9- INNATE IMMUNE CELLS

MAST CELLS

•Where are mast cells found in the body?

•What is the their function?

•What chemical do mast cells release when they detect injury? _____

•WHY do you think mast cells are located so closely to the skin? _____

MACROPHAGES

•What happens if a macrophage stumbles across a pathogen? (also name chemicals it releases): _____

NEUTROPHILS

•Make up _____ of your white blood cells.

•Activated by _____.

•What is pus? _____

Station 10- ADAPTIVE IMMUNE CELLS

•Adaptive immune cells are a bit more advanced. _____ make up most of the adaptive immune system, such as __ cells and ___ cells. These cells rely on _____.

Station 11- ANTIGENS AND ANTIBODIES

•Your adaptive immune system makes _____ called ANTIBODIES. Antibodies help _____ the pathogen.

Antibodies are _____ to _____.

Define antigen: _____

True or False: all antigens are the same. _____

True or False: antibodies specific to strep can also be used to tag E. Coli antigens. _____

Label the antigen and antibody.

Info at stations 11 and 12 may be required for station 20

Station 12- ANTIBODIES

•How are antibodies like a bridge?

Which type of immune cell attaches to antibodies? _____

How do antibodies help prevent or slow down future infections from the same pathogen?

Station 14- HELPER T CELLS

system.

_____ and _____ immune systems by
h antibodies are required. They are activated
find an antigen, they release _____.

_____ cells, which can make _____
e immune system such as _____

Station 15 - KILLER T CELLS Label:

Perforin
Granzymes
CD8
TCR
Class I MHC molecule
Pore

What do killer T cells do? _____

Station 17- LYMPHATIC SYSTEM

LYMPATHIC SYSTEM

The lymphatic system is made up of tissues and _____ that contains _____.

What is produced at the lymph nodes? _____

When you visit the doctor, they may feel your neck during a routine visit. Though the common verbiage is "swollen glands"; they are actually checking for swollen lymph nodes. What might a swollen lymph node tell us? (No wrong answers here, it's your thoughts that count!) _____

The lymphatic system also rids the body of toxins and waste as a _____ system. Lymph can also transport _____ to the _____ _____ where they are destroyed by _____.

Station 18- PRIMARY ORGANS of the LYMPHATIC SYSTEM: THYMUS & RED BONE MARROW

Organ or tissue	Contribution to the lymphatic system's function
Thymus	
Red Bone Marrow	

Station 19- HOW VACCINATIONS WORK

e you injected with when receiving a vaccination? _____

he benefit of using a weakened version of the pathogen when vaccinating?

vaccinations do for the health of the population? _____

VACCINATIONS

ss to disease during the _____
d by the Variola _____.
n completely eradicated since _____.

o smallpox. However, cowpox is _____ and less
does the word vaccine stem from? _____

as like with James Phipps: _____

hen he was exposed to smallpox? _____

d you conclude about the antigens of smallpox and
e visited stations 11 & 12). _____

Station 21- ALLERGIES

Allergies are _____ of the _____ system. The body reacts to things like _____ and _____ as if they were _____. These are called _____.

Why are antihistamines used for allergy relief? _____

Name 3 examples of allergens: _____

Station 22- AUTOIMMUNE DISEASE

Autoimmunity is when your immune system starts attacking _____ _____ when they are mistaken for a foreign substance.

Examples of autoimmune disease:

- _____
- _____
- _____
- _____

Station 23- SIMULATION of DISEASE SPREADING

Choose a slip out of the box and follow the directions found at the station. Look at your slip of paper to determine how many different people to swap the contents of the cup with. *ONCE YOU HAVE THE NUMBER OF CUPS TO SWAP WITH, RETURN THE SLIP TO THE DESIGNATED AREA. DO NOT PUT IT BACK IN THE BOX.*

Once all classmates have gone through the simulation at the end of class, write down the numbers on you scrap paper to see which people/cups you shared germs with. Record them here: _____

How many classmates ended up "sick" after the simulation? _____

Even if you didn't swap liquids with anyone and practiced great hand washing, etc., how can you still get sick? _____

How does this simulate the spreading of germs? _____

5 pages- student packet

✓ Editable

human body systems stations

Immune system



This station is optional should you choose to omit it, as it does take some preparation.

Students simulate germ spreading using acid base indicators. Teacher instructions are provided.

Bonus You can also save this as an extension activity for another class period.

Mini lab or observation stations are always **optional**.

Depending on the materials available, and the needs of your students, you may need to alter the station.

Thorough instructions available in download.

human body systems stations

Integumentary system

22 total stations

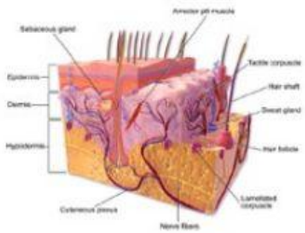
Station 1
Functions

- Protects the body's internal tissues and organs
- Protects against infection from bacteria and viruses
- Helps maintain temperature
- Helps prevent dehydration
- Helps dispose of waste materials
- Stores water and fat
- Serves as a receptor for pressure, touch, pain, and heat.



Station 2
Parts of the integumentary system

The following structures make up the integumentary system:



The Components of the Integumentary System

- Skin
- Hair
- Nails
- Nerves
- Glands
- Blood vessels

Station 6
Dermis and Fingerprints

The middle layer of skin…

Fingerprints are patterns that are formed from the ridges on our fingerprints.

These ridges are protrusions of the papillary layer of the dermis, which tends to be thicker in the fingertips and cause a pattern to protrude from under the epidermis.



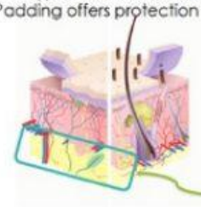


Look at your fingerprints under the magnifying glass. What patterns do you see?

Station 8
Hypodermis

Deepest layer of skin

The hypodermis is the subcutaneous layer of skin- it is a flexible layer of loose connective tissue and fat which separates the skin from the underlying muscles and bones.
The hypodermis functions as insulation and padding. Padding offers protection of internal organs.



The hypodermis contains fat in all parts of the body except the eyelids, ears, and genitalia.

Hypodermis (aka subcutis)

The hypodermis also contains larger blood vessels. The blood vessels become smaller in diameter as they approach the surface of the skin.

Macrophages are immune cells that reside in the hypodermis – they are ready to gobble up any bacteria that may get passed the skin through a wound!



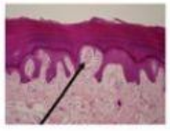
Station 12
Receptors/Senses

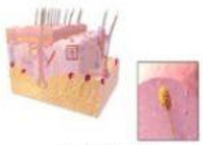
The skin as a sensory organ

The layers of the skin contain numerous sensory receptors that can sense pain, heat, cold, and touch.

Sensory Receptor	Function	Location
Meissner's corpuscle	Touch receptors	Dermis of the palms of hands and soles

✓ Editable





Tactile Corpuscle
(Meissner's Corpuscle)

Station 14
Touch Receptors Part 2

TESTING RECEPTOR ADAPATION- ACTIVITY 2

After a prolonged amount of time, touch receptors tend to slow down their response rate and "get used to" a stimulus. For example, you are not constantly aware that you have socks on, or jewelry, or are holding a utensil, etc. This is called adaptation.

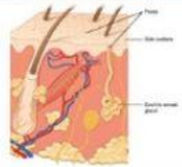
ORE we begin… **predict!**

v much time do you think it takes for receptor aptation to occur?



Station 15
Glands of the integumentary system

Gland		Function	Location
Sweat glands (Sudoriferous glands)	Eccrine sweat gland	Secretes water and salt (sweat) to lower the body temperature via evaporative cooling.	Almost every region of skin
	Apocrine sweat gland	These secrete an oil along the hair shaft and are also called "scent glands".	Axillary (armpit) and pubic regions
Sebaceous glands (oil glands)		Produces sebum, an oil that covers the skin or hair to provide elasticity and waterproofing.	Every region of the skin except the palms of the hand and the soles of the feet.
Ceruminous Glands		Produces earwax	Ear canal



Station 21
Skin Cancer

Skin cancer is typically caused by UV radiation from sunshine or tanning beds. The UV radiation damages the DNA of skin cells, which causes the cells to rapidly multiply and form malignant tumors.



human body systems *stations*

Integumentary system

5 pages- student packet

✓ Editable

human body systems *stations*

Integumentary system

Station 13
Touch Receptors Part 1

TESTING TACTILE LOCALIZATION ACTIVITY 1

Some parts of the body are more sensitive to touch than othe
determine
touched.
the tactile

You will n
carefully!

BEFORE w
Do you th
tactile localization?

Do you think that if you were touched with your eyes closed, you'd be able to pinpoint the *exact* location?

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Station 14
Touch Receptors Part 2

TESTING RECEPTOR ADAPATION- ACTIVITY 2

How much time do you think it takes for receptor adaptation to occur?



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Station 17
Sweat

y sweat?!

one
f you

d



Mini Lab Stations: Observation stations – touch receptors and sweat

Stations are **editable**; you can always alter the mini lab stations.

Thorough instructions available in download.

human body systems stations

Nervous system

22 total stations

THE NERVOUS SYSTEM
Station 1: Function

The nervous system is a complex system that is responsible for:
1. Communicating within the body and controlling the body
   - Examples: blinking, breathing, walking, heart rate
2. Communicating the external environment to the body
   - Example: seeing, hearing, feeling external objects such as heat or textures.

THE NERVOUS SYSTEM CONTROLS AND COORDINATES FUNCTIONS THROUGHOUT THE BODY AND RESPONDS TO EXTERNAL AND INTERNAL STIMULI.

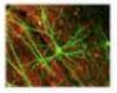


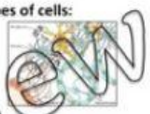
THE FOUR MAIN PARTS OF THE NERVOUS SYSTEM:
1) BRAIN
2) SPINAL CORD
3) SENSORY ORGANS
4) NERVES

THE NERVOUS SYSTEM
Station 2: THE BRAIN

The brain is the most complex organ, and typically located near the primary sense organs (such as ears for hearing and eyes for seeing).

The brain is made of up two types of cells:
- Neurons
- Glial cells





The function of the brain is to control the other organs of the body, by generating muscle activity and secreting chemical messengers (hormones).

The brain is essentially a biological computer. It is able to interpret, process, respond to and store information.





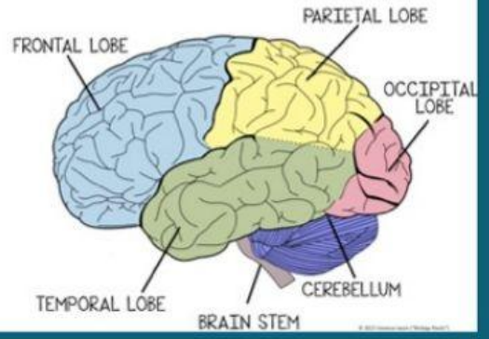
The human brain weighs about 3 pounds and is considered to have the largest body to brain size ratio of all the animal kingdom.
For example, dolphins have the same size brains as humans, but their bodies are about 3x larger than humans.

THE NERVOUS SYSTEM
Station 3: PARTS OF THE BRAIN

The brain is the most complex organ, and typically located near the primary sense organs (such as ears for hearing and eyes for seeing).

THE BRAIN IS DIVIDED INTO 3 GENERAL PARTS:
- CEREBRUM
  - Frontal lobe
  - Parietal lobe
  - Occipital lobe
  - Temporal Lobe

  The cerebrum is divided into 4 lobes. It is the largest part of the brain.
- CEREBELLUM
- BRAINSTEM

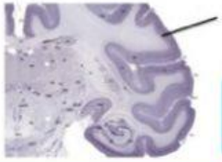


THE NERVOUS SYSTEM
Station 4: THE CEREBRUM

The cerebrum is the largest part of the brain, separated into 4 lobes. The lobes are separated by particular areas of the brain that each have different roles.

CEREBRAL LOBE	FUNCTION
FRONTAL	Plays a role in determining consequence, reward, as well as determining similarities and differences among objects or events.
PARIETAL	Plays a role in spatial relationships, number concepts, and sensory input from the skin.
TEMPORAL	Plays a role in language comprehension, visual memories, and emotional association.
OCCIPITAL	Acts as the visual processing center of the brain.

The outer layer of the cerebrum is called the CEREBRAL CORTEX (aka gray matter).

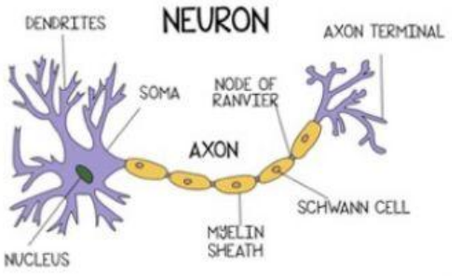


CEREBRAL CORTEX (gray matter outlined in violet)

The cerebral cortex (gray matter) is made up of many bundles of neurons!

THE NERVOUS SYSTEM
Station 14: NEURONS

Nerves are cable-like bundles of axons that communicates the brain to the rest of the body.
Nerves are made up of **neurons**, which are the cells of the nervous system.



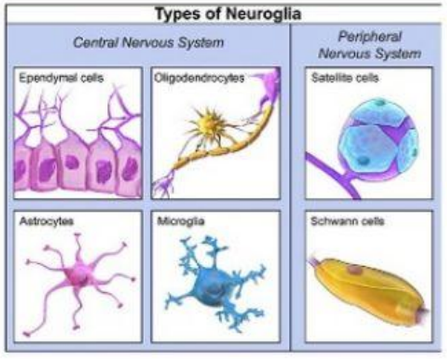
Neurons are the core of the nervous system. They can transit chemical and electrical information in order to communicate.

THE NERVOUS SYSTEM
Station 15: GLIAL CELLS

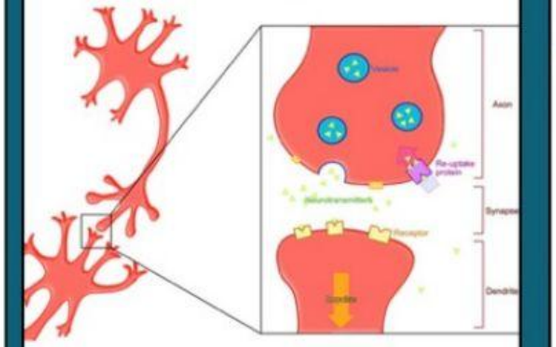
Glial cells are helpers of neural cells.

Functions of glial cells:
1. To surround neurons and help hold them in place.
2. To supply nutrients and oxygen to neurons.
3. To insulate neurons so that they are not directly touching.
4. To remove dead neurons and destroy foreign invaders.

The function depends on the type of glial cells.



THE NERVOUS SYSTEM
Station 17: NEUROTRANSMITTERS CONTINUED

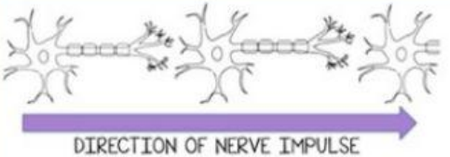


Neurotransmitters are communicated from neuron to neuron. They are released through the axon terminal of one neuron and attached to receptors on the dendrite of another neuron.

The neurotransmitters are simply messengers. They can deliver messages from the brain to other body parts and vice versa. The message depends on which type of neurotransmitter it is.
For example, adrenaline usually means "fight or flight".

THE NERVOUS SYSTEM
Station 18: NERVE IMPLUSE

A NERVE IMPULSE is an electrical transmission across neurons.



DIRECTION OF NERVE IMPULSE

Nerve impulses travel from AWAY from the cell body towards the axons.
Nerve impulses begin when a neuron is stimulated by another neuron or its environment.

Threshold- the minimum level of stimulus that must be reached in order for an impulse to occur.

All impulses are the same strength. If the stimulus reaches the threshold, there will be an impulse. If it is not enough, it will not reach the threshold and nothing will happen.
This is called the "ALL OR NOTHING" rule.



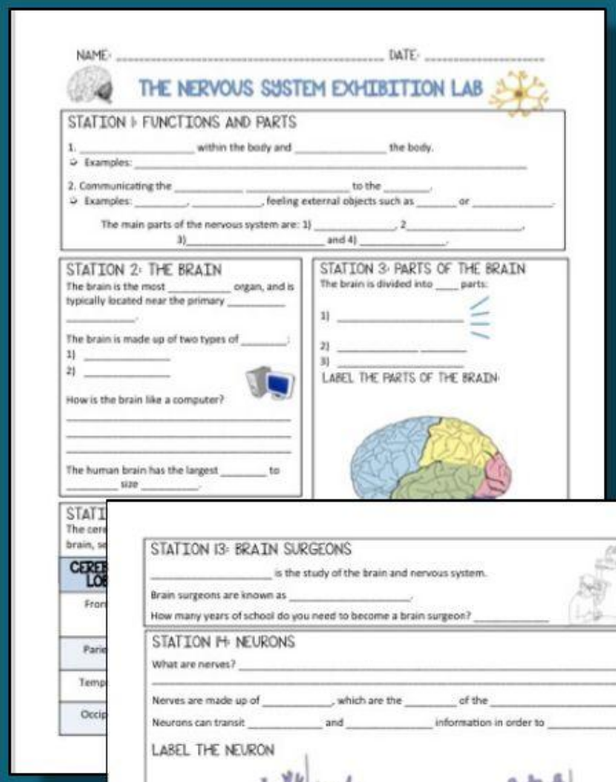
The all or nothing rule is like playing dominoes. As long as you push on the domino just enough, they will fall. However, if you don't push enough, they will not move.

preview
preview

✓ Editable

human body systems *stations*

Nervous System


NAME: _____ DATE: _____

THE NERVOUS SYSTEM EXHIBITION LAB

STATION 1: FUNCTIONS AND PARTS

1. _____ within the body and _____ the body.
- Examples: _____

2. Communicating the _____ _____ to the _____.
- Examples: _____, _____, feeling external objects such as _____ or _____.

The main parts of the nervous system are: 1) _____, 2_____, 3)_____ and 4) _____.

STATION 2: THE BRAIN

The brain is the most _____ organ, and is typically located near the primary _____.

The brain is made up of two types of _____:
1) _____
2) _____

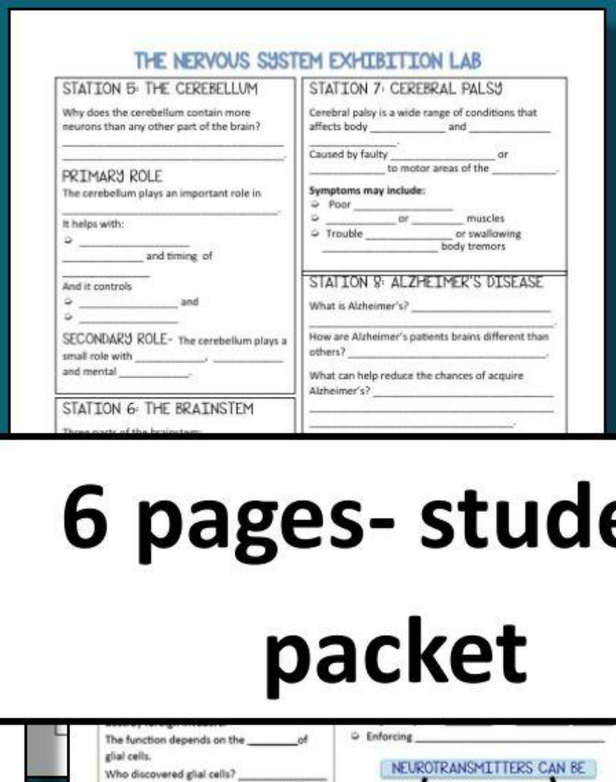
How is the brain like a computer?

The human brain has the largest _____ to _____ size _____.

STATION 3: PARTS OF THE BRAIN

The brain is divided into ____ parts:
1) _____
2) _____ _____
3) _____

LABEL THE PARTS OF THE BRAIN:


THE NERVOUS SYSTEM EXHIBITION LAB

STATION 5: THE CEREBELLUM

Why does the cerebellum contain more neurons than any other part of the brain?

PRIMARY ROLE

The cerebellum plays an important role in _____.

It helps with:
- _____ and timing of _____

And it controls
- _____ and
- _____

SECONDARY ROLE- The cerebellum plays a small role with _____, _____ and mental _____.

STATION 6: THE BRAINSTEM

STATION 7: CEREBRAL PALSY

Cerebral palsy is a wide range of conditions that affects body _____ and _____.

Caused by faulty _____ or _____ to motor areas of the _____.

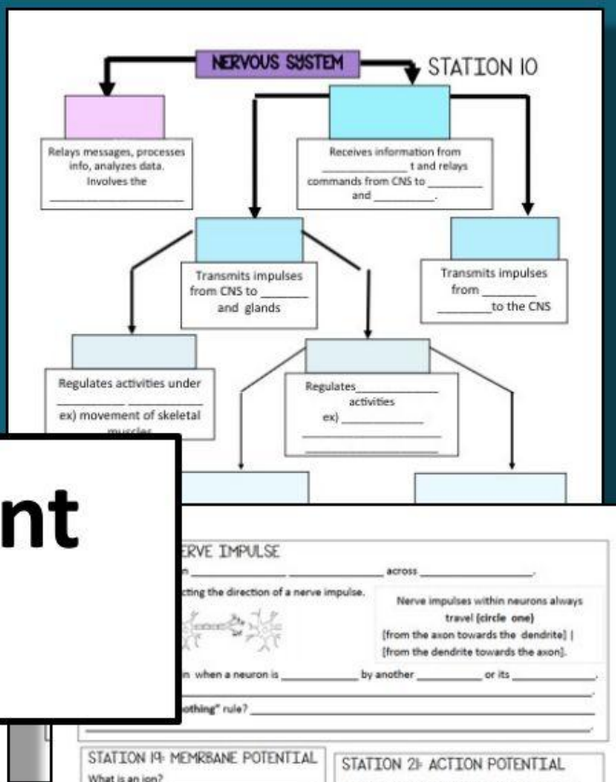
Symptoms may include:
- Poor _____
- _____ or _____ muscles
- Trouble _____ or swallowing _____ body tremors

STATION 8: ALZHEIMER'S DISEASE

What is Alzheimer's? _____

How are Alzheimer's patients brains different than others? _____

What can help reduce the chances of acquire Alzheimer's? _____


NERVOUS SYSTEM

STATION 10

Relays messages, processes info, analyzes data. Involves the _____

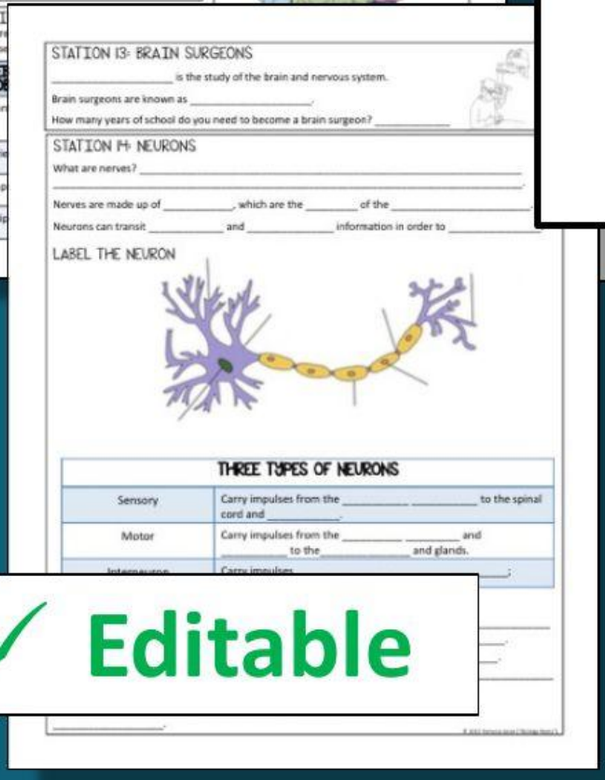
Receives information from _____ t and relays commands from CNS to _____ and _____.

Transmits impulses from CNS to _____ and glands

Transmits impulses from _____ _____to the CNS

Regulates activities under _____ _____ ex) movement of skeletal muscles

Regulates_____ activities ex) _____


STATION 13: BRAIN SURGEONS

_____ is the study of the brain and nervous system.

Brain surgeons are known as _____.

How many years of school do you need to become a brain surgeon? _____

STATION 14: NEURONS

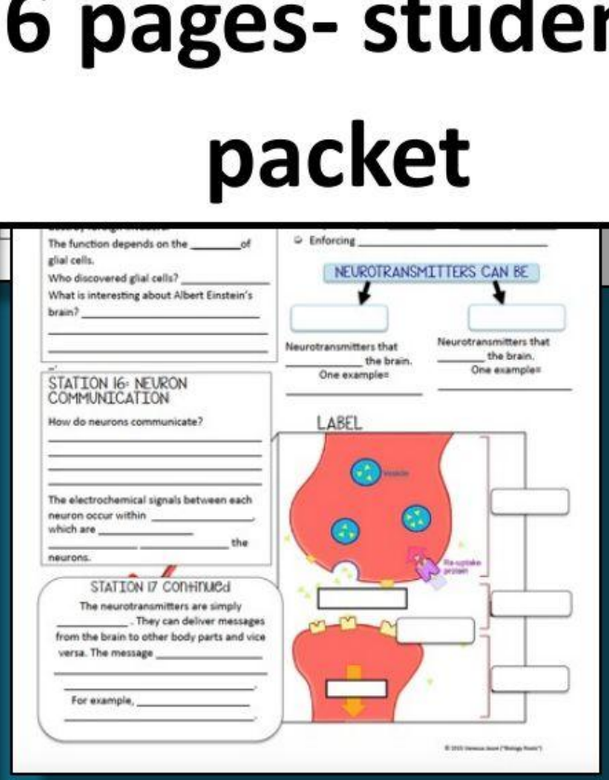
What are nerves? _____

Nerves are made up of _____, which are the _____ of the _____

Neurons can transit _____ and _____ information in order to _____

LABEL THE NEURON

THREE TYPES OF NEURONS	
Sensory	Carry impulses from the _____ _____ to the spinal cord and _____.
Motor	Carry impulses from the _____ _____ and _____ to the _____ and glands.
Interneuron	Carry impulses _____


The function depends on the _____of glial cells.

Who discovered glial cells? _____

What is interesting about Albert Einstein's brain? _____

STATION 16: NEURON COMMUNICATION

How do neurons communicate?

The electrochemical signals between each neuron occur within _____, which are _____ _____ the neurons.

STATION 17 continued

The neurotransmitters are simply _____. They can deliver messages from the brain to other body parts and vice versa. The message _____

For example, _____

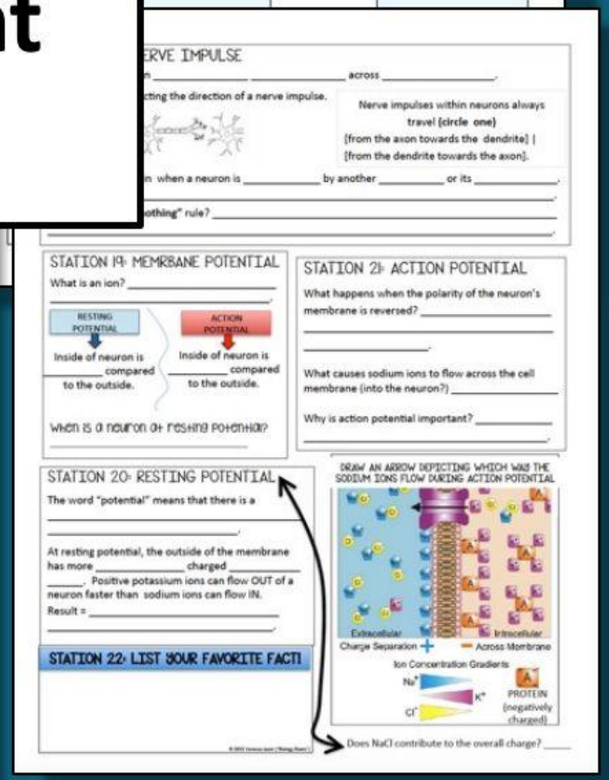
- Enforcing _____

NEUROTRANSMITTERS CAN BE

Neurotransmitters that _____ the brain. One example=

Neurotransmitters that _____ the brain. One example=

LABEL


ERVE IMPULSE

_____ across _____.

cting the direction of a nerve impulse.

Nerve impulses within neurons always travel (circle one) [from the axon towards the dendrite] | [from the dendrite towards the axon].

n when a neuron is _____ by another _____ or its _____.

othing" rule? _____

STATION 19: MEMBRANE POTENTIAL

What is an ion? _____

RESTING POTENTIAL: Inside of neuron is _____ compared to the outside.

ACTION POTENTIAL: Inside of neuron is _____ compared to the outside.

When is a neuron at resting potential?

STATION 21: ACTION POTENTIAL

What happens when the polarity of the neuron's membrane is reversed? _____

What causes sodium ions to flow across the cell membrane (into the neuron?) _____

Why is action potential important? _____

STATION 20: RESTING POTENTIAL

The word "potential" means that there is a _____.

At resting potential, the outside of the membrane has more _____ charged _____. Positive potassium ions can flow OUT of a neuron faster than sodium ions can flow IN.

Result = _____

STATION 22: LIST YOUR FAVORITE FACT!

DRAW AN ARROW DEPICTING WHICH WAY THE SODIUM IONS FLOW DURING ACTION POTENTIAL

Extracellular | Intracellular

Charge Separation + − Across Membrane

Ion Concentration Gradients

Na^+ K^+ Cl^- PROTEIN (negatively charged)

Does NaCl contribute to the overall charge? _____

6 pages- student packet

✓ **Editable**

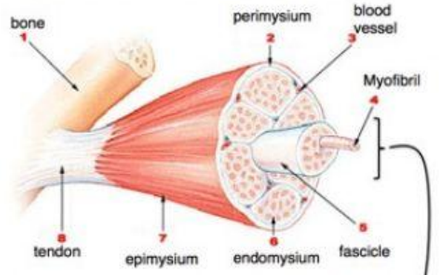
human body systems *stations*

Muscular system

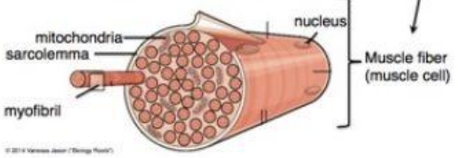
16 total stations

Station 2

Muscles are very complex groups of cells.

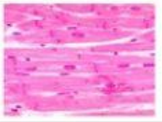
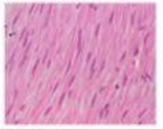
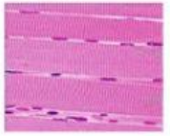


Groups of **myofibrils** are found in muscle cells (aka muscle fibers).



Station 3

There are THREE types of muscle in the body:

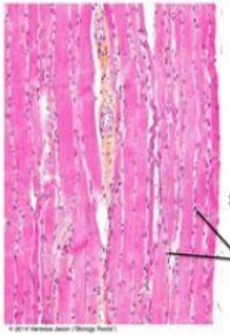
Cardiac muscle 	**INVOLUNTARY** **Muscle contraction occurs automatically without awareness.**
Smooth Muscle 	
Skeletal Muscle 	**VOLUNTARY** **Muscle contraction is under your conscious control.**

Station 5

Skeletal Muscle







Skeletal muscle produces movement and maintains posture- attached to skeleton.

Skeletal muscles are also responsible for generating body heat from activity.

There are over 400 skeletal muscles in your body.

Consist of elongated cells which contain several nuclei (multinucleated).

Striated (striped light and dark bands).

Station 7

Tendon to Bone

Tendons connect muscle to bone. As muscles contract, they can pull the bone to produce movement.

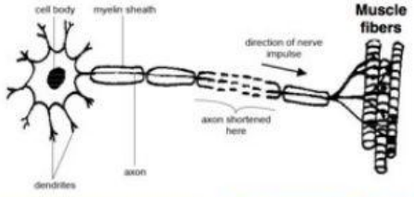




Station 9

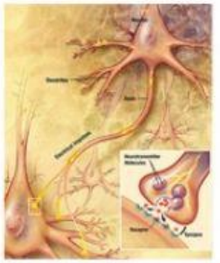
How can you control skeletal muscle?

*The tiny myofibrils are connected to special nerves called **motor neurons**.*



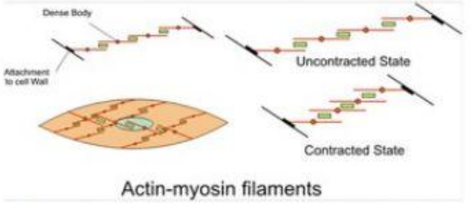
As your brain sends an electrochemical signal to the nerves, they release chemical messengers called **neurotransmitters,** which signal muscle contraction. This chemical reaction causes muscle contractions.

Muscle contraction= movement!



Station 10

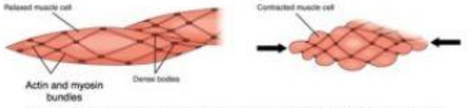
Actin and myosin are repeating units of contractile proteins found in muscle fibers.



Actin-myosin filaments

Myofibrils are organized into two categories of filaments: **thin filaments** called **actin** and **thick filaments** called **myosin.**

Muscles contract by sliding the filaments over each other so that they squeeze into an overlapping position.



When contracted, skeletal muscle can shorten to be 1/3 of it's relaxed length.

✓ Editable

human body systems *stations*

Muscular System

Name: _____ Date: _____

Muscular System Exhibition Lab

Station 1: Function

You need your muscles to:

1. _____ internal organs
2. _____
3. _____ _____
4. _____ food.
5. Maintain _____ _____.
6. _____

Station 3: Three Muscle Types

Involuntary muscle contraction occurs _____ _____.

Examples of involuntary muscle:

Voluntary muscle contraction is under your _____

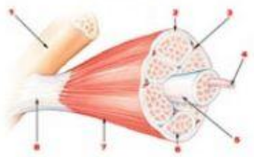
Example of voluntary muscle:

Label the pictures by muscle type:

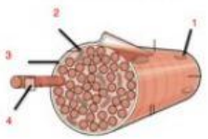
Station 2: Anatomy

Muscles are very complex groups of _____. Groups of myofibrils are found within _____ aka _____.

Label the muscle:



Label the muscle fiber:



Station 4: Cardiac Muscle



Cardiac muscle is only found in the _____.

Never fatigues because it contains many _____.

Cardiac muscle is (circle one) striated I not striated.

Cardiac muscle cells are: (circle one) mononucleated I multinucleated.

A heart cell is called a _____.

The muscle portion of the heart is known as _____.

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Muscular System Exhibition Lab

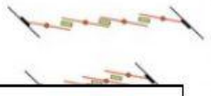
Station 10: Actin and Myosin

What are actin and myosin? _____ _____.

Thin filaments= _____

Thick filaments= _____

How do muscles contract? _____ _____.



Label each picture at left as "contracted muscle" or "relaxed muscle".

Complete the key below by labeling which shapes in the picture are actin (thin filaments) or myosin (thick filaments):

KEY

4 pages- student packet

_____ cells are shaped like _____.

_____ cells are (circle one): mononucleated I multinucleated.

_____ is (circle one): striated I not striated.

Station 7: Tendon to Bone

_____ to _____.

_____ push or pull? _____

There are no muscles in your fingers, only bones, ligaments and tendons. How are they able to move?

Station 8: Pairs

Skeletal muscles work in _____.

Muscle pairs are called _____ pairs; **why is it important that muscles are paired?**

As of the muscles contracts, the other one must _____ (and vice versa).

Station 9: Motor Neurons

What are motor neurons connected to? _____

Fill in the sequence of events that lead to the movement of muscles:

1. The _____ sends an _____ _____ to the nerves.
2. The nerves release _____ _____ called _____.
3. The neurotransmitters signal muscle _____.

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Second round (20 seconds): _____

Third round (30 seconds): _____

_____ or why not?

Microscopic Muscle Slides

Skeletal Muscle | Smooth Muscle

Station 15: ALS



What does ALS stand for?

_____

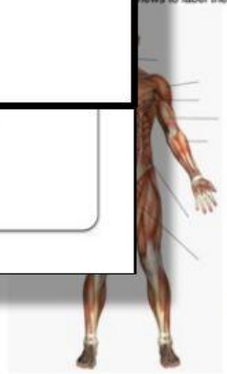
What is ALS? _____ _____.

What are some symptoms of ALS?

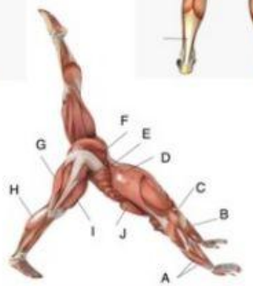
_____ _____.

Label the muscles

_____ views to label the side view:







Choices for A-K:
Biceps
Brachioradialis
Exterior oblique
Gastrocnemius
Gluteus maximum
Gluteus minimus
Latissiumus dorsi
Muscles to fingers
Pectoralis major
triceps

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human body systems stations

Muscular system

Station 12

MICROSCOPE STATION

At each microscope, sketch the different muscle types on your answer sheet in the proper space. Please use pencil!



Have your teacher sign off on your sketches!

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Station 13

CLOTHESPINS

READ ALL DIRECTIONS BEFORE ATTEMPTING.
Try this while having a friend time you!

But before you do...
Come up with a hypothesis as to how many squeezes you think you'll perform during each round. Record on your answer sheet.

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Mini Lab Stations:
Microscope station and muscle fatigue exploration

human body systems stations

Reproductive System

25 total stations

Station 1

FUNCTIONS

Functions of reproductive system:

1. To produce sex cells (eggs in females and sperm in males)

2. To transport the sex cells effectively within the reproductive tracts

3. To produce offspring in a process called fertilization during sexual interaction.

4. To nurture developing offspring (females)

5. To produce hormones that aid in the regulation of these functions.

*Sex cells are also known as gametes.

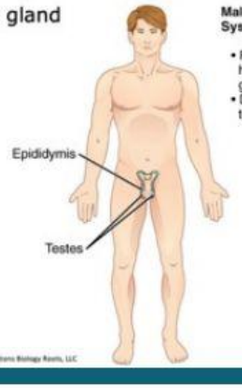


Station 2

MALE STRUCTURES AND FUNCTION

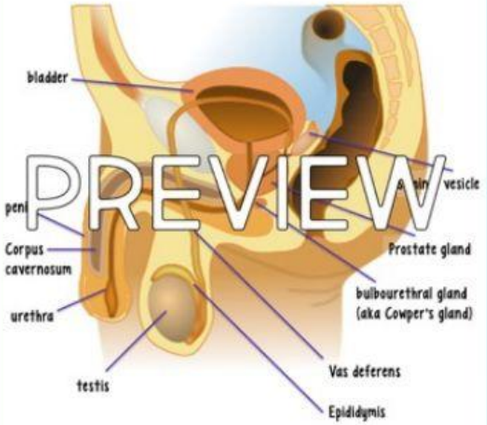
The male reproductive system has 5 main structures:

- Testes
- Epididymis
- Vas Deferens
- Prostate gland
- Penis



Station 3

MALE STRUCTURES- DIAGRAM



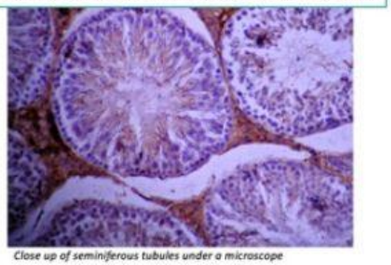
PREVIEW

Station 5

SPERM PRODUCTION

Each testis contains a network of coiled tubes where sperm are produced by meiosis.

The coiled tubes are called seminiferous tubules.



Close up of seminiferous tubules under a microscope

A sexually mature male can produce about 300 million sperm each day.

Station 14

OVARIES:

Ovaries are glands that produce egg cells.

Females have two ovaries, located on either side the lower abdomen. Each ovary is about the size of an almond.

Developing egg within a human ovary



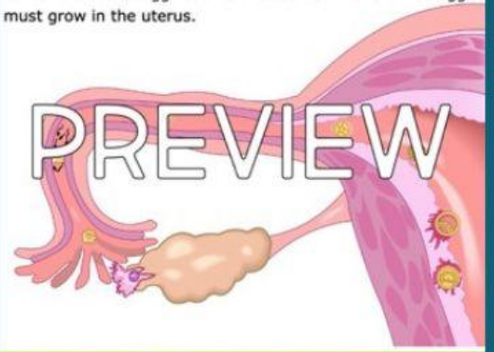


Station 16

FALLOPIAN TUBES:

The fallopian tubes connect the ovaries (where egg production occurs) to the uterus. Fertilization occurs in the fallopian tubes.

Fallopian tubes contain **cilia**, which help move the egg along and to the uterus. Peristaltic muscle contractions also occur to make sure the egg reaches the uterus. The fertilized egg must grow in the uterus.



PREVIEW

Another name for fallopian tube is oviduct

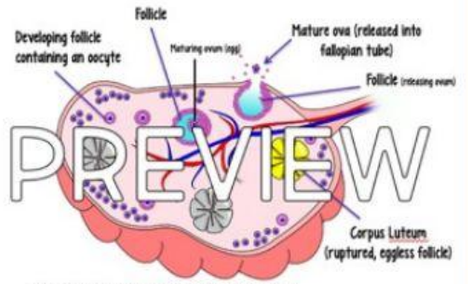
Station 19

OVA PRODUCTION:

Eggs (or "ova") are produced in the ovaries.

Follicles are fluid-filled sacs inside the ovaries that contain an immature egg called an "oocyte".

When the oocyte is matured into an ova, the follicles rupture at the surface of the ovary, releasing the egg. This is known as **ovulation.**



PREVIEW

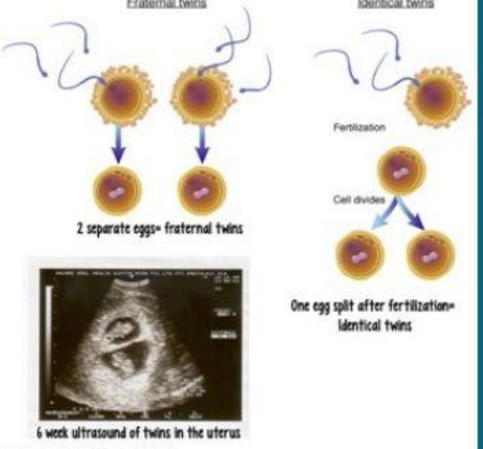
Diagram showing follicle development inside an ovary

The scientific term for egg is "ovum" or plural: "ova".

Station 25

TWINS

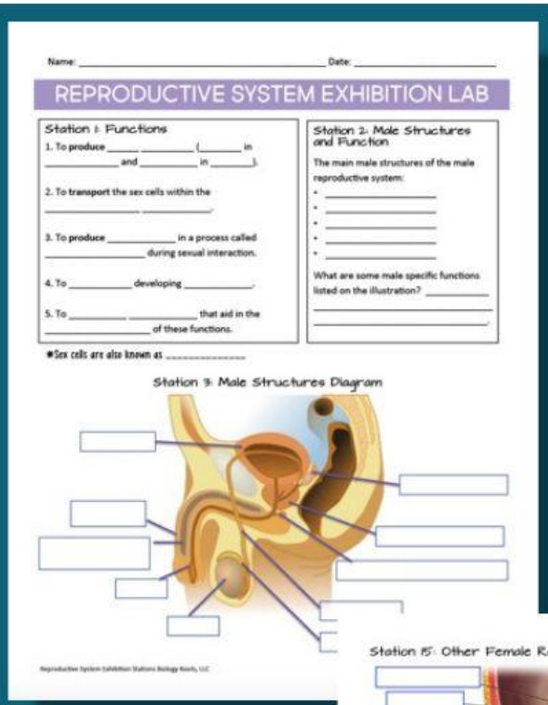
Twins can occur if two eggs are released from the ovary, or if a fertilized egg spontaneously splits into two.

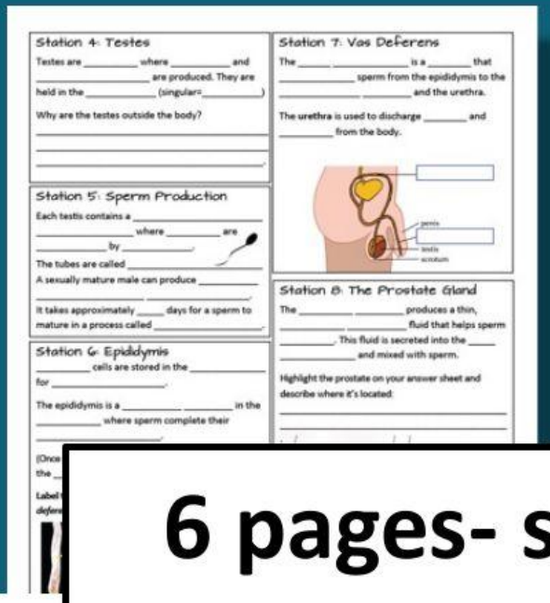


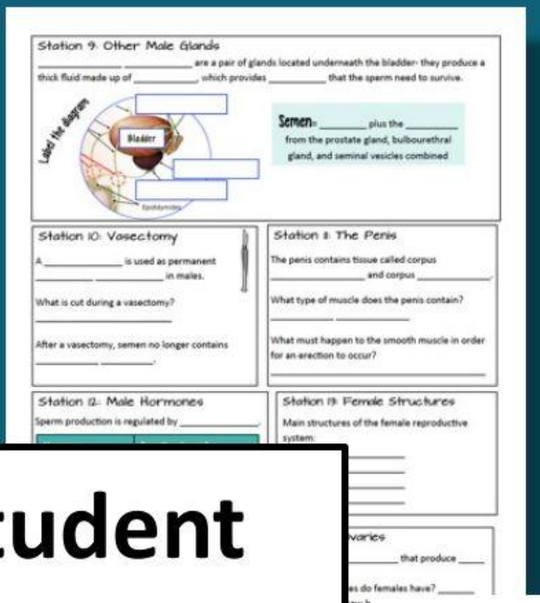
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human body systems stations

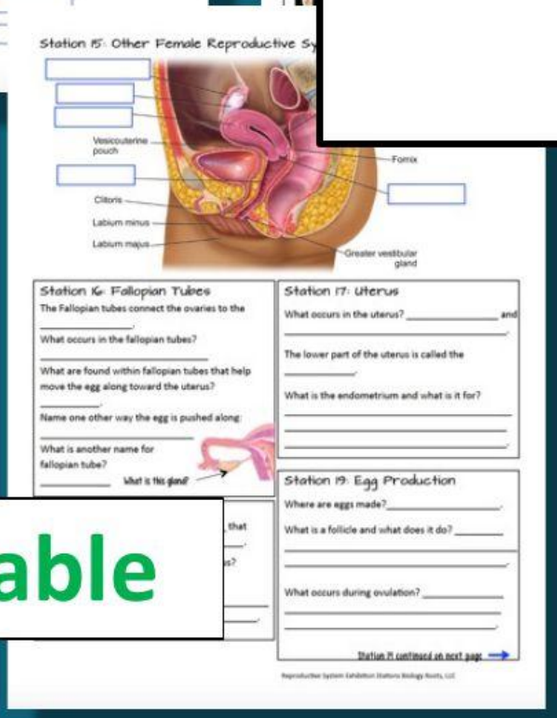
Reproductive System

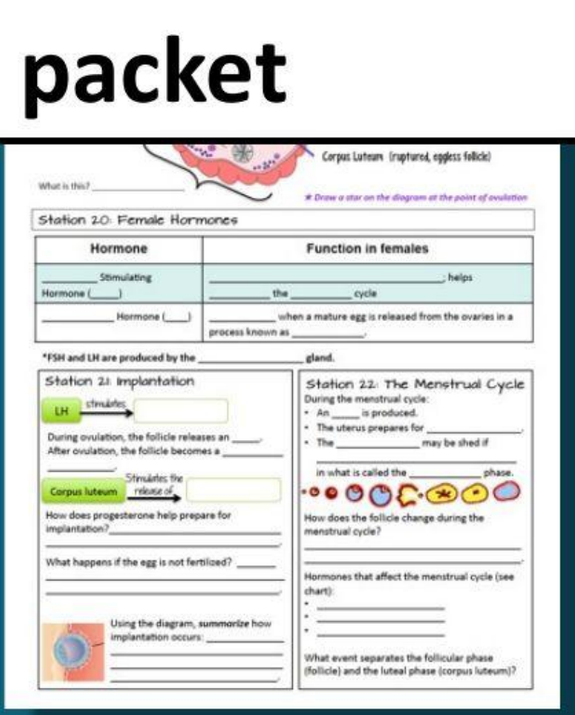


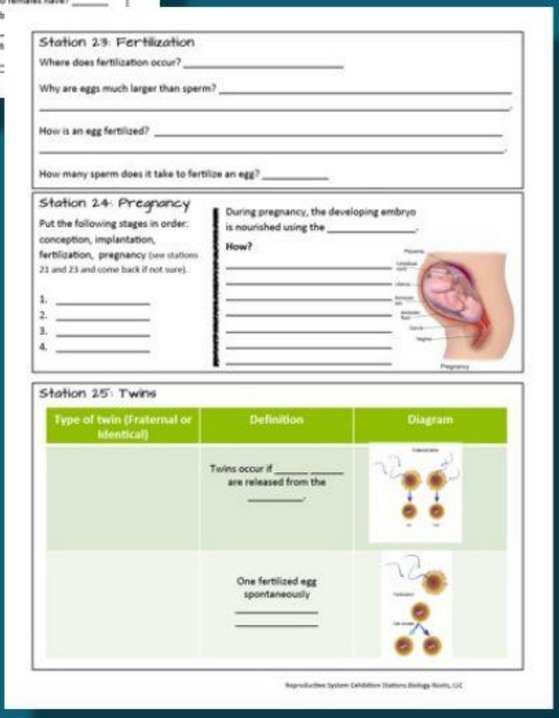




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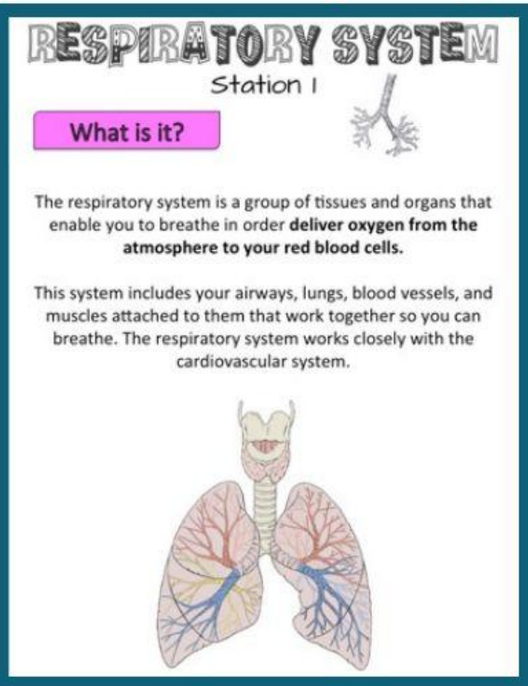


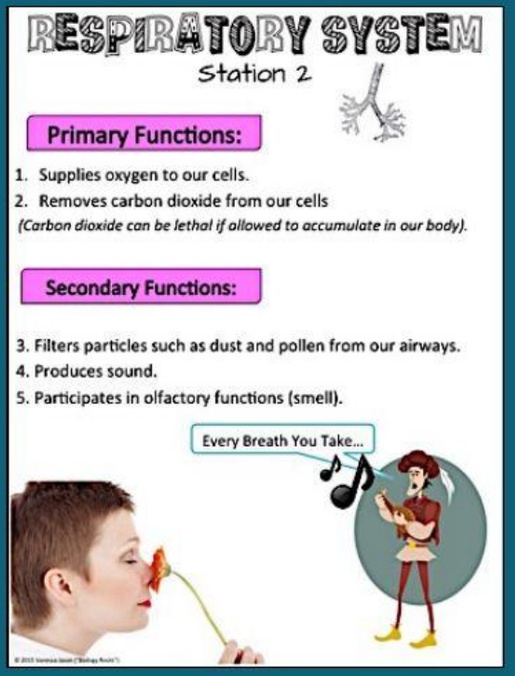
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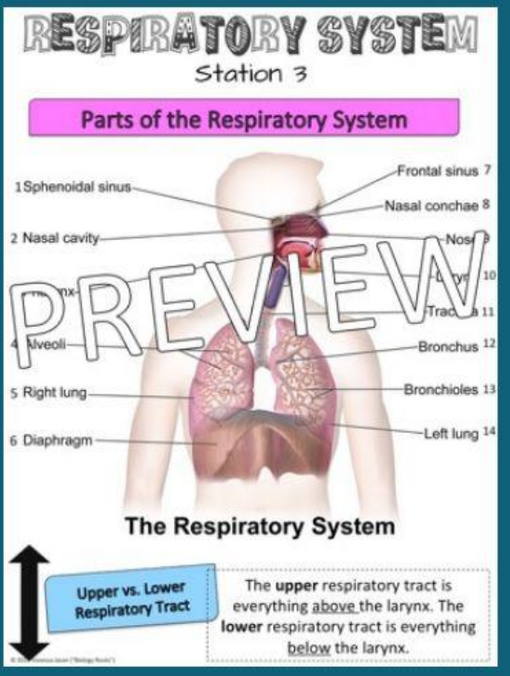
human body systems *stations*

Respiratory System

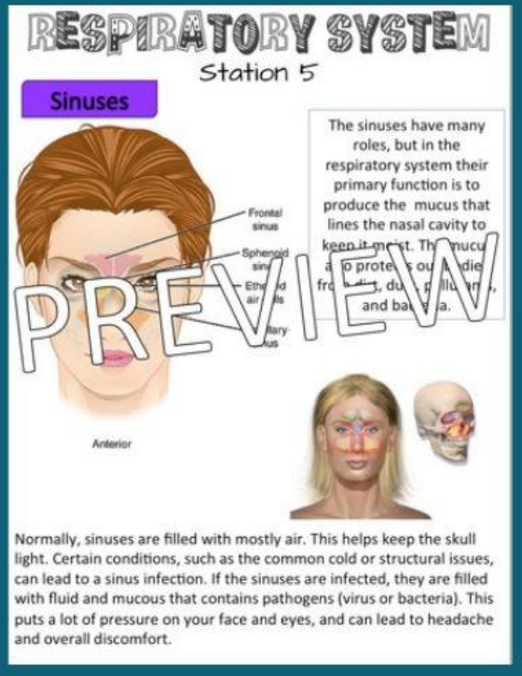
19 total stations

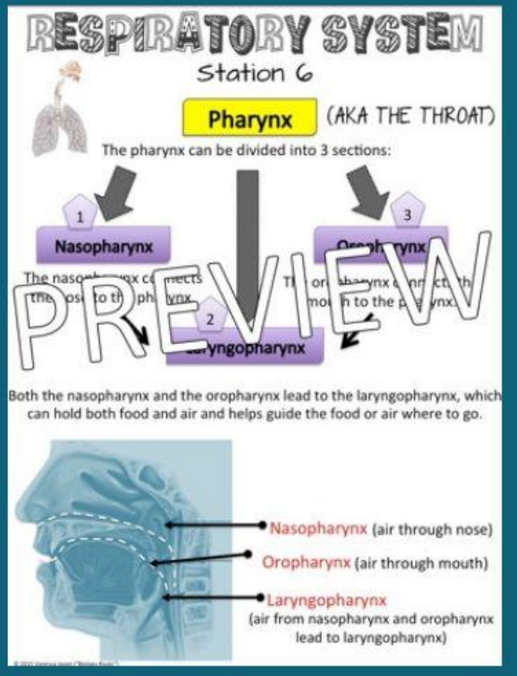








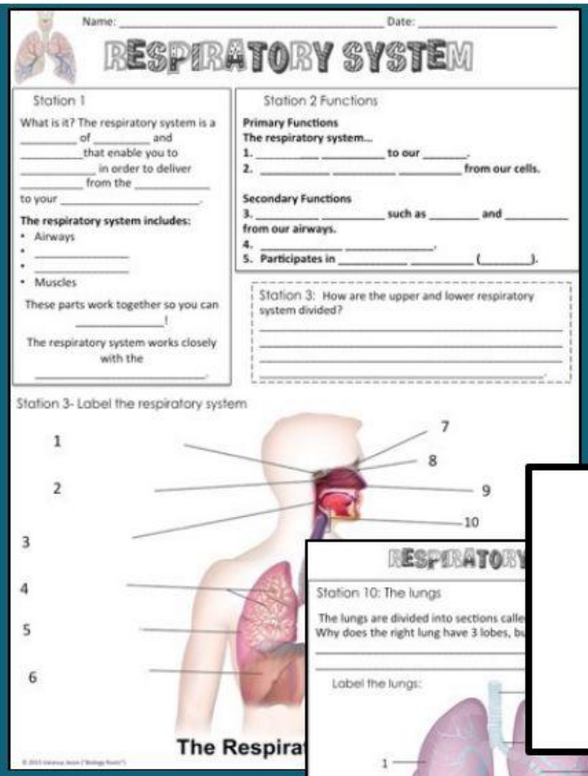


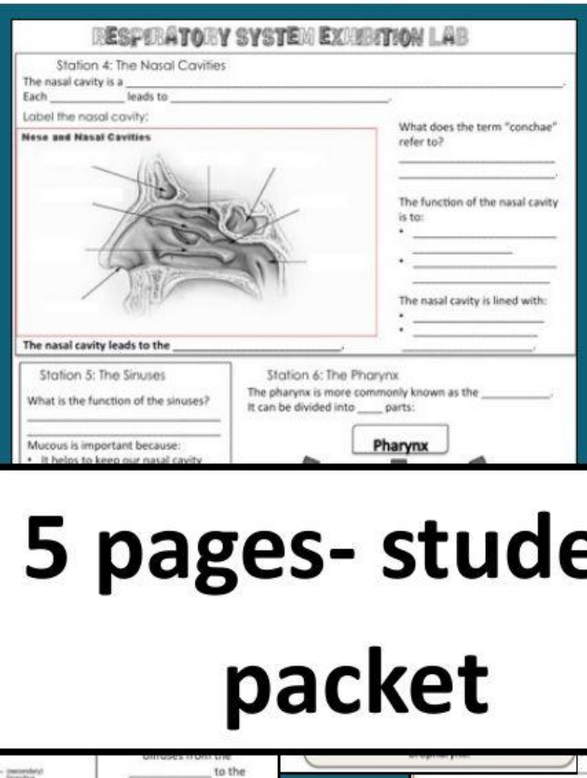


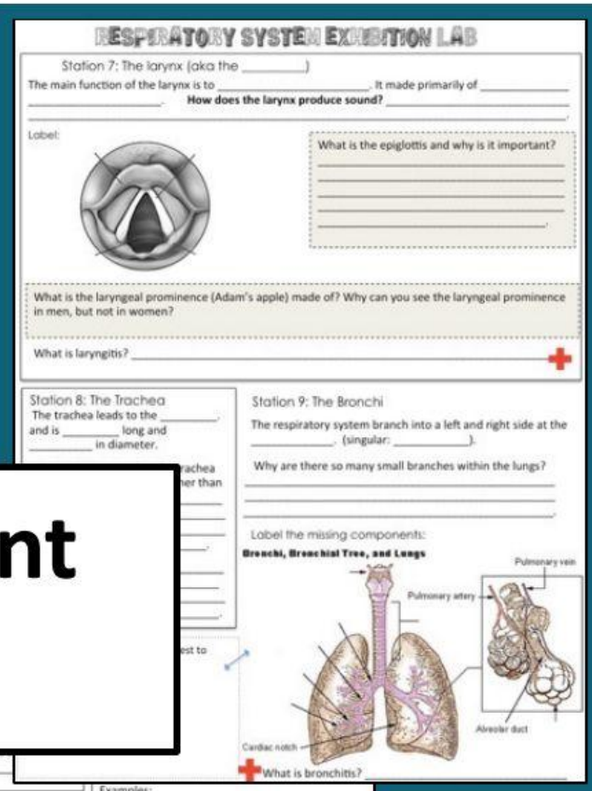
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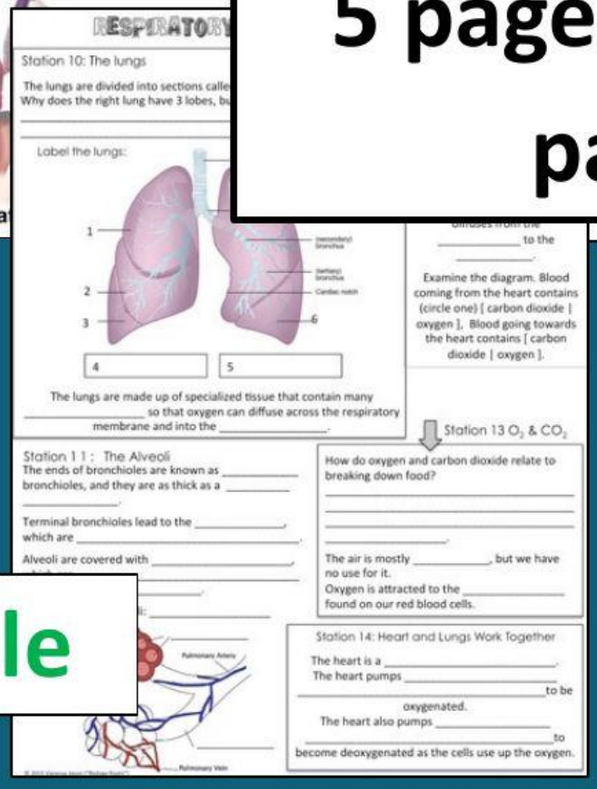
human body systems *stations*

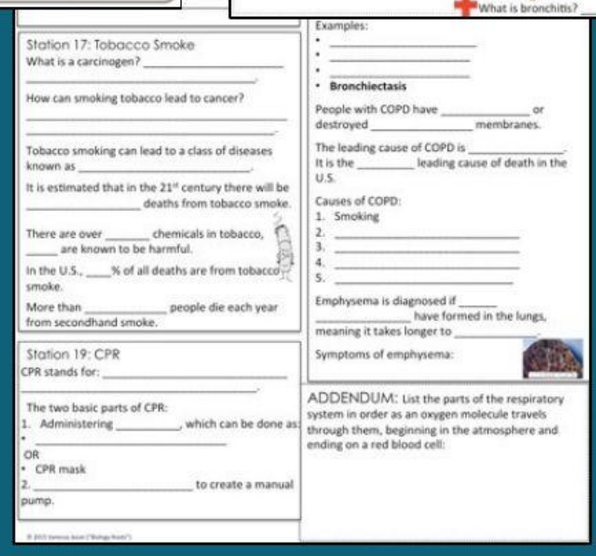
Respiratory System











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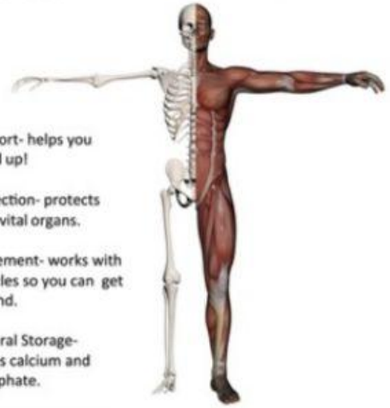
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human body systems stations

Skeletal System

20 total stations

Station 1 Functions of the Skeleton:



1. Support- helps you stand up!
2. Protection- protects your vital organs.
3. Movement- works with muscles so you can get around.
4. Mineral Storage- stores calcium and phosphate.
5. Produces blood cells.

Bones Exhibition Lab
www.biology-roots.com

Station 2- Label

Label the skeleton on your answer sheet.



Bones Exhibition Lab
www.biology-roots.com

Station 5 Types of Bones

For each bone pictured, list whether it is long, flat, short or irregular.

A)



parietal bone of cranium

B)



Thoracic vertebra

C)



Femur

D)

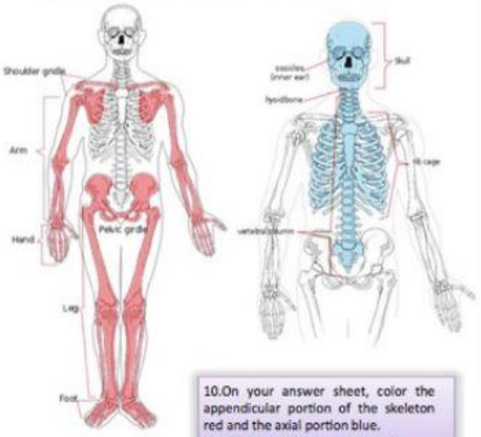


Carpal bone

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Station 7

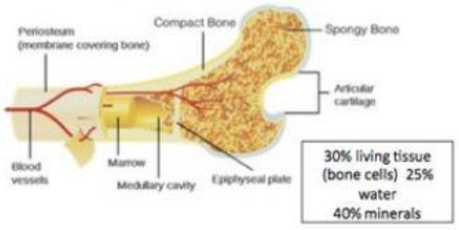
The skeleton can be divided into two main parts: the appendicular and the axial skeletons.



10.On your answer sheet, color the appendicular portion of the skeleton red and the axial portion blue.
11. Fill in the tables appropriately.

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Station 8 Bone composition and structure



30% living tissue (bone cells) 25% water
40% minerals

Periosteum- Tough outer membrane- helps protect and insulate bones.

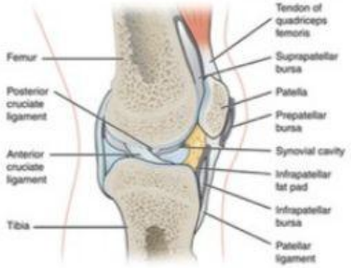
Compact bone- is the hard outer layer made up of bone cells (osteoblasts and osteoclasts).

Spongy bone- hard inner layer of bone with spaces for important materials such as bone marrow.

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Station 12

Joints occur wherever two or more bones meet.



Cartilage is a flexible connective tissue that can be found between some joints and act as a shock absorber.

Synovial fluid is found between moveable joints to help lubricate them (crrreeeak).

Ligaments attach bones to bones at the joints.

Tendons attach bones to muscle for movement.

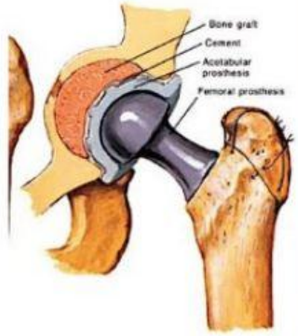
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Station 13

- Hip and knee replacements are the most common joint replacements.
- Common in older people because as the cartilage wears down, bone may begin to rub against bone and become painful.

The deteriorated bone is removed (femur head for hip replacement) and a prosthetic is drilled in.

What type of joint is pictured at this station?



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Station 18 Bad Bones

Type of Fracture	Description
Greenstick	An incomplete fracture where the bone is slightly bent (hence "greenstick" [flexible]; occurs most often in children.
Spiral	A fracture that wraps around the bone in a looped or curved fashion.
Comminuted	A fracture in which the break breaks into several fragments.
Transverse	A bone that occurs at a right angle to the bone's axis (or in other words it breaks clean across the bone).
Compound	This is a very serious fracture in which the bone breaks in half and separates. This fracture is most at risk breaking through the skin and leading to infection.



What type of fracture do you see in the x-ray?

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human body systems *stations*

Skeletal System

Name: _____ Date: _____

BONES EXHIBITION STATIONS

Station 1) List the functions

1. _____
2. _____
3. _____
4. _____
5. _____

Station 3 List the joints

A. _____- (aka fibrous joint) – they don't move!

B. _____

C. Ball and socket joint-

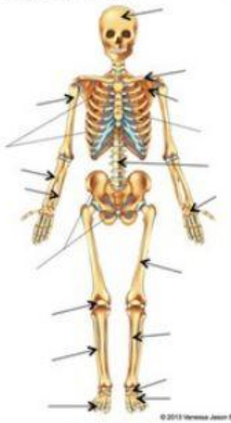
D. _____

E. _____

F. _____

G. _____ - only in the _____ (similar to condyloid but but a wider range of motion).

Station 2) Label the bones



Station 4) Label the joints



Station 5

6. Determine the type of bone

A) _____
B) _____
C) _____
D) _____

Station 6

7. How many bones do adults have? _____

8. How many ribs do you have? _____

9. Which part of the body has the the highest number of bones? _____

Station 7 (use colored pencils provided for #10)

10



11

Parts of the appendicular skeleton	Parts of the axial skeleton
Shoulder girdle,	Inner ear, skull,

Station 8

Label: compact bo
row



Station 9

15. Which part of the bone are Haversian canals found? _____

16. What is found within Haversian canals?

17. What i

18. What is the outside

Station 10

19.

Station 11

21. What ty transplants

22. What a

23. What do stem cells in your bone marrow eventually become? _____

24. What is the different between an autologous and allogeneic bone marrow transplant? _____

25. Where is the bone marrow usually taken from?

skulls of adults and infants

bones to bones.

30. _____ attach bone to _____.

Station 13

31. What are the two most common joint replacements?

32. Why are joint replacements generally needed?

33. Which type of joint is pictured?

Station 15

38. How many total bones are in your vertebral column? (Hint: read the whole page!)

39. If a new office chair advertised having

you expect from

h and dinner rule:

ter as you get

Station 16

43. Approximately how many bones are babies born with? _____

44. Which hormone controls growth?

Station 17

43. The last bone to grow is the _____.

44. Would a child or an adult be more likely to break their clavicle? Explain!

Station 18

45. Which type of fracture is pictured in the x-ray?

46. _____
47. _____
48. _____
49. _____
50. _____

Station 19

51. Name two characteristics of osteoporosis:

52. How can osteoporosis be prevented?

53. Arthritis affects the

54. Why is osteoarthritis painful?

55. What is one unique characteristic about rheumatoid arthritis? _____

Station 20

56. What is your favorite fact and why?

57. Are bones alive? _____
Explain!

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human body systems stations

Skeletal System

Mini Lab Stations: Observation Stations

Station 10

This is
cross s

19. W
bone?



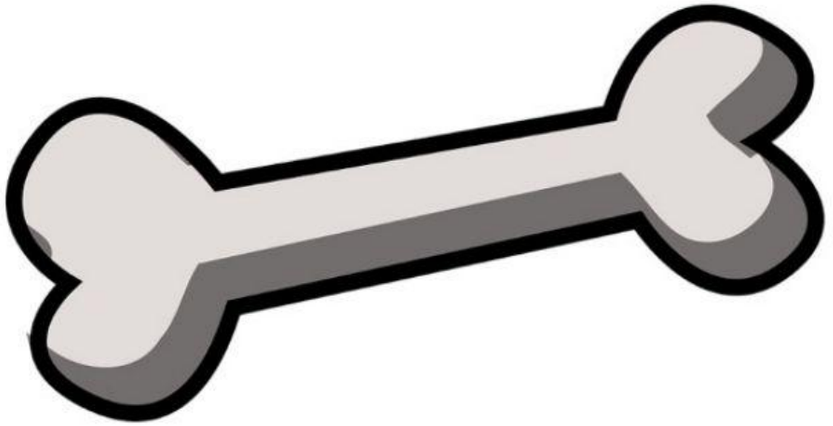


20. What type of cells (besides bone) are made in the spaces of spongy bones?

Bones Exhibition Lab
www.biology-roots.com

Station 21

Please do not try to bend it- it can break!



Bones Exhibition Lab
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human body systems stations

Classes this resource supports:

This set of stations can be used in a general biology class to teach or reinforce body systems. For higher levels, it can be used to introduce body systems. This resource can also be used as supplemental material in an anatomy class.

Prior Knowledge:

Before using this resource, students should have **prior knowledge on the organization of life; cell structure and function; and homeostasis.**

This can be found in my cells unit and introduction to life science digital flip book or homeostasis stations.

How to Use this Product:

The stations are designed to be posted around a room or hallway. Students travel from station to station (in any order) while recording their answers on the student answer sheet provided.
Both the stations and student answer sheet are editable (in case you'd like to alter or delete stations.)

Reviewing the stations and making any changes before printing is recommended. Laminating the stations or placing them in sheet protectors will give them more life.

*These stations take approximately 2 class periods to complete. Depending on the level or grade of your class, you may need to adapt or shorten the stations.



human body systems stations

Supports the following TEKS:

B.10 (A)- describe the interactions that occur among systems that perform the functions of regulation, nutrient absorption, reproduction, and defense from injury or illness in animals

B.10 (C)- analyze the levels of organization in biological systems and relate the levels to each other and to the whole system

7.12(B)- identify the main functions of the systems of the human organism, including the circulatory, respiratory, skeletal, muscular, digestive, excretory, reproductive, integumentary, nervous, and endocrine systems

Ties in with the following NGSS performance expectations:

HS-LS1-2- Develop and use a model to demonstrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

(Body systems are not directly a performance expectation of NGSS; but these stations can be adapted and used to support organization of life and homeostasis.)

Cross-Content Connections		
SEP (Science and Engineering Practices)	**DCI (Disciplinary Core Ideas)**	**CC (Crosscutting Concepts)**
Develop and use models; construct explanations and design solutions	Structure and function	Structure and function

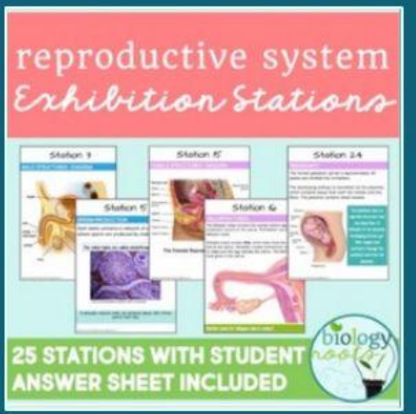
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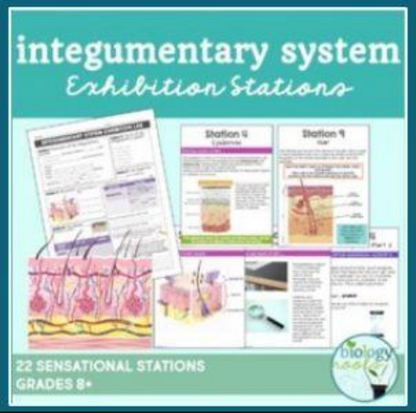
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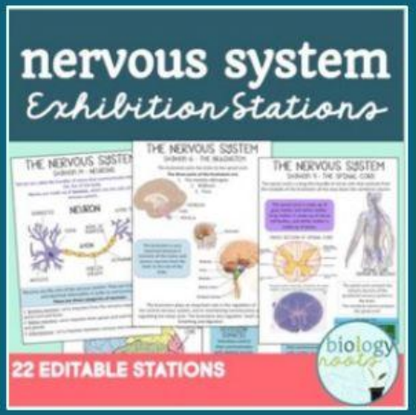










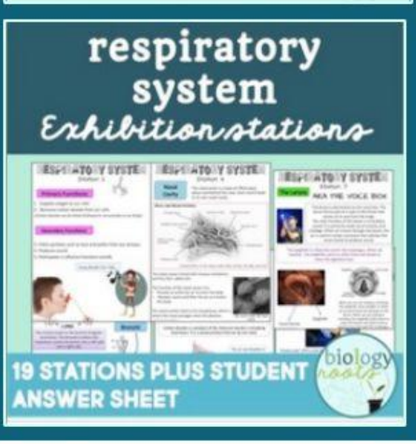




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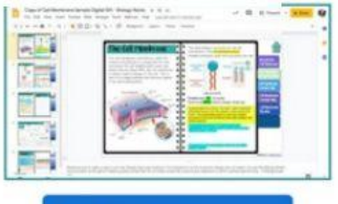
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Sample Body System Stations



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