

ACTIVITY

Body Works

Date

12/12

Page 41

Title Page

Body Works

Learning Targets

Learning Targets for Unit B: Body Works

Activity 12: What's Happening Inside?

- CONTENT: I can name and describe the function of the 8 main body systems.
- CONTENT: I can explain what an organ is, and the main functions of the organs within the body systems.
- SEP #2: I can create models of the body.

Activity 14: Breakdown

- CONTENT: I can explain the difference between mechanical and chemical breakdown, and the importance of both.
- SEP #3 & 4: I can design and do an experiment, collect data, and analyze it to answer a scientific question.

Activity 15: Digestion: An Absorbing Tale

- CONTENT: I can explain the parts of the digestive system, and their functions.
- SEP #8: I can critically read a scientific text to obtain information.

Activity 17: Gas Exchange

- SEP #3: I can conduct an investigation to find the difference between inhaled and exhaled air.
- CONTENT: I can describe and draw the anatomy of the lungs and where gas exchange occurs.

Activity 18: The Circulation Game

- SEP #2 & CONTENT: I can model and explain how blood flows through the body to transport and exchange gases, nutrients, and wastes.

Activity 22: The Heart: A Muscle

- SEP #3: I can measure how hard my heart works.
- SEP #2: I can analyze the pros and cons of a model.

Activity 23: Heart Parts

- CONTENT: I can explain how the heart works as a double pump.
- SEP #8: I can critically read a scientific text to obtain information.

12/12

Paper Pocket

WRU Thinking?

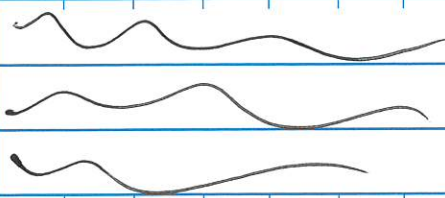
List as many organs as you can and what they do.

Organ	Function
stomach	digests food
heart	pumps blood
brain	thinks
liver	cleans blood
lungs	
small intestine	
kidney	
skin	
eyes	
tongue	
appendix	
bladder	
large intestine	
muscles	
ears	
mouth	
tonsils	
nose	
pancreas	
gall bladder	
esophagus	
trachea	

WRU Thinking?, continued

Organ	Function
urethra	
testicle	
uterus	
fallopian tubes	
Cowper's gland	
veins	
penis	
vagina	
anus	

Gallery Walk Observations



Organ card Categories

Name _____

Date _____

Act 12: Functions of Human Body Systems pg 1

Function	Organ	System
These begin the process of mechanical digestion.	teeth	digestive
These remove wastes from the blood and transfer them into urine.	kidneys	excretory
Nutrients are absorbed from food and go into the blood here.	small intestine	digestive
This holds solid waste before it is expelled from the body.	rectum	digestive/excretory
This produces chemicals, such as digestive enzymes, that help digest food.	pancreas	digestive
This tube connects the throat and nose to the bronchial tubes.	trachea	respiratory
These are the tiny sacs where the exchange of oxygen and carbon dioxide takes place.	alveoli	respiratory
Eggs develop in these.	ovaries	reproductive
A fertilized egg grows here.	uterus	reproductive
This signals the body to react to changes in the environment, such as danger or the smell of food.	brain	nervous
These sense the outside world and communicate with the rest of the body's systems.	nerves	nervous
This protects the lungs and supports breathing.	rib cage	skeletal
This holds urine before it is released from the body.	bladder	excretory
Semen passes through these tubes from the testes to the urethra.	vas deferens	reproductive
This pump works every minute of life.	heart	cardiovascular
These blood vessels carry blood toward the heart.	veins	cardiovascular
This moves food from the mouth into the stomach.	esophagus	digestive
This stretchy muscular sac holds food.	stomach	digestive

Name _____

Date _____

Functions of Human Body Systems (continued)

Function	Organ	System
This stretchy muscular sac holds food.		
Urine is eliminated from the body through this tube.	urethra	excretory
This absorbs water from food, stores wastes, and eventually eliminates wastes from the body.	large intestine	digestive
This produces bile, which helps digest fats, breaks down toxins, and regulates cholesterol and sugar in the blood.	liver	digestive/excretory
Sperm exit the body here.	penis	reproductive/excretory
These contract to help the body to move.	skeletal muscles	muscular
Air enters the body here.	nose mouth	respiratory
Air passes through these just before it reaches the lungs.	bronchial tubes	respiratory
These are where oxygen is exchanged between the blood and circulatory system. These expand during inhalation and contract during exhalation.	lungs	respiratory/excretory
Sperm are produced here.	testes	reproductive
In one of these tubes between the ovaries and uterus an egg is fertilized.	fallopian tubes	reprod
This is a bundle of nerves that connects your brain to all the rest of your body.	spinal cord	nervous
This is a tube-shaped passage from the uterus to the outside of the body.	vagina	reprod.
These provide support for the body and are where blood cells are produced.	long bones	skeletal
These protect the spinal cord and support the head and back.	spinal column	skeletal
These are tubes that urine passes through from the kidneys to the bladder.	ureters	excretory
These blood vessels carry blood away from the heart.	arteries	cardiovascular
In these tiniest blood vessels blood and organs exchange nutrients and waste.	capillaries	CV; Resp; Dig!

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Name

Human Body Systems - Act 12

Name:

Activity 12: What's Happening Inside? Body System Information

Excretory System

This system filters out wastes and purifies the blood. It also is responsible for eliminating those wastes from the body. The body's water balance is maintained by this system.

• Lungs get rid of CO_2

Muscular System

This system allows movement. Its organs are found in practically every part of the body. This is the only system that has organs that can contract. The largest body system by mass, it makes up approximately 40% of a person's body weight.

Respiratory System

This system is responsible for gas exchange between the body and the surrounding air. As air enters the body, its oxygen travels through the many organs of this system until eventually the oxygen is diffused into the blood. This system also releases carbon dioxide from the blood into the air during exhalation.

Reproductive System

This system allows continuation of our species. The organs are different in males and females. The different organs produce different types of cells. If the cell produced by a male fertilizes the cell produced by a female, the fertilized cell can develop into a new human.

Name _____

Date _____

L12: Functions of Human Body Systems

PURPLE

Nervous System

This is the master system that senses the outside world, controls the body, and allows communication among all of the other systems. Every thought, action, and emotion a person has requires activity in this system. It is the fastest acting and most complex system of the body. The cells in this system can communicate at speeds up to 200 miles per hour!

Skeletal System

This system provides support and shape. It also protects delicate organs within the body. Organs of this system are attached to muscles and often act as levers allowing movement. They range in size from 0.1 inch (0.3 cm) to 18 inches (45.7 cm)! Minerals are stored here and red blood cells are produced within this system.

GREEN

Digestive System

This system transforms food to energy. Food enters the body, goes through many organs of this system while other nearby organs secrete chemicals. Finally food is transformed into nutrients that the body can use and wastes which are eliminated from your body.

heart circulatory
↓ vessels

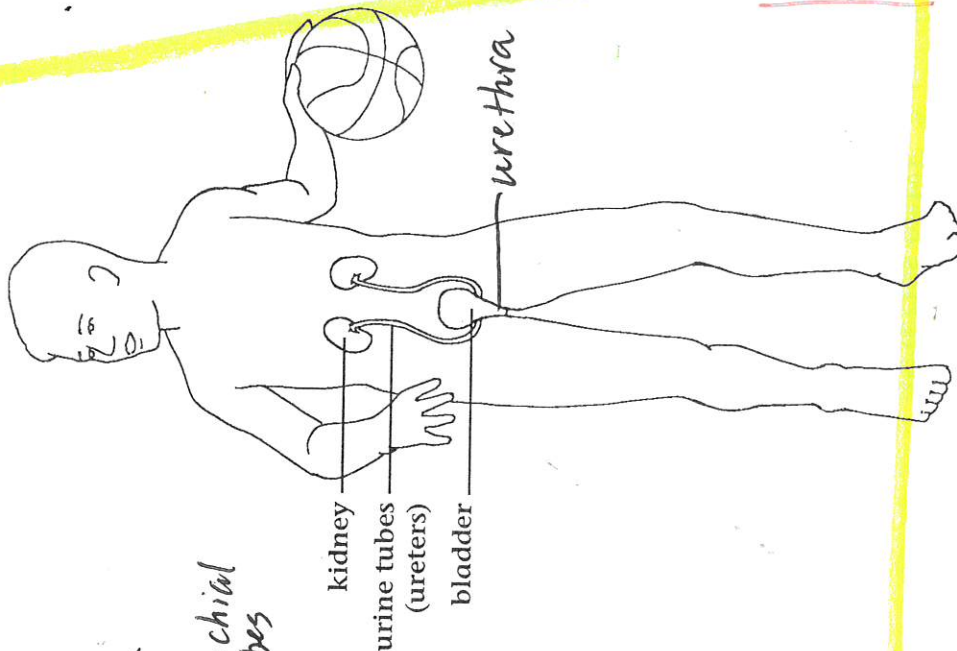
Cardiovascular System

This system transports nutrients and wastes through the body. It includes a pump that pumps blood. The blood picks up oxygen from the lungs and nutrients from the small intestines and delivers them to the body's cells. This enables the cells to create energy. The blood also picks up wastes from the cells and delivers them to the excretory and respiratory systems so they can be removed from the body.

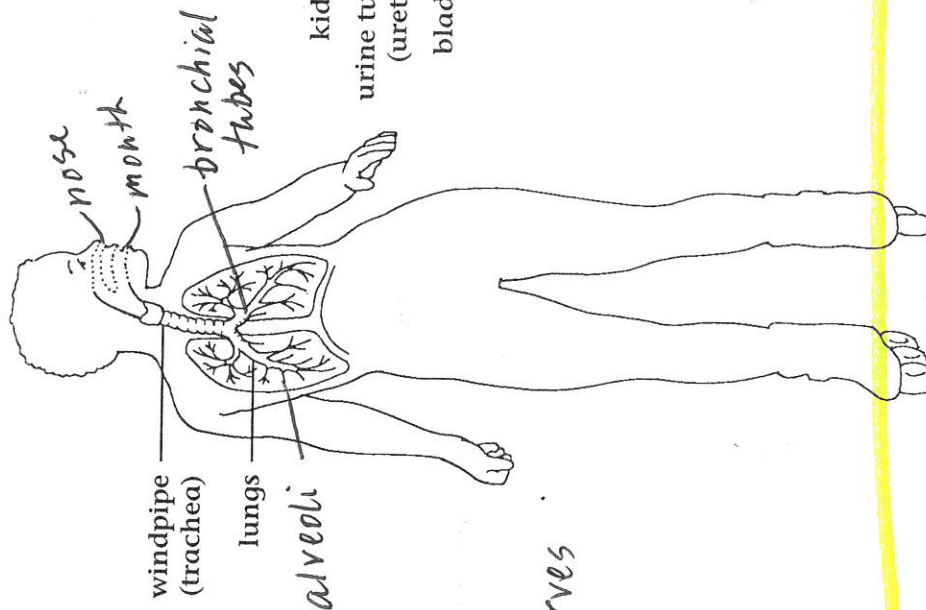
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Human Body Systems - Act 12

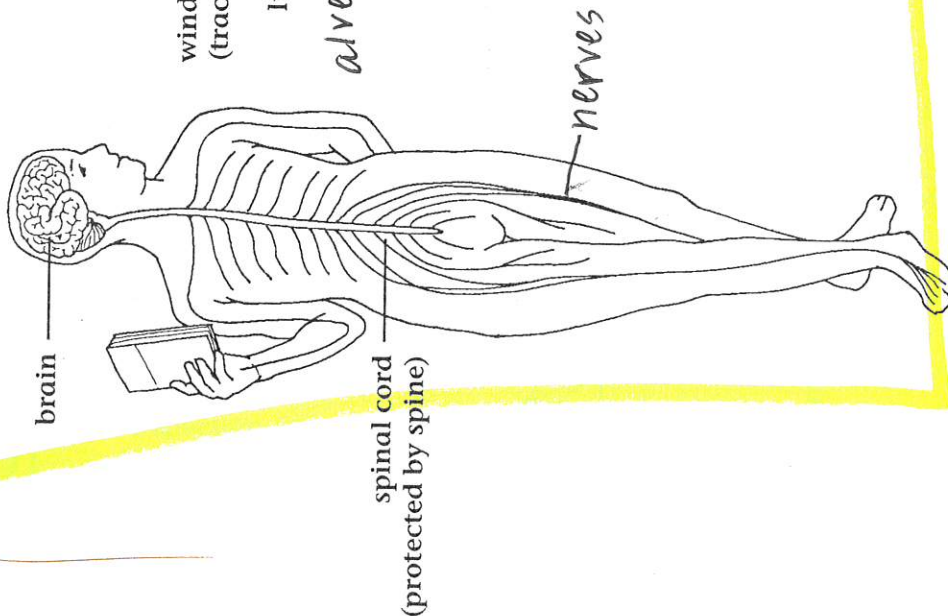
Excretory



Respiratory



Nervous



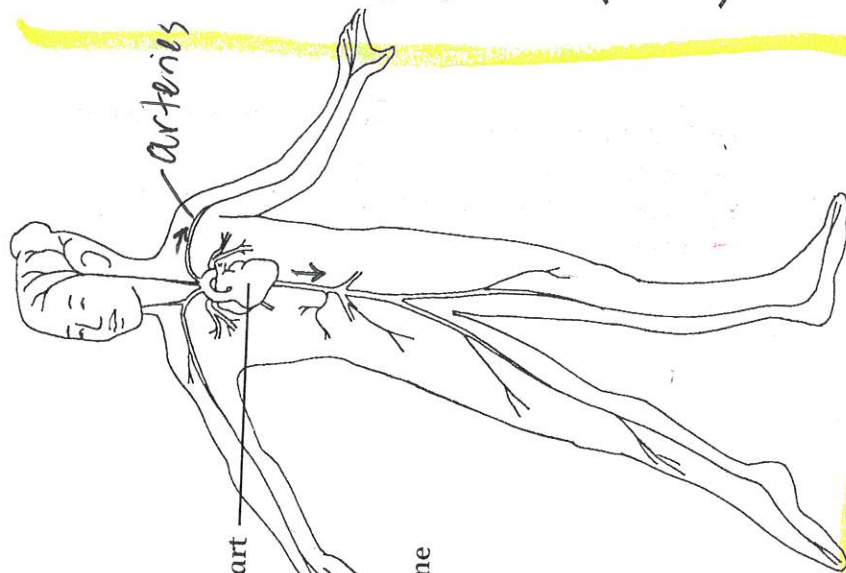
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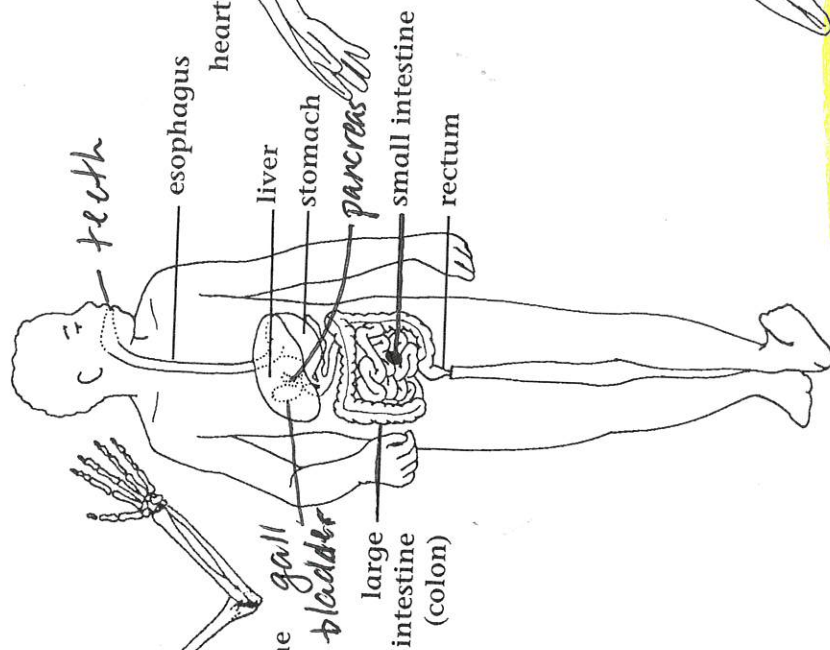
Act

Human Body Systems (cont.)

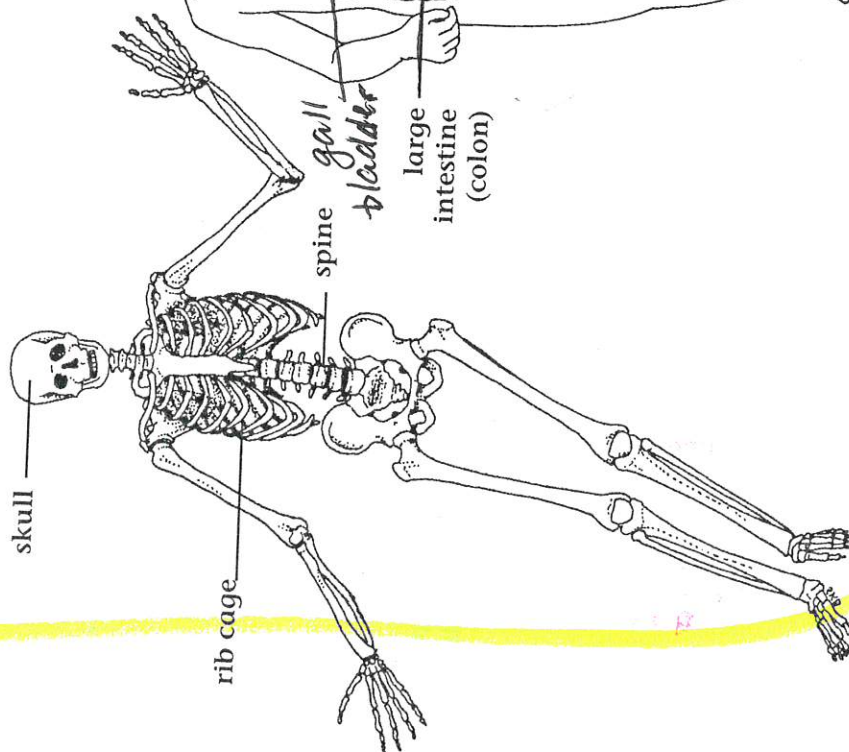
Circulatory (arteries only)



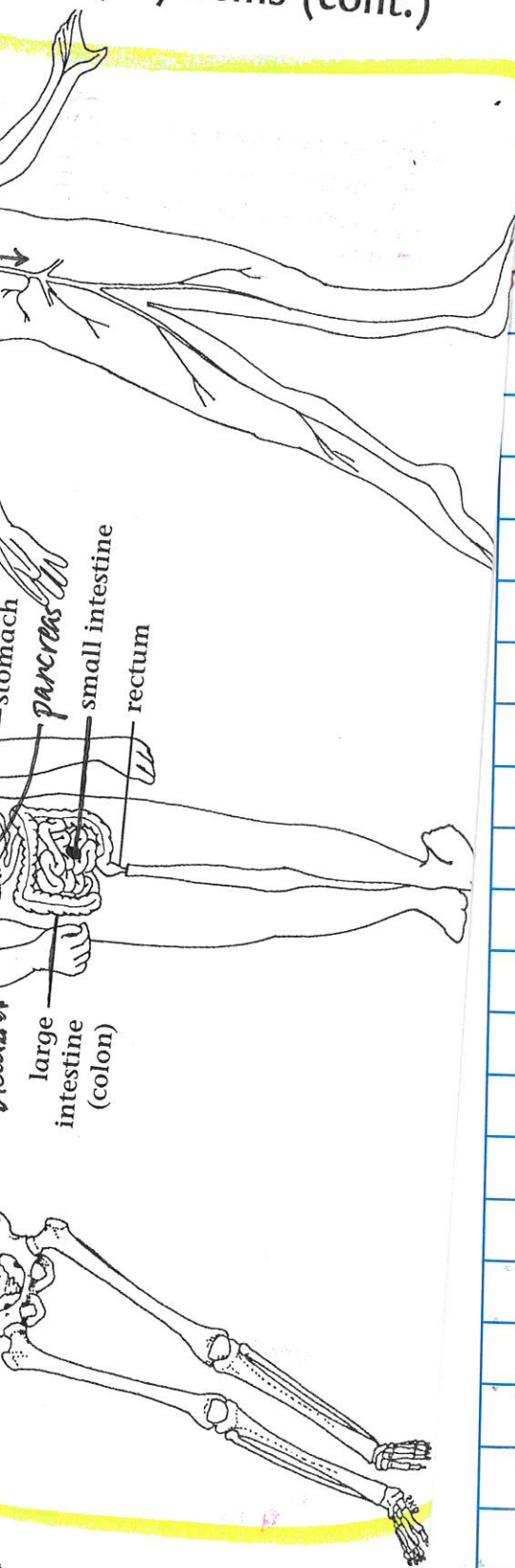
Digestive



Skeletal



Body Systems (cont.)



Analysis Questions (#1, 4, 7)

1. Look at the drawing that you made in Part A. List some structures or organs that were not the right shape or size or were in the wrong place on your original drawing. Explain how you would change them if you could redraw the diagram.
2. Look at the questions that you recorded in your science notebook after Part A. Answer all of the questions that you can answer. Discuss with your group any that you are still not sure about.
3. The liver is the largest internal organ of the human body. Was the liver the largest organ in your clay model? Do you think that the other organs you modeled in the clay were accurate in size? Why or why not?
4. What are some of the limitations of the clay model you made of the human body in Part C?
5. Prepare a table with headings as shown below. Fill in the first column with the organs or structures listed in Table 1.

Organs and Structures	System	Function

- a. In the second column of your table, identify the system that matches each organ or structure. For example, the stomach is a part of the digestive system.
 - b. In the third column of your table, identify the function of each of the systems you mentioned in 5a.
6. Imagine a younger student did not understand the difference between the body's organs and systems. Explain the relationship in a way that a younger student could understand.
 7. Reflection: What new things have you learned about the human body in this activity?

Warm up

List all organs that are part of the digestive system.

Digestive system

- esophagus
- stomach
- capillaries
- teeth
- rectum
- pancreas
- Liver
- Large intestine
- small intestine
- Stomach



Question:

Why do we chew food before swallowing?

Hypothesis:

If the antacid pill is broken into half, quarters, and eighths, then the _____ will dissolve the fastest, because....

Data Table

Size of pill	Time to dissolve (s)
Y8:	49.58

Procedure:

Decide:

Manipulated Variable:

what are you changing?

Responding Variable:

what are you measuring?

what liquid to use?

Use phones for timing.

Make a data table!

X axis label

Procedure:

Responding Variables:

- no longer solid tablet left
- every remnant gone
- no more bubbles
- no sound

x axis label

Name _____

Date _____

Anticipation Guide: Gas Exchange

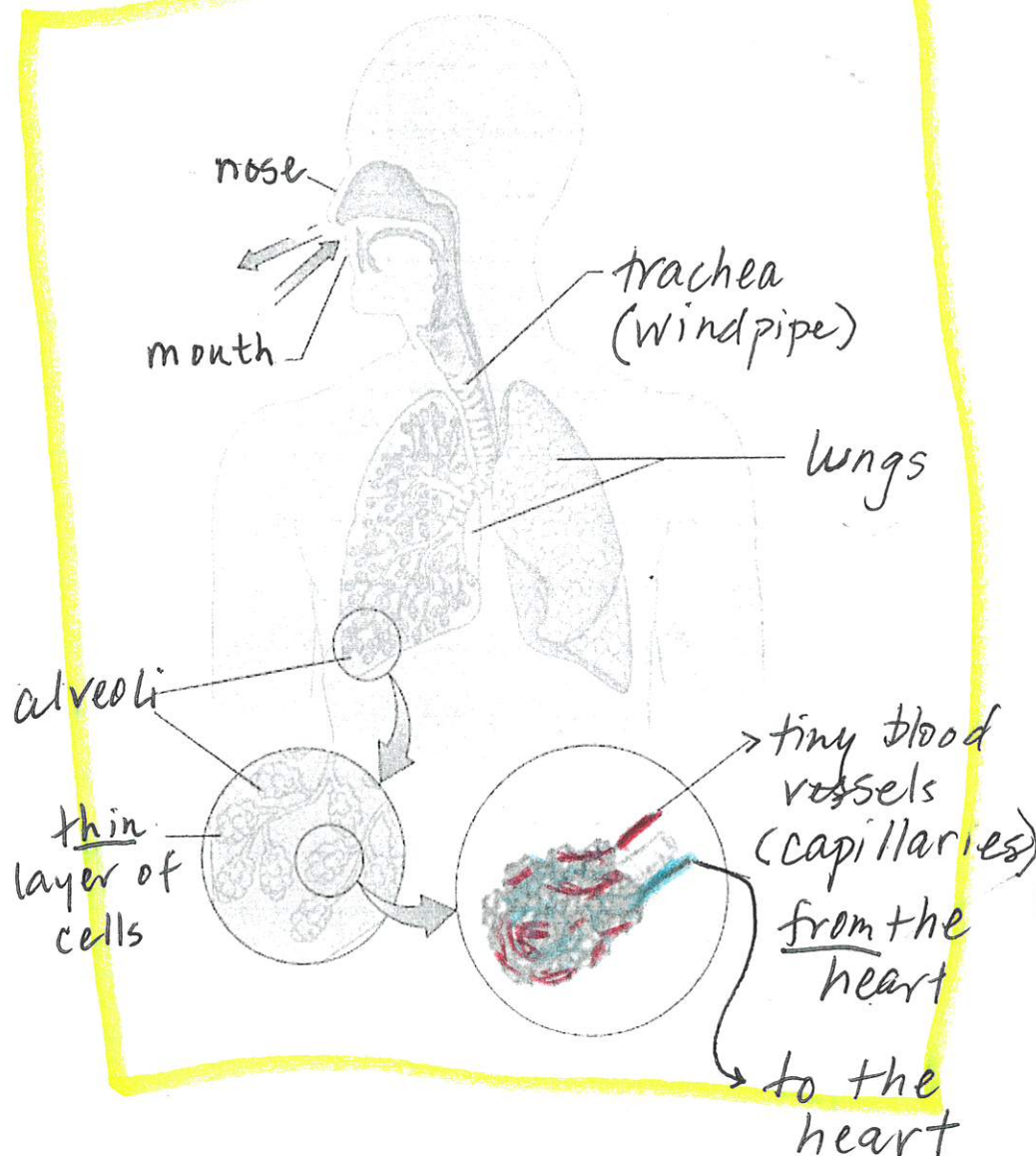
Before starting the activity, mark whether you agree (+) or disagree (—) with each statement below.

After completing the activity, mark whether you agree (+) or disagree (—) with each statement below. Under each statement, explain how the activity gave evidence to support or change your ideas.

- | Before | After |
|--------|---|
| _____ | <u>+</u> 1. Carbon dioxide is produced when your body chemically breaks down substances in food. |
| _____ | <u>—</u> 2. All of the air that you exhale is carbon dioxide. |
| _____ | <u>+</u> 3. Your body needs oxygen to get energy from food. |
| _____ | <u>+</u> 4. The amount of carbon dioxide that you exhale is different than the amount exhaled by other people. |
| _____ | <u>—</u> 5. The air we breathe is pure oxygen. ↪ 21% Nitrogen (N₂) = 78% |
| _____ | <u>—</u> 6. Your lungs are sacs with smooth walls, similar to the walls of a balloon. |
| _____ | <u>—</u> 7. Air and food go down the same passageway. |
| _____ | <u>+</u> 8. The walls of your lungs are filled with many tiny blood vessels. |

Name: _____ Activity 17: Gas Exchange
Period _____ Parts of Respiratory System

Label the parts of the respiratory system on the diagram below.



absorbing ~~and~~ Tale

tail bone =
coccyx

Name:

Answer Key

Period:

Activity 15: Digestion: An Absorbing Tale

READING OUTLINE

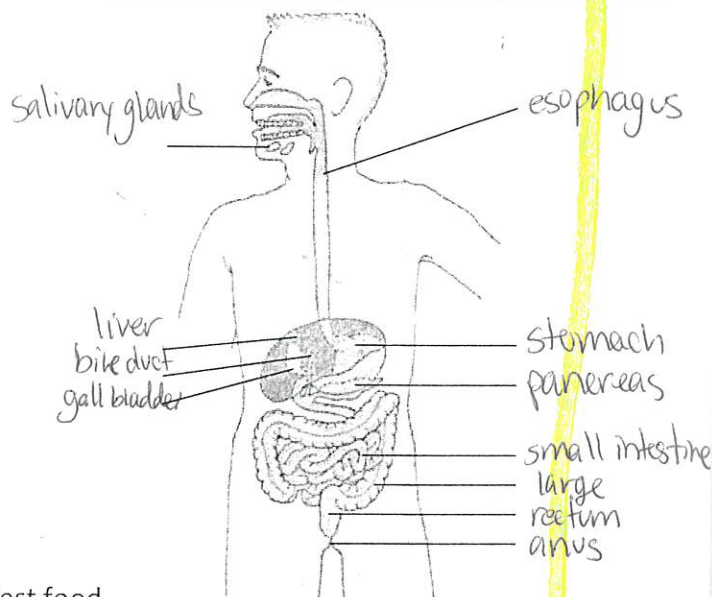
1. Go back to the introduction from Activity 14. Define the difference between **mechanical** and **chemical breakdown** of food, AND explain **where** each type of breakdown occurs.

Mechanical breakdown breaks apart food into small pieces with help from your teeth and tongue. Chemical breakdown uses chemicals to break down food even smaller in your mouth, stomach, and intestines.

2. Label the parts of the digestive system on the diagram to the right.

3. Explain how food moves from the mouth to the stomach.

Food travels from your mouth through the esophagus when you swallow. Your esophagus muscles contract to help food move towards your stomach.



4. Explain how the stomach works to help digest food.

Muscles in your stomach help mix the contents. Also, acid in your stomach chemically breaks down food.

5. How does your stomach protect itself, and what happens if it can't?

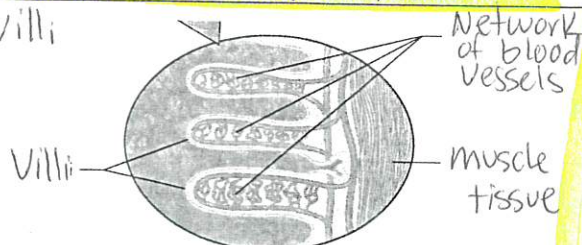
Your stomach is lined with mucus to protect itself from acid. When the lining is gone, ulcers can form.

6. chemicals from the pancreas and bile from the liver help break down proteins and fat.

7. Once food is broken down completely into **nutrients**, the nutrients move from the small intestine into the blood which moves those nutrients all around the body.

8. Explain how villi in your intestine work to absorb nutrients. Label the picture, too.

Nutrients must pass through villi and the walls of tiny blood vessels to enter the blood.



9. What functions do the following organs have for digestion?

Liver (the <u>first</u> place blood goes after the intestines)	Kidneys
<ul style="list-style-type: none"> breaks down toxins & medicines processes nutrients into easier forms to use 	<ul style="list-style-type: none"> filters your blood excretes urine

10. Nearing the end (literally). What two things are absorbed in the colon (another name for the large intestine)?

Water and vitamins

11. What happens to the leftover unabsorbed materials in the large intestine?

It forms a solid waste product that travels through the large intestine. It is temporarily stored in the rectum.

12. What are the pros and cons of having trillions of bacteria live in your colon?

Pros	Cons (trade-offs)
<ul style="list-style-type: none"> break down plant material produces vitamin K prevents bacteria (harmful) 	<ul style="list-style-type: none"> gas & odors they produce

AQ #2: Complete the table below:

Functions of Digestive Organs				
Organ (or structure)	Mechanical breakdown	Chemical breakdown	Nutrient absorption	Water absorption and solid waste production
Mouth	X	X		
Stomach	X	X		
Small intestine		X	X	
Pancreas		X		
Liver			X	
Large intestine		X	X	X

Name: Mr. Awesome (Jack T) STUDY GUIDE UNIT B: BODY WORKS

Activity	Learning Targets	Questions You Should Be Able to Answer	Key Vocabulary
12: What's Happening Inside?	<p><u>CONTENT:</u> I can name and describe the function of the 8 main body systems.</p> <p><u>CONTENT:</u> I can explain what an organ is, and the main functions of the organs within the body systems.</p> <p><u>SEP #2:</u> I can create models of the body.</p>	<ul style="list-style-type: none"> What are the 8 body (organ) systems? What is the function of each body system? What are the main organs of each body system? 	<p>Body system</p> <p>Organ</p> <p>Digestive</p> <p>Excretory</p> <p>Respiratory</p> <p>Nervous</p> <p>Skeletal</p> <p>Reproductive</p> <p>Cardiovascular</p>
14: Breakdown	<p><u>CONTENT:</u> I can explain the difference between mechanical and chemical breakdown, and the importance of both.</p> <p><u>SEP #3 & 4:</u> I can design and do an experiment, collect data, and analyze it to answer a scientific question.</p>	<ul style="list-style-type: none"> Why are mechanical and chemical breakdown both important parts of digestion? 	<p>Mechanical breakdown</p> <p>Chemical breakdown</p>
15: Digestion: An Absorbing Tale	<p><u>CONTENT:</u> I can explain the parts of the digestive system, and their functions.</p> <p><u>SEP #8:</u> I can critically read a scientific text to obtain information.</p>	<ul style="list-style-type: none"> What is the purpose of the digestive system? What are the main organs of the digestive system, and what do they do? What are all the stages of digestion from eating to excreting waste? 	<p>Nutrients</p> <p>Absorption</p> <p>Stomach</p> <p>Esophagus</p> <p>Small intestine</p> <p>Large intestine</p> <p>Liver</p> <p>pancreas</p>
17: Gas Exchange	<p><u>SEP #3:</u> I can conduct an investigation to find the difference between inhaled and exhaled air.</p> <p><u>CONTENT:</u> I can describe and draw the anatomy of the lungs and where gas exchange occurs.</p>	<ul style="list-style-type: none"> How are inhaled air and exhaled air different? How does an indicator work? What is the difference between cellular respiration and the respiratory system? 	<p>Indicator</p> <p>Respiratory system</p> <p>Respiration</p> <p>Exhaled vs. inhaled</p>
18: The Circulation Game	<p><u>SEP #2 & CONTENT:</u> I can model and explain how blood flows through the body to transport and exchange gases, nutrients, and wastes.</p>	<ul style="list-style-type: none"> What is the function of the cardiovascular system? How do the heart, arteries, veins, and capillaries work together? How are wastes and nutrients transported through the body? 	<p>Cardiovascular system</p> <p>arteries</p> <p>veins</p> <p>capillaries</p>

Name: _____

Period: _____

Activity 15: Digestion: An Absorbing Tale

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7. Once food is broken down completely into **nutrients**, the nutrients move from the _____ into the _____ which moves those nutrients all around the body.

<p>19 22: The Heart: A Muscle Heartily Fit</p>	<p>SEP #3: I can measure how hard my heart works. SEP #2: I can analyze the pros and cons of a model.</p>	<ul style="list-style-type: none"> How can you measure how hard your heart muscle works? 	<p>volume pulse rate resting pulse rate</p>
<p>23: Heart Parts</p>	<p>CONTENT: I can explain how the heart works as a double pump. SEP #8: I can critically read a scientific text to obtain information.</p>	<ul style="list-style-type: none"> How does the heart work (left vs. right?) What pathway does blood take through atria and ventricles? Where can you find oxygenated and deoxygenated blood? 	<p>Valves Atrium Ventricle Blood vessels Arteries Veins capillaries</p>

GameThings We Learned

- Blood moves with heart beat
- Organs received nutrients and O_2
- Organs got rid of wastes & CO_2
- Blood can travel through different paths
- Lungs collect CO_2 and replace O_2
- Small intestine gives nutrients to blood
- Kidneys collect wastes
- Blood goes to liver right after intestines
- Brain is biggest user of O_2
- Blood is ~~the~~ responsible for transporting tons of things around the body. (Bloodmobile)

Analysis Questions

(not assigned)

Name _____

Date _____

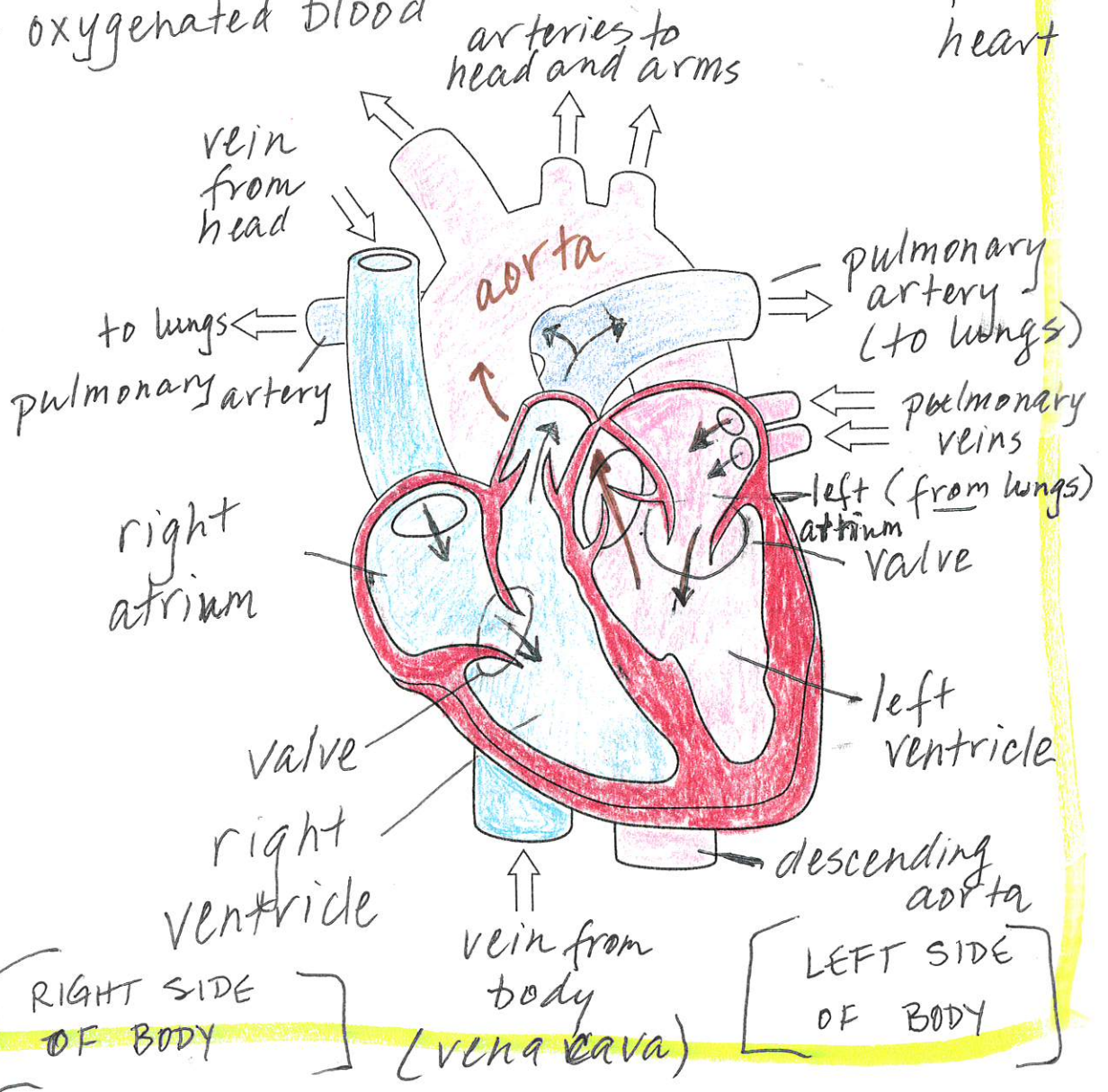
Heart Diagram

(Double Pump)

- = deoxygenated blood
- = heart muscle
- = oxygenated blood

veins = to
heart

arteries = away
from
heart



Name: _____

Period: _____

 Activity 23: Heart Parts
CIRCULATION RAP LYRICS

By Glen Wolkenfeld

I'm a little red blood cell heading for the heart,
The inferior vena cava's where my journey starts,
My O₂ level's low 'cause I gave it the muscles
in the legs when you were running it was powering your hustle

Now I'm in the right atrium, chamber number 1,
All your blood comes here, doesn't matter where it's from,
superior vena cava drained the arms and head,
It's deoxygenated blood, cherry dark red!

I pass through a valve when the atrium contracts,
This valve's got two names, here are the facts.
You might know it as right atrio-ventricular
Or tricuspid if you want to be particular

CHORUS

Pump it up! Pump it up! I see your heart throb
Pump it up! Pump it up! Let me do my job
Pump it up! Pump it up! Improve your condition,
'Cause oxygenation is my mission.

Now to the next chamber right ventricle I pass,
I'm suffering I'm still low, in oxygen gas,
Right ventricle contracts I'm heading for the lungs,
Through the pulmonary valve, I first get flung,

Now my location is the pulmonary artery,
Which branches right and left toward the system respiratory,
Through smaller arteries to a lung capillary
Where CO₂ goes out of me and oxygen goes into me,

I feel so great, I'm oxygenated
And I'm flowing to the pulmonary vein I'm elated,
Cause I'm heading back to the heart as its thumpin',
To the left atrium as the heart keeps pumpin'

CHORUS

Name

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Left atrium sends me through the left a-v valve,
Left Atrio-ventricular or bicuspid valve,
To the left ventricle, which when it contracts,
Sends me through the aortic valve putting me on track,

To go to the aorta, the biggest artery,
from there to any artery and any capillary
Maybe liver, bones, muscles, kidneys, brain, small intestines,
Wherever I go I'll give up oxygen,

And pick up some CO₂, and go into a vein,
and I'll find myself in the vena cava again,
then back to heart to repeat this story
'Bout our journey through the system circulatory,

CHORUS

Main points: can't be over-rated
Right side of the heart's deoxygenated
Left side has blood full of oxygen,
Repeat that til you know it now say it again.

Right side blood: deoxygenated
Left side blood: oxygenated
Chambers on the top: atria
Chambers on the bottom: ventricles

Biggest artery is the aorta,
Vein that brings blood to the heart the vena cava
and if you want more questions to review
click the link for circulatory system rap 2

Analysis Questions #1, 3, 4, 7*

ANALYSIS



1. Copy the lists of words shown below:

a. In each list, look for a relationship among the words or terms. Cross out the word or phrase that does not belong.

List 1

heart

liver

arteries

veins

cardiovascular
system

capillaries

List 2

bones

valves

atria

ventricles

arteries

cardiovascular
structures

List 3

distributes nutrients

transports gases

digests food

cardiovascular system
functions

pumps blood

transports wastes

b. In each list, circle the word or phrase that includes the others.

c. Explain how the word or phrase you circled is related to the other words on the list.



2. The diagram in the reading shows the blood in the arteries as red and the blood in the veins as blue. Is the blood in your veins really blue? Explain.

3. How is the structure of the heart related to its function?

4. What structures prevent blood in the ventricles from backing up into the atria? Why is it important for your heart to have these structures?

5. Use Student Sheet 23.1, "Heart Diagram," and add the function of all of the structures you have labeled.

7. Explain what is meant by the statement: "The heart is two pumps." You may want to draw a diagram to support your explanation.