Gas Exchange

Cross-Curricular Focus: Life Science

Name: _____

Did you know that your body has its very own gas exchange program that runs 24 hours a day? It's called the **respiratory system**. It is one of your body's vital systems, which means you could not live without it. Every time you take a breath, oxygen enters your lungs and is carried around to all the body's cells by the circulatory system. Waste products, like carbon dioxide gas, are picked up by the circulatory system as well. Carbon dioxide is dropped off at the lungs so you can breathe it out.

The respiratory and circulatory systems need each other. The respiratory system brings in oxygen and pushes out carbon dioxide. The circulatory system transports these gases where they need to go. The two systems work together to make sure that your body gets what it needs to survive. That is why we say that the respiratory and circulatory systems are **interdependent**. They need each other.

The respiratory system is not just your lungs. It also includes your nose, mouth, and the air passageways that connect them to your lungs. After you inhale air through your nose and mouth, it enters a tube in your throat called the trachea. Right before the trachea gets to your lungs, it splits into two smaller tubes called the bronchi. The deeper you go into your lungs, the smaller and smaller the tubes become as they keep dividing in two. The very smallest tubes end with tiny sacs. These sacs look like grape clusters under the microscope. These are called alveoli. They diffuse oxygen into the blood and receive carbon dioxide being returned to the lungs from the blood. Carbon dioxide travels out of your body when you exhale.

Your body has a special way of making sure that you can get the oxygen that you need when you breathe. Your chest actually changes size when you inhale. You have muscles that are attached to your ribs. These muscles pull up when you inhale. Your diaphragm, a large muscle under your lungs, pulls down. This gives plenty of room so you can get the air you need.

Answer the following questions based on the reading passage. Don't forget to go back to the passage whenever necessary to find or confirm your answers.

1) What is the purpose of the circulatory system?

_____

_____

2) Identify the parts of the respiratory system.

_____

_____

3) What is the function of the alveoli?

_____

_____

4) How does the body get rid of carbon dioxide?

_____

_____

5) How does your body make room for a deep breath? _____

_____

Unit **11**

Performance Task

Name _____

Field Day Fun!

The 5th grade is having their yearly field day competition.

Part A

For the first event, each of the 8 teams will need a bucket of sand. If there are 6 pounds of sand, what weight of sand will each team get? Write an equation and solve. Explain your work.

Part B

For the second event, a team of students runs 2 times around the track. If each student runs $\frac{1}{10}$ of the track, how many students do they need on each team? Use a representation to solve.

Part C

For the third event, student teams will bunny hop $\frac{1}{4}$ of the way around the track. If there are 6 students on a team, how far will each person go? Show your work.

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Super-Journal Week 3:7

Every night, you should be reading at least 30 minutes of whatever book you have checked out from your assigned reading list. Tape or glue (but do not staple) this sheet into your Super-Journal on the left-side page. Fill in the table below *every day* by recording the required data.

Day	Title	Start Pg.	End Pg.	Parent Sign.
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				
Saturday				
Sunday				

On the right-side page of your Super-Journal, answer two of the questions below throughout the week. Be sure that the questions you choose to answer go with the appropriate type of book (Fiction or Nonfiction). The Super-Journal is due on the first day after the weekend (usually Monday). To earn credit for your journal entry, you *must* respond in at least five complete sentences per response and use **specific evidence from the text to support your claim** based on what you've read this week.

FICTION

1. How do illustrations or images add to the meaning of a story?
2. How do or could illustrations/graphics add to the tone or mood of the chapter you just finished reading? How could a picture change your feelings about what you just read?

NONFICTION

1. What is this text about?
2. Summarize the main ideas in 5 sentences.

RL.3.7/RI.1.2

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The Circulatory System

Use the words in the box to fill in the blanks.

veins	transport	circulatory	blood
arteries	oxygen	lungs	heart
nutrients	energy	carbon dioxide	pumped
capillaries	dark	bright	intestine
away	heat	to	atmosphere

All animals need to _____ materials around to the different parts of their body. This is the job of the _____ system. The circulatory system consists of a liquid called _____, a pump called the _____ and a series of vessels called _____ and _____.

One thing that must be transported around is a gas called _____. Oxygen enters the blood through the _____. It is then _____ through the heart and around the body where it is used along with food to make _____. The body produces another gas called _____, which is a waste product. This gas is carried back to the heart and then to the lungs where it is released back into the _____.

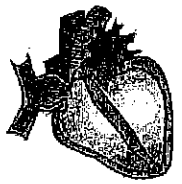
The vessels that transport blood _____ from the heart are called arteries. The blood in arteries is _____ red because it is rich in oxygen. The vessels that transport blood _____ the heart are called veins. The blood in veins is _____ red because it is low in oxygen. _____ are small vessels that join the arteries and veins.

_____ from food are also transported around the body by the circulatory system. They enter the blood from the small _____. The circulatory system also helps to regulate temperature by transporting _____ around the body.

The Circulatory System

H	A	S	D	A	U	N	U	T	R	I	E	N	T	S	Y
O	V	G	C	A	P	I	L	L	A	R	Y	L	R	G	I
Z	A	M	R	N	R	T	R	A	N	S	P	O	R	T	L
S	L	R	C	H	E	K	J	W	N	R	W	V	D	D	P
K	V	R	A	A	V	C	R	A	I	R	H	L	E	M	N
A	E	E	E	B	R	J	I	E	R	C	I	T	U	I	Q
A	D	D	X	R	T	B	F	R	D	T	T	P	H	M	N
Y	O	B	K	I	V	J	O	K	C	U	E	L	K	N	C
F	R	L	J	G	O	H	U	N	L	U	B	R	K	V	F
O	E	O	G	H	X	X	R	O	D	I	L	S	Y	B	J
O	G	O	V	T	Y	F	C	K	L	I	O	A	T	A	H
A	N	D	X	R	G	X	H	N	U	M	O	J	T	T	S
Z	O	C	T	E	E	I	A	V	N	F	D	X	R	E	C
Y	W	E	O	D	N	R	M	D	G	U	C	A	I	D	V
Q	H	L	W	R	E	G	B	O	S	U	E	V	O	D	S
K	E	L	C	T	B	E	E	P	V	H	L	O	M	Q	E
G	X	S	A	F	A	O	R	T	A	E	L	O	D	D	K
Q	S	W	B	F	H	G	S	V	O	B	S	U	U	D	N

Find the circulatory system words below in the grid to the left.



aorta	carbon dioxide	lungs	transport
artery	circulate	nutrients	valve
blood	dark red	oxygen	vein
bright red	four chambers	pump	water
capillary	heart	red blood cells	white blood cells

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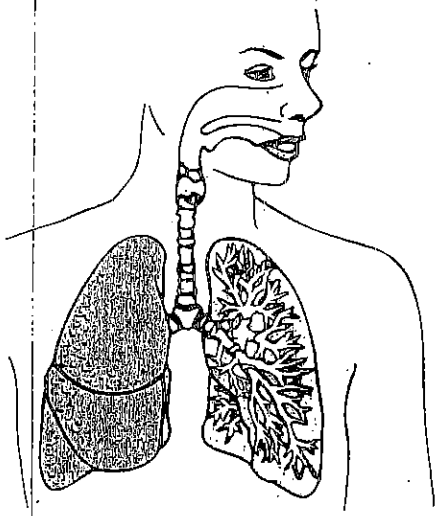
A Breathtaking System

An adult's lungs can hold five quarts of air! How large a balloon do you think it would take to hold that much air?



When you breathe in air through your nose and mouth, you get oxygen. You need oxygen to live. The air goes down your *windpipe* and into your lungs. Your lungs absorb oxygen from the air. The oxygen travels in the blood to every part of the body.

Your body uses oxygen to burn food and to give you energy. You make carbon dioxide when you do this. The blood carries the carbon dioxide back to the lungs. Then it is breathed out. This whole process is called *respiration.*

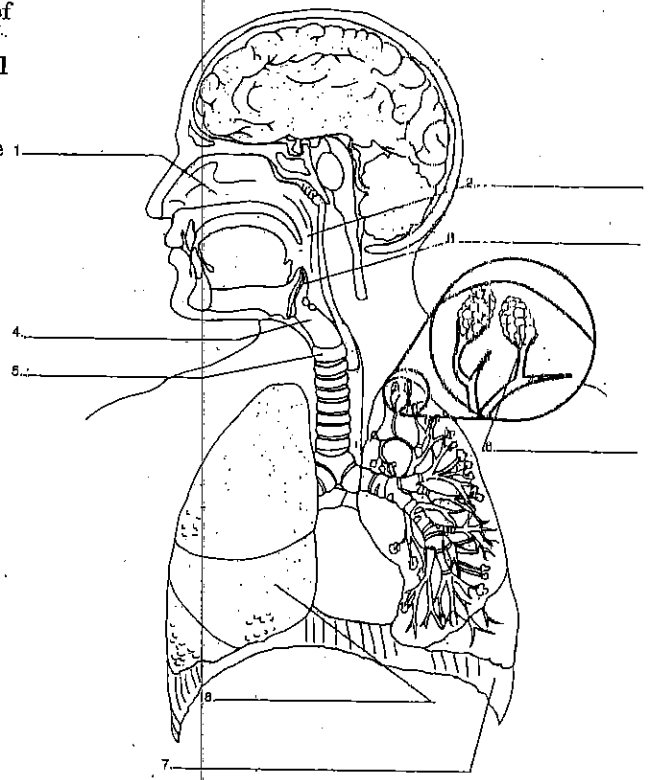
Directions: Use one word from the text to complete the statements.

1. You need _____ to live.
2. You take in air through the nose or the _____.
3. The air you breathe in goes down your _____ and into your lungs.
4. The words in the text that mean "to inhale" are _____.
5. The oxygen you breathe in travels in the _____ to every part of your body.
6. When you breathe in, you take in _____.
7. When you breathe out, you get rid of _____.
8. Your body uses oxygen to burn _____.
9. The blood carries the carbon dioxide back to the lungs, and it is _____ out.
10. The process of breathing in and out is called _____.

A Breathtaking System

Directions: Use the number code to label and color the diagram of the respiratory system.

1. You take in air through your **nasal passage.** Color it green.
2. The **pharynx** connects your mouth and nasal passages. Color it yellow.
3. The **epiglottis** is the flap of cartilage behind your tongue. It helps close the opening to your windpipe when you swallow. Color it red.
4. The **larynx** is made of muscle and cartilage. It is where your **vocal cords** are located. Color it brown.
5. The **trachea** is a tube that serves as the main passageway for air to and from the lungs. Color it purple.
6. The **alveoli** are tiny air sacs at the ends of the **bronchioles.** Color them red.
7. The **diaphragm** is a wall of muscle and connecting tissue. Color it gray.
8. The **lungs** absorb oxygen from the air you breathe. Color the left lung blue.

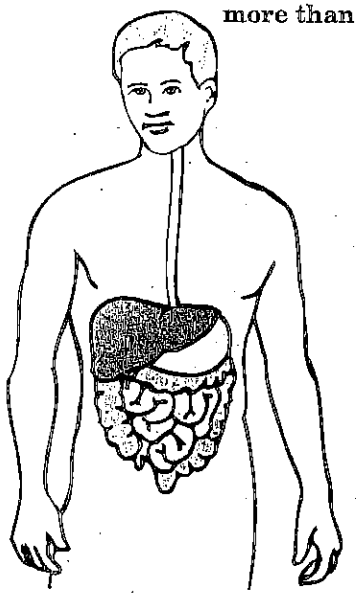


Research: Your right and left lungs are not identical. Find out how they are different.

Bonus: Sit quietly and listen to your breathing. Count how many times you breathe in and out each minute. Stand up and do 25 jumping jacks. Then count your breaths again. How does exercise affect breathing? Write a true statement about this.

Dealing With Digestion

Did you know that digestion begins before you even begin to eat? Digestion begins when you think about eating. In anticipation, your body begins to prepare itself by producing saliva. Your mouth makes more than a quart of saliva a day.



Your digestive system processes food, which provides your body with the energy it needs for maintenance and repair. When you put food into your mouth, your teeth cut, grind, crush, mash, and shred the food while mixing it with saliva. Then the food moves down a tube called the *esophagus* to the stomach. There three bands of strong muscles churn, squeeze, and break the food up into smaller pieces. An acid produced in the stomach dissolves meat and other foods.

After the food leaves the stomach, it travels through the small and large intestines, where particles of food pass through the linings of the intestines and into the blood. Powerful body chemicals called *enzymes* digest the carbohydrates, proteins, and fats that make up your diet.

Directions: Use words or short phrases to complete the sentences.

1. What is the function of the digestive system?

_____

_____

2. Name two reasons your body needs food.

_____

_____

3. Name four body parts involved in the digestive process.

_____

_____

Dealing With Digestion

Directions: Hidden in the word-search puzzle are 20 words from the text. The words are written vertically, horizontally, and diagonally. How many of them can you find? There are other words in the puzzle that are not in the text, but they don't count. Find and circle only words from the text.

e	s	o	p	h	a	g	u	s	c	k	h
d	t	i	n	t	e	s	t	i	n	e	s
i	o	r	g	a	n	s	f	n	e	e	z
g	m	s	y	s	t	e	m	o	u	r	b
e	a	p	b	o	d	i	e	s	o	r	r
s	c	r	e	p	a	i	r	p	l	d	e
t	h	o	n	m	o	u	t	h	i	a	a
i	f	c	e	b	b	b	r	p	n	o	t
v	a	e	r	l	a	l	o	r	i	e	c
e	t	s	g	o	n	o	t	o	n	n	o
c	s	s	y	o	d	o	e	t	g	z	n
d	i	e	t	d	k	b	i	e	s	y	e
r	i	s	f	e	t	s	n	i	m	m	s
m	a	i	n	t	e	n	a	n	c	e	p
p	a	r	t	i	c	l	e	s	q	s	e

Research: Find out what saliva does. Write a paragraph about it.

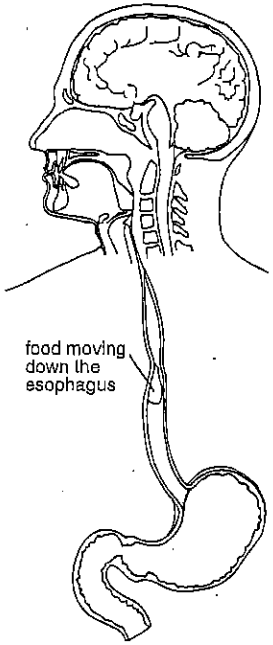
Bonus: What happens when your food goes down the wrong way? If someone were choking on a piece of food stuck in his windpipe, what would you do? What is the Heimlich maneuver? Draw a picture to show how it can save a life.

Tracking Digestion

In the average adult, the digestive canal is about 29 feet long! Think of a 29-foot-long garden hose that winds through your body, helping you break down food into nutrients—the basic materials your body needs.

Do you chew your food thoroughly? Your mouth and teeth are specially designed to chop and chew food. Then the food passes through a tube about ten inches long called the *esophagus*. A series of wave-like muscle contractions automatically moves the food along the digestive tract. This is called *peristalsis*.

Your stomach secretes juices that continue to break down the food particles. Contractions in the stomach push the food into the upper intestine, or *small intestine*. When you get to be an adult, your stomach will hold about 1/2 gallon (2 quarts) of food!



Directions: Write T for true or F for false before each statement.

_____1. The mouth is not part of the digestive system.

_____2. The teeth are part of the digestive system.

_____3. Food passes from the mouth to the esophagus.

_____4. The esophagus connects the mouth and the stomach.

_____5. The esophagus is about two inches long.

_____6. There are no muscles in the esophagus.

_____7. Food moves automatically through our digestive system.

_____8. Peristalsis is a disease of the digestive system.

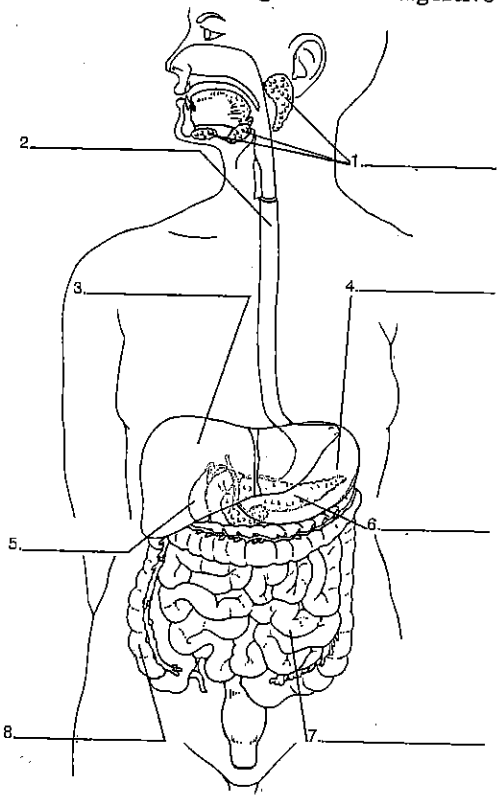
_____9. The stomach secretes juices that help break down food.

_____10. Food goes from the stomach to the upper intestine.

Tracking Digestion

Directions: Use the number code to label and color the diagram of the digestive system.

1. The **salivary glands** secrete digestive enzymes to begin the digestive process in the mouth. Color them yellow.
2. The **esophagus** moves the food into the stomach. Color it brown.
3. The **liver** is an important warehouse for the body's nutrients. Color it green.
4. The **stomach** secretes juices that continue to break food particles down. Color it purple.
5. The **gall bladder** stores bile. Color it orange.
6. The **pancreas** secretes juices that help the digestion of food in the small intestine. It also secretes insulin, an important hormone that regulates glucose levels in the blood. Color it pink.
7. In the **small intestine**, body chemicals act with food and nutrients, which are absorbed into the blood. Color the small intestine red.
8. In the **large intestine**, leftover food that is of no use to the body is processed for elimination. Color it blue.

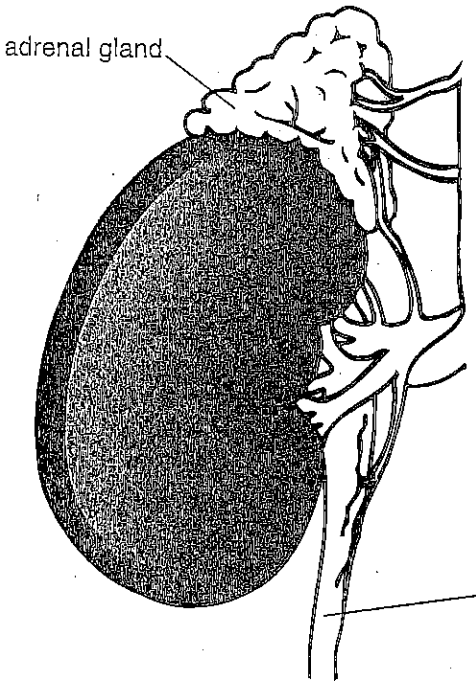


Research: Saliva in your mouth contains enzymes that break down starch and turn it into sugar. Put a piece of dry bread in your mouth and hold it there for a few minutes. Did the bread begin to taste sweet? Try this with two other starchy foods such as potatoes, crackers, corn, or rice. Write a few sentences to tell what happened.

Bonus: A meal stays in your stomach about three hours. It may take three days to pass through your body. Coarse foods that are high in fiber stimulate peristalsis. These high-fiber foods are called *roughage*. Make a list of ten foods that provide roughage for your digestive system.

Shaped Like A Bean

About 2 1/2 pints of blood are pumped through the kidneys every minute. That is more than a quart!



Do you know why kidney beans have that name? It's because they are shaped like your body's *kidneys*. You have two kidneys. They are located on each side of your spine, above your waist, behind your abdominal cavity. Two tubes connect the kidneys with the *bladder*.

The kidneys filter waste from the blood. This waste combines with water to form a fluid called *urine*. The tiny units in the kidneys that filter the blood are called *nephrons*. Each kidney has more than one million (1,000,000) nephrons.

Directions: Unscramble the words to complete the sentences.

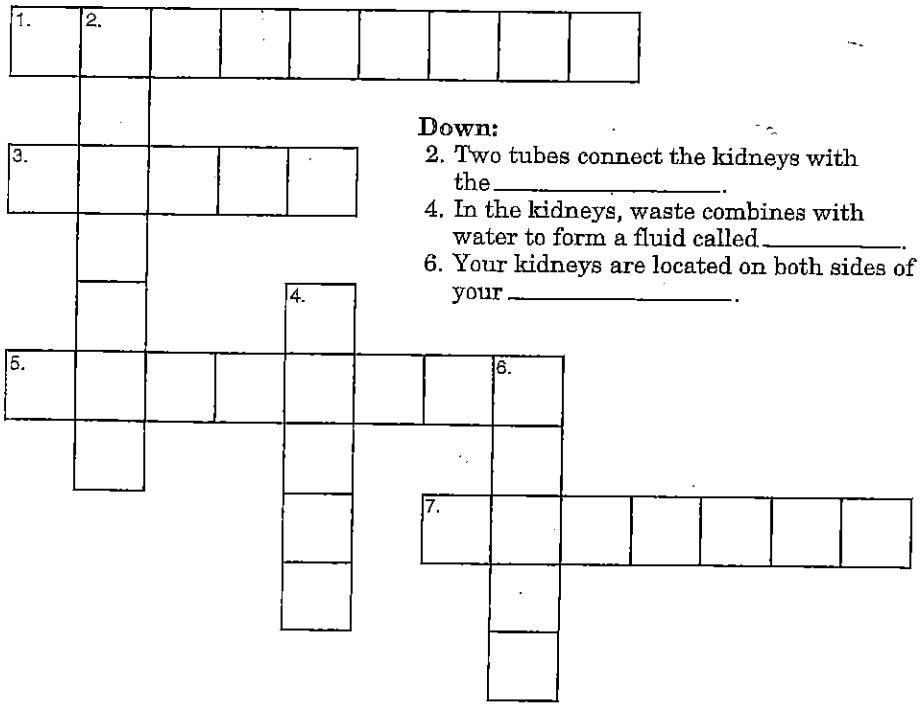
1. Most people have two (s y d k i n e)_____.
2. Tubes (c c n t o e n)_____ the kidneys with the bladder.
3. The kidneys (i l f r e t)_____ waste from the blood.
4. (n i u r e)_____ is made in the kidneys.
5. Nephrons are the (t s i n u)_____ that filter waste from the blood in the kidneys.

Shaped Like A Bean

Directions: Use the clues and the text to fill in the crossword puzzle.

Across:

1. Kidneys are above your waist and behind your _____ cavity.
3. Your kidneys filter_____ from your blood.
5. The tiny units in the kidneys that filter the blood are called_____.
7. Kidney beans are shaped like your body's_____.



Down:

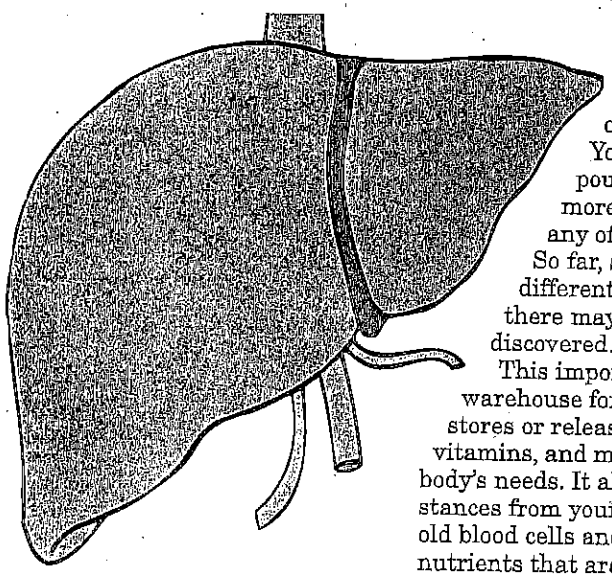
2. Two tubes connect the kidneys with the_____.
4. In the kidneys, waste combines with water to form a fluid called_____.
6. Your kidneys are located on both sides of your _____.

Research: What is *dialysis*? Describe it in a few sentences.

Bonus: Have you ever eaten kidney pie? Make a list of internal organs of animals that some people eat.

The Body's Chemical Factory

During your lifetime, you may consume from 60,000 to 100,000 pounds of food! Without enzymes, the body couldn't digest any of that food.



Do you know what your body's largest internal organ is? It's your *liver*. Your liver weighs about 4 1/2 pounds. Your liver also has more separate functions than any of your body's other organs. So far, scientists know of 500 different functions of the liver, and there may be many others yet to be discovered.

This important organ acts like a warehouse for your body's nutrients. It stores or releases sugars, starches, fats, vitamins, and minerals according to your body's needs. It also removes harmful substances from your blood. Your liver filters old blood cells and processes most of the nutrients that are absorbed from the small intestine. Your liver is the most complex organ in the digestive system.

Directions: Circle the letter that is the correct answer for each question.

1. The body's largest internal organ is

   (a) the stomach (b) the liver (c) the gall bladder

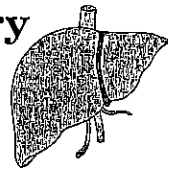
2. About how much does the liver weigh?

   (a) 4 1/2 ounces (b) 14 ounces (c) 4 1/2 pounds

3. The liver acts like a

   (a) warehouse (b) pump (c) both a and b

The Body's Chemical Factory



Directions: Use words from the text to fill in the blanks.

1. Name five nutrients that the liver stores.

   _____

   _____

2. Weighing about 4 1/2 pounds, the liver is the _____ internal organ.

3. Which word in the text means "a series of changes by which something develops"? _____

4. The liver detoxifies the _____.

5. The liver filters out old blood _____.

6. The liver processes most of the nutrients that are absorbed from the _____.

7. The liver is the digestive system's most _____ organ.

8. Without enzymes, your body couldn't _____ food.

Research: One of the liver's jobs is to deal with poisonous chemicals in the blood such as drugs and alcohol. Find out what happens to the liver after constant alcohol or drug abuse. Draw a cartoon or make a poster that tells why alcohol is bad for your liver.

Bonus: The liver acts as a filter for the body. To simulate what the liver does for our bodies, use a strainer or a few coffee filters to do this experiment. Pour different substances through the strainer or filters. Try freshly squeezed fruit juice. What happens? What slips through the filter, and what stays in? Write a few sentences about what straining or filtering does to a substance.

The Excretory System

Cross-Curricular Focus: Life Science

Name: _____

Your body is approximately 60% water. Water is part of all the cells in your body and the plasma in your blood. Water helps your cells receive the nutrients they need, and it helps take away the wastes.

All living things produce wastes. It is the job of the **excretory** system to regulate the amount of water that you have in your body and to help remove wastes from your system. If wastes build up in your blood and in your cells, your body becomes toxic, which can be deadly.

Several different organs are involved in your excretory system. Even your skin participates in the process! You have sweat glands that can release water onto the surface of your skin to keep you from getting overheated. You might find it inconvenient to sweat in certain situations, but people who physically cannot sweat are in constant danger of dying from heat stroke, so be glad if you can sweat!

Your liver is an important part of the process as well. Whenever your body recycles parts of cells that are damaged or old, they become part of the wastes that need to be removed. This recycling puts a lot of nitrogen into your blood. Your liver filters the nitrogen out of your blood, changing it into urea. Without your liver, you could die of nitrogen poisoning.

Just inside your lower back are two large bean-shaped organs called your **kidneys**. Their main job is to filter out the urea in your blood. The kidneys have a sophisticated system of pumps and tubes. Most of the liquid is returned to the blood, where it continues on its way through the circulatory system. Your kidneys have sensors that tell it how much water to release. If you've been drinking a lot of water, your blood will have more water in it. Your kidneys can tell. They send only the right amount of water back into the blood. The small portion of liquid that remains behind becomes **urine**. It drains through tiny tubes called ureters into a muscular bag called the **bladder**. Your body knows when your bladder is full and needs to be emptied. Your brain receives a signal to let you know that it's time to visit the bathroom.

Answer the following questions based on the reading passage. Don't forget to go back to the passage whenever necessary to find or confirm your answers.

1) In your own words, explain why the excretory system is important to your body.

_____

_____

2) Why is it dangerous to be unable to sweat?

_____

_____

3) What substance does the liver change into urea?

_____

_____

4) Which organs turns liquid into urine?

_____

_____

5) What happens if waste builds up in our body?

_____

_____