



unit one

Human Body Detectives Go to School Elementary Curriculum

The Digestive System

HBD, a trip through the digestive system
activities and worksheets

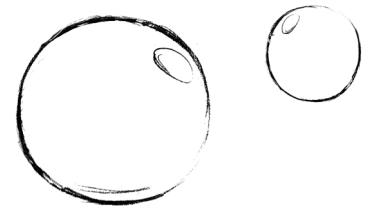
human body detectives

THE LUCKY ESCAPE



Merrin and Pearl's little brother Robbie has swallowed a penny. Now through magic and imagination they find themselves on an adventure through his digestive system where they must grab the penny, save Robbie, and narrowly escape his poopy diaper.

Dr. Heather Manley, N.D.



A Quick Voyage through the Digestive System

The digestive system is the system in the body that is responsible for the breakdown of food, absorption of nutrients from food, and the elimination of the waste and water the body does not need. The digestive system is made up of important organs, parts and chemicals, which all work together to do these things. One might compare the digestive system to a hose that is 25-35 feet long. This would be measuring from the mouth to the end of the **large intestine**, and taking into consideration that most of the hose is neatly coiled up in a person's abdomen.

The digestive system's main job is to turn foods we eat into tiny particles that the body can absorb and use for energy, maintenance, growth and repair. It also keeps **bacteria** or **foreign bugs** from entering the bloodstream. The stomach and its hydrochloric acid are designed to kill any unwanted visitors.

The digestive process begins in the mouth with teeth chewing food. **Saliva**, produced by the **salivary glands** in the mouth, also helps break down food, making it easier to swallow. Once the food is broken down, it is called a **bolus**. Chewing food is extremely important because it stimulates the brain to tell the stomach that the bolus is on the way. The stomach then gets prepared by producing **hydrochloric acid** to break the bolus down even more and kill any foreign bugs. The bolus travels to the back of the mouth with the help of a powerful muscle: the tongue! Here, the **uvula**, or that flap that hangs down at the back of your mouth, helps direct the bolus down the **esophagus**. The **epiglottis** is a sort of valve that makes sure that the bolus goes down the esophagus and not the trachea, or windpipe. The esophagus is approximately 10 inches long and the bolus takes about 6 seconds to get down it and into the stomach. Digestion continues in the stomach and the small intestine with the help of the **pancreas**, **liver** and **gallbladder**. The pancreas produces digestive juices and the liver produces bile, which both aid in further food breakdown. The gallbladder stores bile until it is needed in the stomach.

Absorption occurs after the bolus is completely broken down into nutrients. The nutrients will now travel through the lining of the small intestine and into the bloodstream to the liver. The liver stores the nutrients until the body needs them.

Finally, elimination, or pooping, occurs after all the necessary nutrients have been absorbed and only waste is left in the large intestine. Any excess water goes to the **kidneys** and leaves via the **bladder**, as urine.

The digestive system is so important to your health. If you take care to eat healthy foods and drink lots of water, and remember to eat slowly and chew your food very well, you are doing your part to help your digestive system do the best job it can, which in turn helps you stay healthy!

Human Body Detectives: Know, Want to Know and Learned



The digestive system is the body system that changes food into energy to be used by the body. Some of the organs and body parts of the digestive system are the teeth, tongue, esophagus, stomach, small intestine, liver, gallbladder, pancreas, and large intestine.

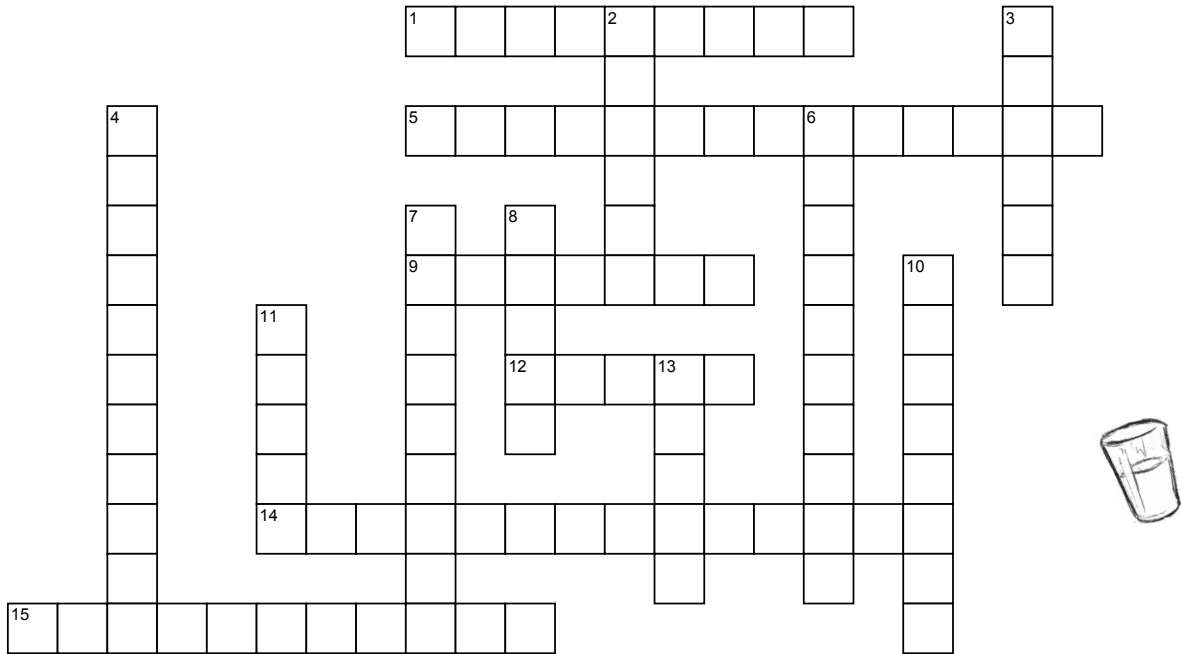
What I know about the digestive system:

What I want to know about the digestive system:



What I learned about the digestive system:

Digestive Crossword Puzzle



ACROSS

- 1 This process allows your body to get the nutrients and energy it needs from the food that you eat.
- 5 This is a long tube that connects to the bottom of your stomach. It breaks down the food mixture even more so your body can absorb all the vitamins, minerals, proteins, carbohydrates and fats.
- 9 This organ is a stretchy sack shaped like the letter J. It breaks down food into a liquidy mixture and slowly empties that liquidy mixture into the small intestine.
- 12 This hangs down in the back of your mouth and helps direct food into your esophagus.
- 14 This large tube is almost the last stop on the digestive tract. If it was stretched out it would measure about five feet long.
- 15 The wavy muscle action that helps push food throughout the digestive system.



DOWN

- 2 This substance helps break down food in the mouth, making the food mushy and easy to swallow.
- 3 This pushes the food around in your mouth while you chew with your teeth.
- 4 This organ is a warehouse for bile. It is stored here until the body needs it.
- 6 This is a special flap that prevents choking by covering the opening of your trachea while you are swallowing.
- 7 This ten inch long stretchy pipe moves food from the back of your throat to your stomach.
- 8 This is another name for chewed food that gets pushed toward the back of your throat.
- 10 This organ makes juices that help the body digest fats and proteins.
- 11 This is solid waste that is removed from your large intestine.
- 13 This organ filters out harmful substances and wastes from the body. It also produces bile which helps to absorb fats in the bloodstream.

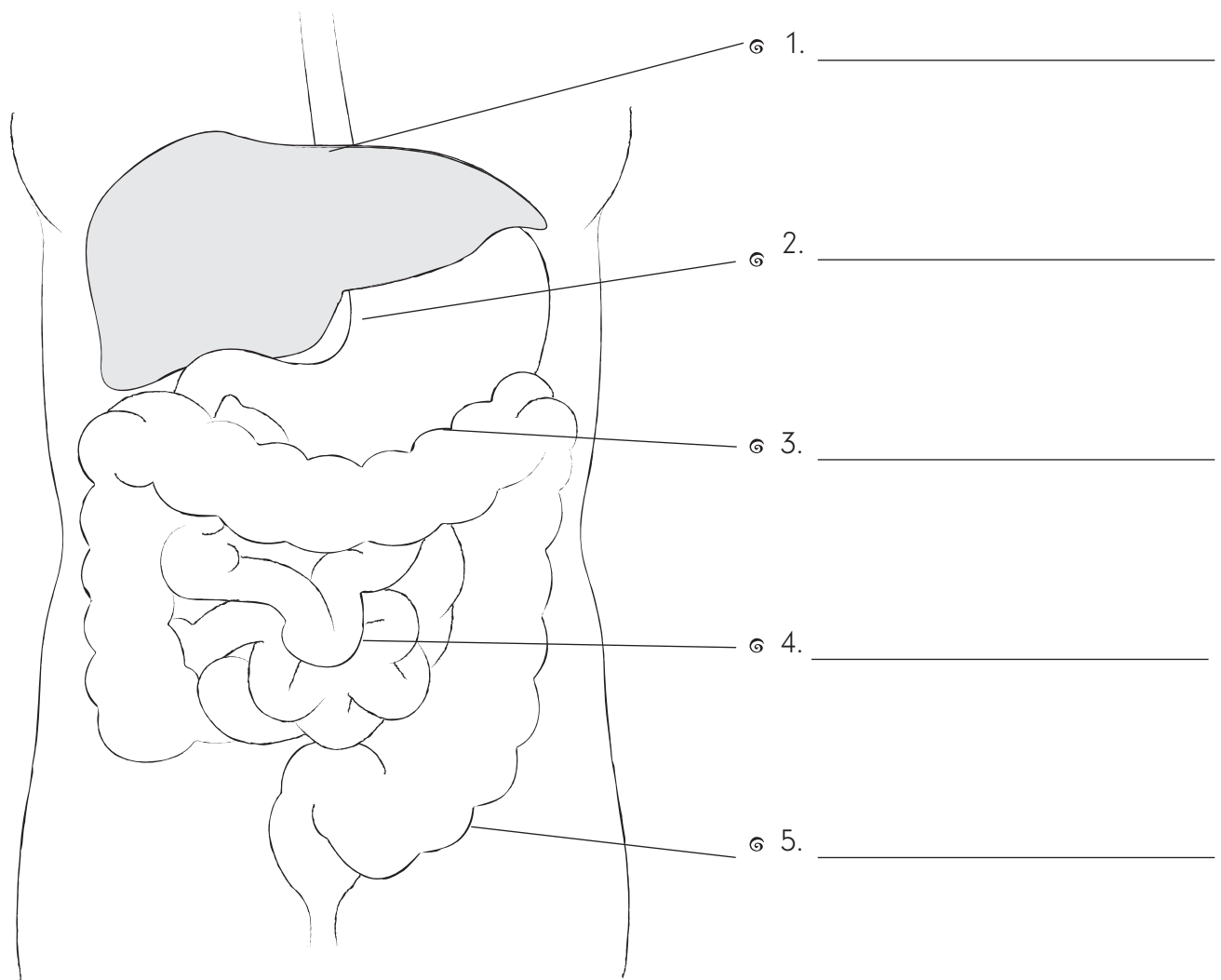
Label the Digestive System

Can you name the parts of the digestive system?



esophagus
stomach
liver

large intestine
small intestine



The Human Body Detectives Need Your Help!

Solve the mystery of the missing words. Robbie is at it again. He has eaten up some of the words in this text about digestion. See if you can help Merrin and Pearl put the words back where they belong. Good luck!

It all starts with that first bite of delicious fruit salad. Your _____ glands go right to work producing a much needed supply of liquid as your teeth chew and your _____ begins to push the chewed food, called a _____, toward the back of your throat.

Next, your muscles move the mushy mass of food into a tube called the _____. The muscles in your esophagus begin squeezing without you even knowing. This strong muscle action is called _____.

As the muscles squeeze the food down your esophagus, a small valve opens and the food drops directly into the _____. Hydrochloric acid squirts down on the food as your strong stomach muscles continue to flex, breaking the food into even smaller bits. These then pass into the _____.

Digestive juices are sent from the liver, pancreas and gallbladder to continue to break down the food. The small intestine looks like a forest filled with pink fingers called _____. These absorb large amounts of _____ from the food that you eat. From here the nutrients will flow directly into your _____.

The leftovers that your body will not use then travel into a larger tube called the _____. The end is near, my friend. It is time for the waste, which is called a _____, to leave your body. You might think this sounds gross, but when this happens it brings relief!

The End.
Really!

small intestine
bolus
large intestine
esophagus

stool
peristalsis
tongue
stomach

nutrients
villi
salivary
bloodstream

Human Body Detectives Ask

Merrin and Pearl have done lots of reading about the digestive system, not to mention traveling through their little brother's digestive tract. These are some fun facts they learned and want to share with you.



Did you know that...

- ⑥ the stomach has 35 million digestive glands?
- ⑥ the word "fart" comes from the Old English word, **feortan**, which means "to break wind?"
- ⑥ on average, a healthy person farts 16 times a day?
- ⑥ many animals, including cats, dogs, and horses, fart too? The animal that farts the most is the elephant.
- ⑥ people fart the most during sleep?
- ⑥ in an average lifetime a stomach will digest approximately the weight of a dozen elephants? That's about 50 tons!
- ⑥ the muscular contractions of your esophagus are so powerful you could drink a glass of water or eat while standing on your head? (don't try this at home!)
- ⑥ an adult's intestines uncoiled are at least 25 feet long? Be glad you're not a full-grown horse. A horse's uncoiled intestines are 89 feet long!
- ⑥ chewing food takes from 5 to 30 seconds and swallowing takes about 10 seconds?
- ⑥ food can slosh around in the stomach for up to 3 to 4 hours?
- ⑥ food waste can hang out in the large intestine from 8 hours to 2 days?
- ⑥ Americans eat about 700 million pounds of peanut butter a year?
- ⑥ Americans eat over 2 billion pounds of chocolate a year?



Digestive Search

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

digestion
esophagus
stomach
small intestine
liver
gallbladder
large intestine
mouth
peristalsis



hydrochloric acid
tongue
epiglottis
saliva
villi
uvula
pancreas
stool

The Human Body Detectives

Search for the Truth

Help Merrin and Pearl decide if the following statements are true or false.
Label each statement with a **T** if the statement is true or **F** if the statement is false.

_____ 1. Digestion begins in the stomach.

_____ 2. Bile helps to digest fatty foods.

_____ 3. The esophagus pushes food into the large intestine.

_____ 4. The tongue is a very strong muscle that aids in digestion.

_____ 5. The liver produces bile which aids in digestion.

_____ 6. The epiglottis is like a trap door that prevents food from entering the trachea.

_____ 7. Peristalsis means chewing.

_____ 8. The small intestine absorbs nutrients.



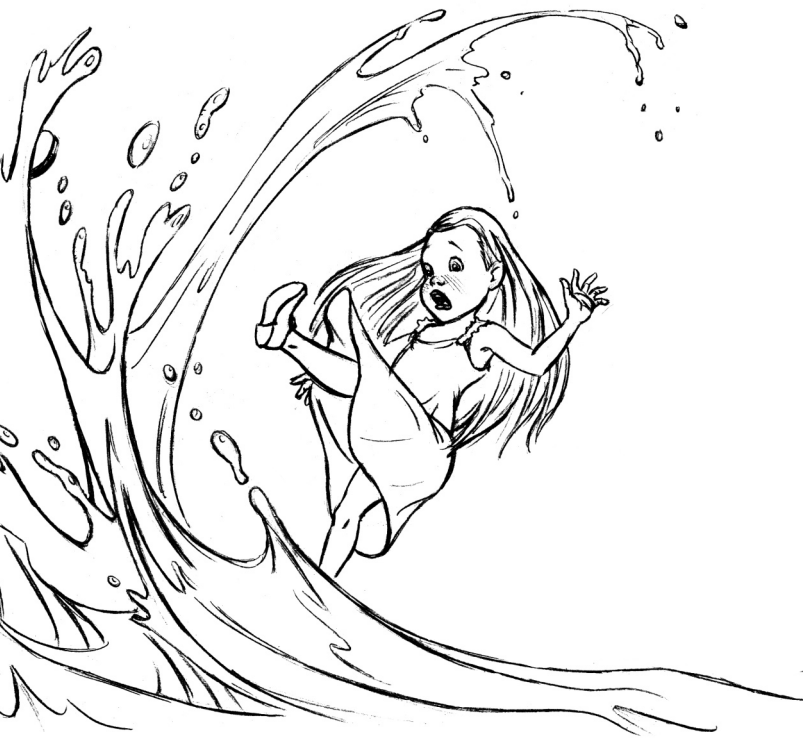
Peristalsis

Peristalsis is the wave-like muscle action that helped Merrin and Pearl travel down Robbie's digestive system. Now Merrin and Pearl have a challenge for you!

See how many different words you can make using the letters in the word "peristalsis." Can you fill up the entire page with words?

persist

staples



trip



Questions About Digestion

Listen closely to ***The Lucky Escape*** and see if you can answer the following questions. You can pretend you are a body detective like Merrin and Pearl.

According to the story, what does digest mean? _____

How does saliva help you digest your food? _____

What muscular action pushed Merrin and Pearl through their little brother's esophagus, into his stomach, and along his digestive tract? _____

As Merrin and Pearl entered the small intestine they saw what looked like a forest of "pink fingers." These "pink fingers" are called villi. Describe how food is absorbed here. _____

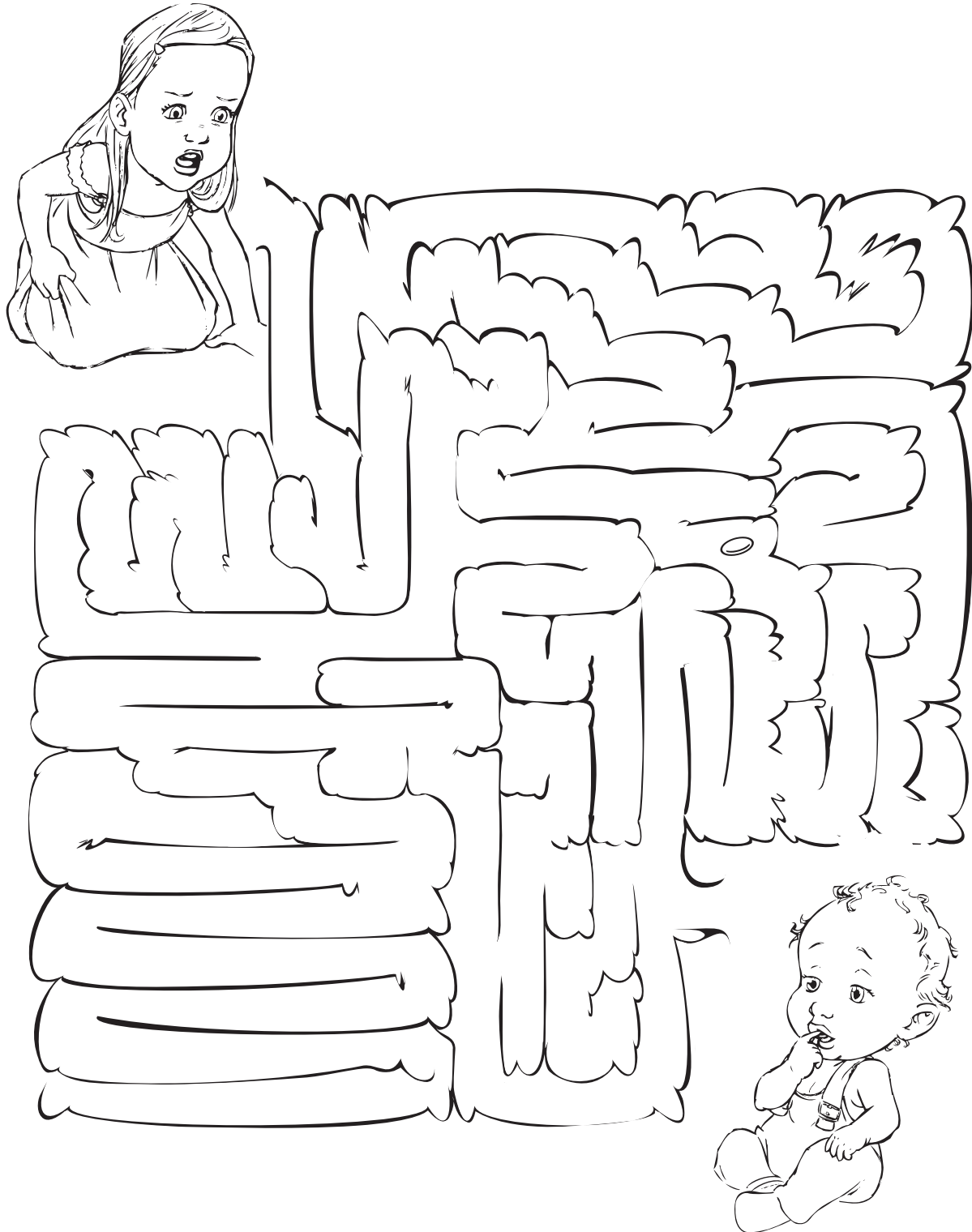
What is the last stop in the digestive tract and what liquid enters the bloodstream here? _____

Why do you think that Merrin and Pearl chose to eat healthy lunches at the end of the story?

What was the most important fact you learned about the digestive system as you listened to *The Lucky Escape*? _____

Human Body Detectives

Can you help Pearl grab the penny and get to Robbie?



Digest that Joke



Here are some of Merrin and Pearl's favorites! Do you have any?

Why was the skeleton afraid to go down the esophagus?

Because he didn't have the GUTS to do it!

What is the strongest and most powerful muscle in the human body?

The MUSCLE SPROUT!

What vegetable would you not want to take on a boat?

A LEEK!

Say this 5 times fast:

Digest that small intestine! Digest that small intestine! Digest that small intestine!

Digest that small intestine! Digest that small intestine!

Why did the yellow banana peel?

It forgot to put on SUNSCREEN!

Why did the banana go to the hospital?

He was not PEELING WELL!

Why did the leaf go to the doctor?

He was feeling a little GREEN!

Knock Knock

Who's there?

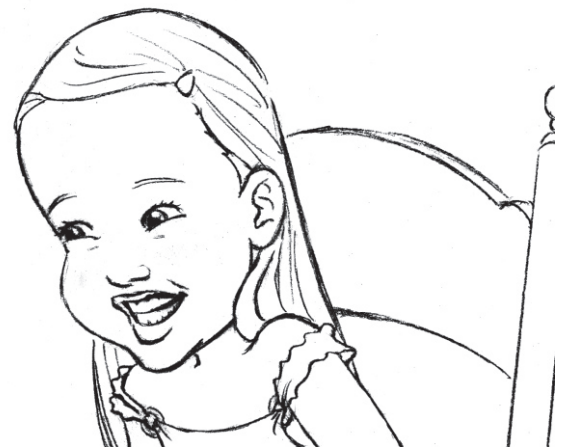
Bean

Bean Who?

Bean to the bathroom lately?

Say this 5 times fast:

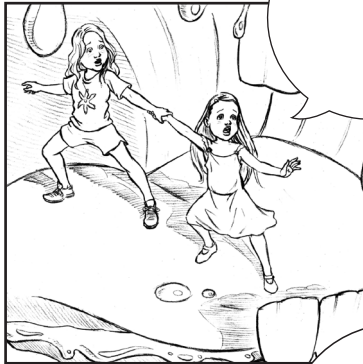
Uvula Uvula Uvula Uvula Uvula

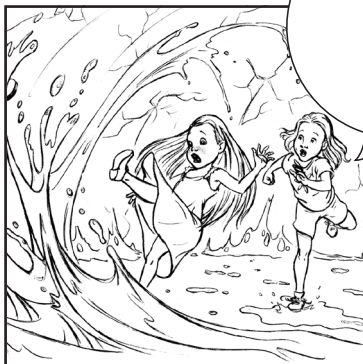


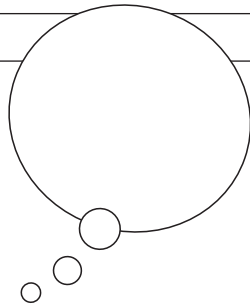
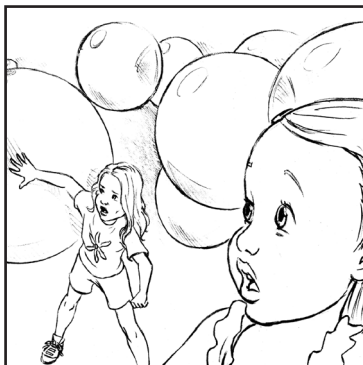
Quest to Digest



What is your QUEST to DIGEST story? Create your own story and add your own quotes too!

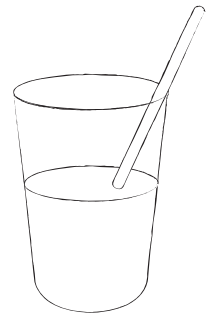




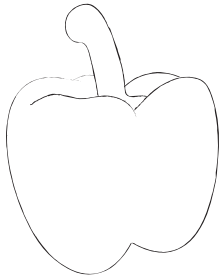


The Human Body Detectives

Discover a Rainbow of Nutritional Whole Foods

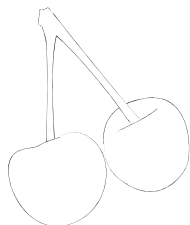


Merrin and Pearl have put together a list of colorful foods.



1. Categorize the fruits and vegetables by color.
2. Categorize the foods high in protein.
3. Categorize the beverages (drinks).
4. Select foods from each category to create a custom menu for yourself and your family.

blueberries
carrots
strawberries
sweet potatoes
herbal tea
milk
tomatoes
asparagus
eggs
turkey
grapes
avocados
oranges



cherries
raspberries
spinach
salmon
squash
red bell peppers
beef
green beans
blackberries
swiss chard
apricots
papayas
bananas

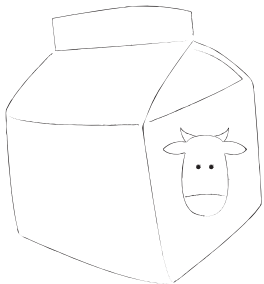
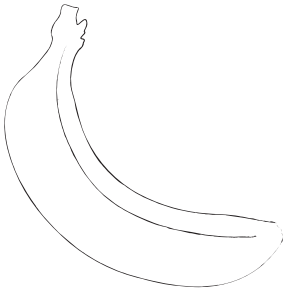
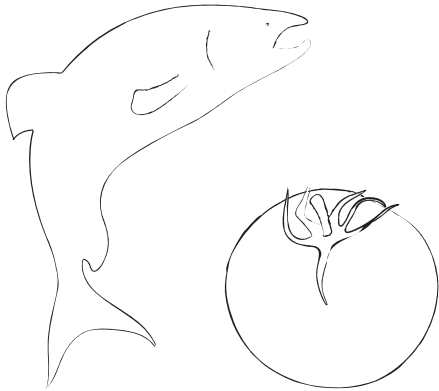


kiwis
tofu
almonds
pumpkin
water
cashews
kale
broccoli
mangoes
walnuts
chicken
brussel sprouts
pork

Categories of Colorful Foods

Can you name foods in each category?

Match the foods on the left to their category on the right.



red foods

support the immune system
protect your brain
anti-inflammatory

orange & yellow foods

supports your immune system
helps your eyes
helps your complexion
supplies vitamin A

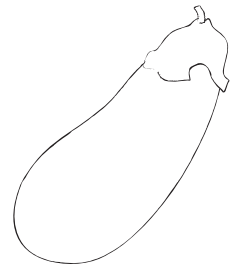
green foods

fights illness
helps your heart
helps your bones
supplies vitamin C



blue & purple foods

supports your heart
aids in healthy brain function



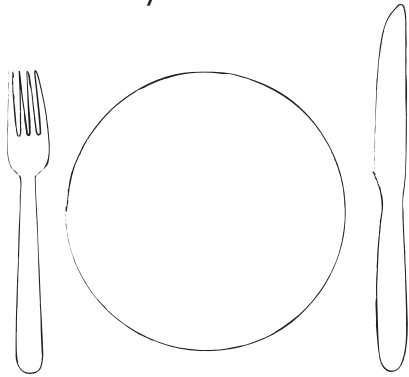
proteins

builds and repairs body tissues

beverages

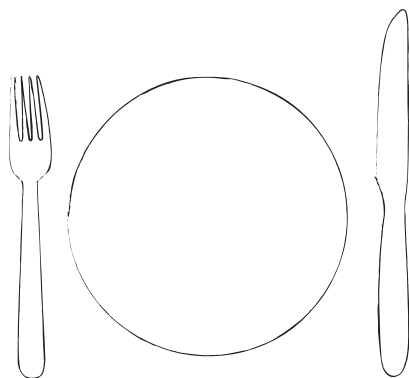
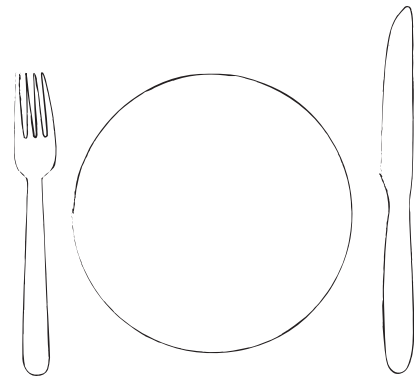
Human Body Detectives Discover a Healthy Food Plan

Now you get to create your own healthy menu. Make choices from the categories of colorful foods and draw a fun meal too! Be sure to include proteins, plenty of fruits and vegetables, and always remember to drink water. **Have fun and be healthy!**



BREAKFAST

LUNCH



DINNER

Human Body Detective Riddles

WORD BANK:

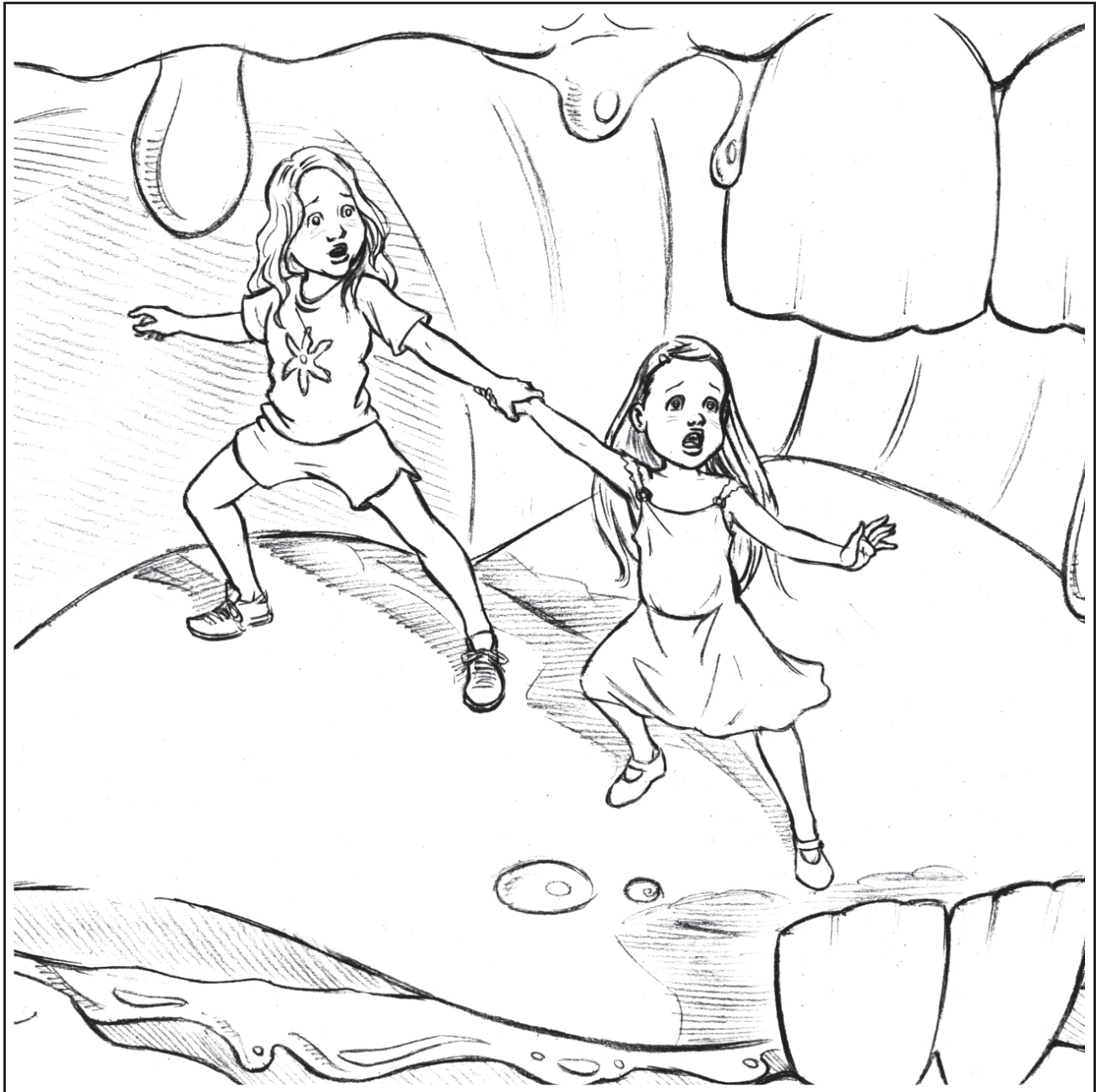
salivary
liver
protein
esophagus
large intestine

small intestine
epiglottis
peristalsis
digestive system



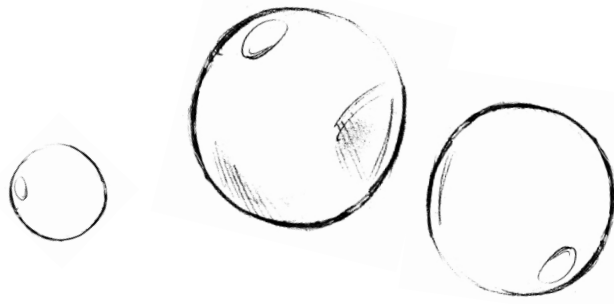
- ⑥ I am a tunnel passage between the mouth and the stomach after you swallow.
What am I?
- ⑥ I am the glands that are the first response as food enters the mouth. If I were a firefighter I would be the first on the scene to put out the fire. **What am I?**
- ⑥ I am the muscle action that aids in digestion. I have a long, important name and I am like an ocean wave traveling through your muscle. **What am I?**
- ⑥ I am in foods such as meats, eggs, and beans. I am digested by enzymes and then used to build and repair body tissues. **What am I?**
- ⑥ I am the most exciting place to be in the entire digestive system. This is where almost all nutrients are absorbed. **What am I?**
- ⑥ I am the largest organ inside your body and I protect you from harmful substances and waste as you digest food. **What am I?**
- ⑥ I prevent food from going the wrong way when you swallow. You might say that I continually save your life as you eat. **What am I?**
- ⑥ I have a gross job, but someone has to do it. I store solid waste (stool) until you are ready to go to the bathroom. YUCK! **What am I?**
- ⑥ I am a very important system in your body. Without me, you could not get the nutrients you need to grow properly and stay healthy. **What am I?**

Color!





Glossary



Bacteria (bak-TEER-ee-uh) There are “good” bacteria our bodies need and there are “bad” bacteria and viruses, which can enter our bodies (like when we catch a cold or a “bug”). Our bodies and our “good” bacteria work hard to get rid of any foreign, unwanted bacteria and viruses.

Bile (BYE-L) Bile is a yellowish liquid that is produced in the liver and stored in the gallbladder. It is needed in the digestive process to help break down foods.

Bladder (BLA-der) The bladder is a hollow, muscular organ that collects urine from your kidney and stores it until you go to the bathroom.

Bolus (BOH-lus) A bolus is food that has been chewed, wet and softened by saliva, and is ready to be swallowed.

Digestive System (dye-JEST-iv SIS-tem) The digestive system is the system in the body that is responsible for the breakdown of food, absorption of nutrients from food, and the elimination of the waste and water the body does not need. The digestive system is made up of important organs, parts and chemicals, which all work together to do these things.

Epiglottis (eh-pih-GLAW-tis) The epiglottis is a flap at the back of the mouth that prevents choking by covering the trachea (windpipe) during swallowing.

Esophagus (eh-SAW-fah-gus) The esophagus is the tunnel passage between the mouth and stomach.

Hydrochloric Acid (hye-droh-KLAWR-ik ASS-id) Hydrochloric acid is produced in the stomach to further break down the bolus. It also kills any unwanted visitors like bacteria and viruses.

Gallbladder (GAWL-blad-er) The gallbladder, located next to the liver, stores the bile that the liver has produced.

Kidney (KID-nee) There are 2 kidneys; one on each side of your body. They have many jobs, one of which is to filter the blood and remove liquid waste, which is then sent to the bladder.

Liver (LIV-ver) The liver is the powerhouse organ of the body. It makes and secretes bile, stores and filters blood, and stores nutrients.



Nutrients (NOO-tree-ents) Nutrients are vitamins and minerals that have been broken down from food during the digestive process. Nutrients help the body function on a daily basis.

Pancreas (PANG-kree-us) The pancreas is located close to the stomach. It secretes digestive juices into the small intestine to aid in the breakdown of food.

Peristalsis (pehr-ih-STAWL-sis) This is a wave-like muscle action that allows for food and waste material to move through the digestive system.

Protein (PROH-teen) Protein is an important part of certain foods (like eggs, meats and nuts) that helps our bodies grow and be strong.

Saliva (sah-LYE-vuh) Saliva is a clear liquid that is secreted by the salivary glands in the mouth. It helps break down food so it is easy to swallow.

Salivary Glands (SA-lih-vehr-ee GLANDS) The salivary glands produce and secrete saliva into the mouth.

Small Intestine (SMAWL in-TEST-in) The small intestine is the coiled tube between the stomach and the large intestine. This is where digestion and most absorption of nutrients occur.

Stomach (STUM-ahk) The stomach is a bag-like organ located between the esophagus and the small intestine, where food is mixed (almost like a blender) and partially digested.

Stool (STOOL) Stool is unwanted solid waste from the body. It's really poop!

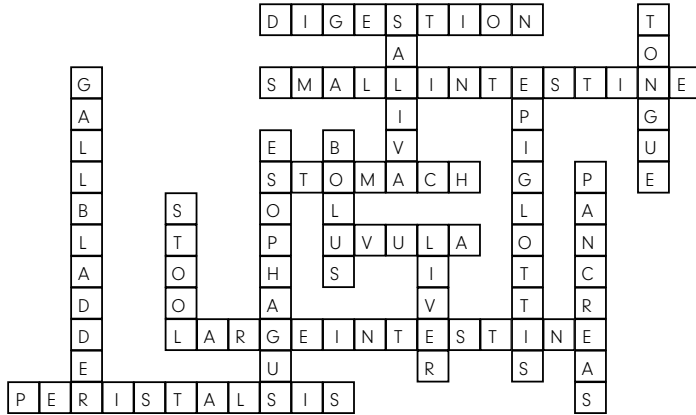
Tongue (TUNG) The tongue is important for tasting foods, licking, swallowing and for us humans, talking!

Uvula (YOOV-yoo-luh) The uvula marks the entrance to the throat. It hangs above the back of the tongue and helps direct food down the esophagus.

Villi (VIHL-lye) These are finger-like projections found in the small intestine that help with the absorption of food.



Answers

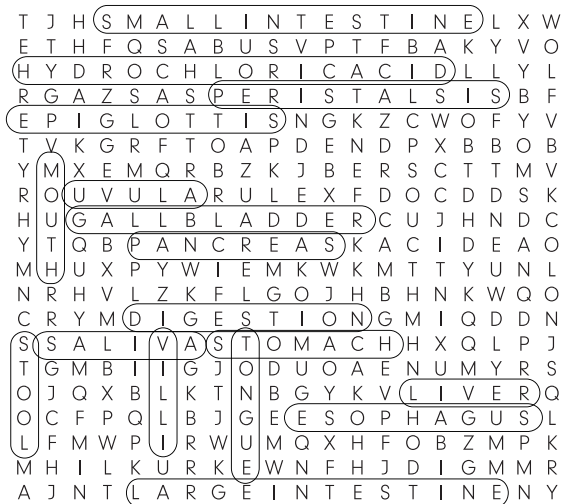


riddles

1. esophagus
2. salivary
3. peristalsis
4. protein
5. small intestine
6. liver
7. epiglottis
8. large intestine
9. digestive system

find the missing words

1. salivary
2. tongue
3. bolus
4. esophagus
5. peristalsis
6. stomach
7. small intestine
8. villi
9. nutrients
10. bloodstream
11. large intestine
12. stool



true and false

1. false
2. true
3. false
4. true
5. true
6. true
7. false
8. true

label the digestive system

1. esophagus
2. liver
3. stomach
4. small intestine
5. large intestine

Questions about Digestion

1. Digest means to break down food so the body can use it for energy.
2. Saliva mixes with food and softens the food so it can be swallowed.
3. The muscular action that pushes the girls through the digestive tract is called peristalsis.
4. Nutrients from food are absorbed in the small intestine and enter the bloodstream here.
5. The last stop on the digestive tract is the large intestine.
6. Merrin and Pearl experienced how the digestive system works and this encouraged them to make healthy choices when eating.
7. Responses will vary on this question.