

# Chapter 28

## Pancreas, Liver and Gallbladder



I'M SO DONE LISTENING TO YOU.

THE BODY CONSISTS OF THREE PARTS- THE BRAINIUM, THE BORAX AND THE ABOMINABLE CAVITY. THE BRAINIUM CONTAINS THE BRAIN, THE BORAX CONTAINS THE HEART AND LUNGS, AND THE ABOMINABLE CAVITY CONTAINS THE BOWELS, OF WHICH THERE ARE FIVE - A, E, I, O, AND U.

# Day One:

Today, you and your child will:

1. Read the text
2. Review the text with your child
3. Complete the student worksheets
4. Collect the materials you will need for days two and three

## National Science Education Standards covered this week:

The pancreas is responsible for generating enzymes to help the small intestines digest your food. It also sends out hormones to the liver to help regulate sugar levels in the blood.

In addition to storing sugar, the liver also helps to filter the blood from harmful chemicals and generates bile which is used in the small intestine to digest fats.

When not in use, bile is stored in the gallbladder.

# Definitions

<b>Pancreas</b>	"pan-kre-az"; makes enzymes to help break down the food that comes into your small intestine
<b>Digesting</b>	to break down your food into smaller, softer and more usable pieces
<b>Proteins</b>	the building blocks for many parts of the body
<b>Hormones</b>	chemical messengers made by your body
<b>Glucagon</b>	a hormone made by your pancreas which informs the liver to send more sugar into your blood
<b>Insulin</b>	a hormone made by your pancreas which informs the liver to stop sending sugar into your blood
<b>Diabetes</b>	"di-a-beet-ez"; a common disease that occurs when your pancreas stops making insulin
<b>Liver</b>	an organ of the body that filters your blood, stores sugar and makes bile
<b>Bile</b>	a liquid that is made by your liver and is used to digest any fat that is in your food
<b>Gallbladder</b>	a storage area for bile

# Sample questions to ask your child after completing the weekly reading.

**What two jobs does your pancreas have to do?**

Make enzymes to help digest our food and makes certain our blood has enough sugar in it.

**What may happen if your pancreas stops making insulin?**

Without insulin to lower the amount of sugar in your blood, you can get very sick. When your body cannot produce insulin, you are said to have diabetes.

**What similarities do your liver and pancreas have?**

Both the liver and pancreas are organs in your body, they both produce chemicals and they both get rid of wastes in your body.

# Answers to worksheet questions:

## Page 1:

Bile

Digesting

Proteins

Hormones

Glucagon

Insulin

Diabetes

Pancreas

Gallbladder

Liver

## Page 2:

9 - pancreas

4 - digesting

1 - proteins

7 - hormones

10 - glucagon

8 - insulin

6 - diabetes

3 - liver

2 - bile

5 - gallbladder

# Unit Seven Review Answer Key

Fill in the blanks in the story below.

You use the skeletal muscles and bones in your arms to reach for the last slice of pizza and place it into your mouth. After chewing up the pizza, your esophagus forces your food down into your stomach. The smooth muscles in your stomach store your food until it gets moved into your small intestines. At this point, it looks like a creamy goo. Your pancreas squirts enzymes and your gallbladder squirts bile into the goo. The goo gets digested into smaller, softer pieces and gets placed into your blood. Your blood is passed through the liver. This organ removes the poisons and wastes from the blood. Your blood leaves your liver and ends up in your lungs where it can pick up oxygen.

**Be certain to go over your definitions for the test!**

# Day Two:

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

**The following text will give you the most important items to review for your activity today.**

Bile is a chemical produced by your liver that is used to digest fats that you eat or drink.

Bile is stored in your gallbladder and is released into your intestines during digestion.

Given the unlikelihood of obtaining a sample of bile, it is not practical for young students to utilize this fluid; however, a suitable replacement can be found in dish soap. This chemical has a similar property of bile in that they both break apart fats very efficiently.

# The cat's meow

## Objective:

Children will model how fat can be digested by bile.

## Materials:

whole milk

water

shallow dish or pie pan

food coloring

liquid dish or hand soap

cotton swabs

## Procedure:

Pour about  $\frac{1}{2}$  inch of milk into the dish/pan.

Add a couple of drops of four different food colors at the edge of the container. Place the drops equal distances from each other (If you can imagine the dish/pan as a clock, put the drops at 3, 6, 9 and 12 o'clock.)

Inform the child that they are going to Dip the tip of the cotton swab into the soap and insert it in the center of the container of milk. They will need to hold the swab in place for a short period of time.

Ask the child to make a prediction as to what may happen.

Dip and hold the soap-coated cotton swab into the milk. You should notice, after a few moments that the food coloring starts to swirl around inside the milk.

## Explanation:

Your liver makes a liquid called bile, which is used to break down the fat in your food. In this experiment, you are using another chemical (soap) to break down the fat that is found inside the milk. Small particles of soap try to surround other chemicals, like fats. When the soap surrounds a fat, it tends to break apart the fat into smaller pieces. This is why you use soap to wash your hands and clothes.

The soap surrounds the "dirty" stuff and breaks it apart so that it can be clean again. In this experiment, the fat is so spread out inside the milk that the soap cannot easily surround it. So, it swirls around and around trying to surround all of the fat. This swirling motion causes the food coloring to move as well.

# Day Three: Lab Activity

Today, you and your child will:

1. Review Day One using the following text
2. Run the first activity this week

**The following text will give you the most important items to review for your activity today.**

The small intestine is filled with small, finger-like projections that are called villi.

These villi allow the small intestine to increase its surface area as they are folded along the inner lining of this organ. When food is present, the folds are able to open up, thereby providing a larger area for food to be absorbed.

## ESP Activity: Stretching out your dinner

### Objective:

Children will explore how the small intestine absorbs our food.

### Materials:

paper towels

measuring cups/spoons

bowl of water

### Procedure:

Fill a bowl with a measured amount of water. The bowl should be about half-full. Take one paper towel and lower its edge into the water for ten seconds. Do not fold the paper towel during this process. Depending on the size of the bowl, you may need to cut the paper towel into quarters.

Remove the paper towel from the water and measure the amount of water that remains in the bowl. Then, replace the amount of water that was removed by the paper towel.

Fold the paper towel into multiple layers and dip its edge into the water again for experimentation.

### Explanation:

During digestion, the food you eat is chemically broken down and absorbed by the small intestine. The walls of the small intestine are folded and bent into small finger-like projections called villi. These villi increase the amount of surface area on the small intestine that absorb the nutrients we need to live. It is a common misconception that the stomach digests our food...it is the small intestines that do all the work.

**Independent Variable:** Number of folds

**Dependent Variable:** Amount of water remaining

### Hypothesis:

If the number folds are (increased/decreased), then amount of water remaining will (increase/decrease).

# Test: Unit 7

## Chapters 25-28

Match the words in the second column to the best available answer in the third column. Place the correct number on the blank line.

_____	<b>Muscle</b>	1) makes enzymes to help break down the food that comes into your small intestine
_____	<b>Liver</b>	2) a long tube that moves food from your throat into your stomach
_____	<b>Red blood cells</b>	3) the largest organ of the human body
_____	<b>Stomach</b>	4) an organ that helps you to move everything in your body
_____	<b>Pancreas</b>	5) a kind of muscle that is only found in the heart
_____	<b>Esophagus</b>	6) an acid-filled sack that stores your food before digestion
_____	<b>Digesting</b>	7) an organ that filters your blood
_____	<b>Plasma</b>	8) a "cushion" of cells between your bones to keep them from rubbing together
_____	<b>Skin</b>	9) to break down your food into smaller pieces
_____	<b>Cardiac muscle</b>	10) the liquid part of your blood
_____	<b>Cartilage</b>	11) small bumps inside your small intestine that pulls out all of the nutrients from the food you eat
_____	<b>Villi</b>	12) part of the blood that carries oxygen to all of the muscles and organs of your body

## Which one is right? Circle the correct answer.

1. Your skin does not get thicker because...

- a) you are always making new skin cells inside your body
- b) you are always losing skin cells on your body
- c) your body never makes new skin cells

2. What kind of muscle helps you to move around the most?

- a) skeletal
- b) cardiac
- c) smooth

3. Your heart beats faster when you exercise because...

- a) your heart moves your bones when you exercise
- b) your muscles need more oxygen from your blood
- c) your muscles need less oxygen from your blood

4. Oxygen gets into your red blood cells from your...

- a) lungs
- b) arteries
- c) veins

5. Food is digested in your...

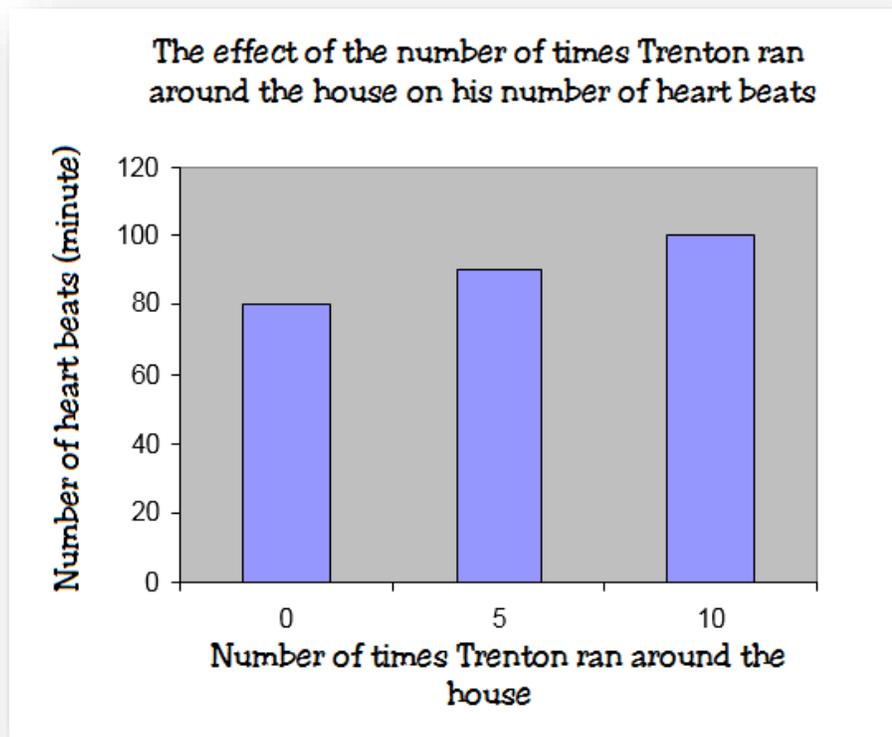
- a) esophagus
- b) stomach
- c) intestines

6. The amount of sugar in your blood is watched carefully by your...

- a) pancreas
- b) liver
- c) kidneys

Trenton wanted to see how fast he could get his heart to beat. He ran an experiment to test his idea. He recorded his heart rate and then ran around the house five times and recorded it again. He then ran around the house five more times and recorded his heart rate one more time.

Here are his results:



Did Trenton's heart rate increase or decrease after he ran around the house?

Why do you think this happened?


# Test: Unit 7

## Answer Key

### Matching

4 muscle

7 liver

12 red blood cells

6 stomach

1 pancreas

2 esophagus

9 digesting

10 plasma

3 skin

5 cardiac muscle

8 cartilage

11 villi

### Multiple choice

1. b

2. a

3. b

4. a

5. c

6. a

### Graph analysis

Did Trenton's heart rate increase or decrease after he ran around the house?

*Increase*

Why do you think this happened?

*Trenton's muscles needed more oxygen for him to keep running. In order to get more oxygen, he needed his heart to pump more blood so that more oxygen can be carried to these muscles.*