

Lesson 3.8: The Digestive System

Task	Page(s)	Learning Target
1	2-3	I can identify structures and explain functions of the digestive system.
2	4	I can use shapes to show a 3-step model that describes how enzymes work.
3	5	I can use experimental evidence to explain the digestion that takes place in the mouth.
4	6	I can plan a model for the digestive system using household materials.
5	7-9	I can create a writing piece that describes how a food particle moves through the digestive system.

Task 1 Learning Target: I can identify structures and explain functions of the digestive system.

1. Function: break down food into small molecules

A. Watch the following video and describe peristalsis: <https://www.youtube.com/watch?v=o18UycWRsaA>
Peristalsis:

B. Complete the following flow chart using the phrases given.

Wastes pass out of the body Nutrients are moved into the blood Elimination Absorption
 food enters the mouth Digestion Food is chewed, mixed, and churned
 Chemical reactions break down food Food is broken down Ingestion

Step: Ingestion
What happens: _____



Step: Digestion
What happens: _____
 Chemical: _____
 Mechanical: _____



Step: Absorption
What happens: _____



Step: _____
What happens: _____

2. Structures

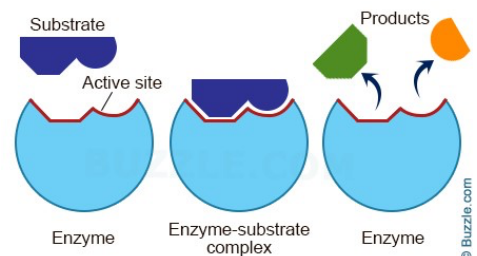
A. **Enzymes-** proteins that speed up digestion

***Watch the following video and describe how enzymes work: <https://www.youtube.com/watch?v=UVeoXYJlBtI>

1. **The enzyme and the sub_____ are in the same area.** Enzymes are very, very specific and don't just grab on to any molecule. They will bind with a specifically _____ substrate.

2. **The enzyme grabs on to the substrate at a specifically shaped area called the act_____.** This combination is called the **enzyme/substrate _____**.

A process called catalysis happens. Catalysis is when the substrate is changed. The video shows the **building** of a chemical bond by **combining** one molecule with another molecule. Many enzymes of the digestive system work to make larger food molecules smaller, working oppositely to how the video shows enzyme function. ****How does the video and image to the right compare?***



3. **The enzyme releases the _____.** When the enzyme lets go, it is then ready to work on another molecule of substrate.

B. Accessory organs:

C. Digestive tract organs:

****Complete the table below using the following phrases:**

- ~~-chew with tongue and teeth~~
- moves solid waste
- bile breaks down fat
- saliva breaks down food
- peristalsis moves food to stomach
- eliminates waste from body
- absorbs water from chyme
- peristalsis mix food
- enzymes and hydrochloric acid make chyme
- villi absorb nutrients in blood and transport to cells

Digestive Track Organs	Mechanical Digestion	Chemical Digestion
1. Mouth	Chew with tongue and teeth	
2. Esophagus		
3. St_____		
4. _____		
5. Large In_____		
6. Rectum		
7. An_____		

****Draw a diagram of the digestive system**

4. Affecting the Digestive System

a. Watch the following video and describe acid reflux: <https://www.youtube.com/watch?v=TdK0jRFpWPQ>

Acid Reflux: _____

b. Why are there bacteria in the large intestine?

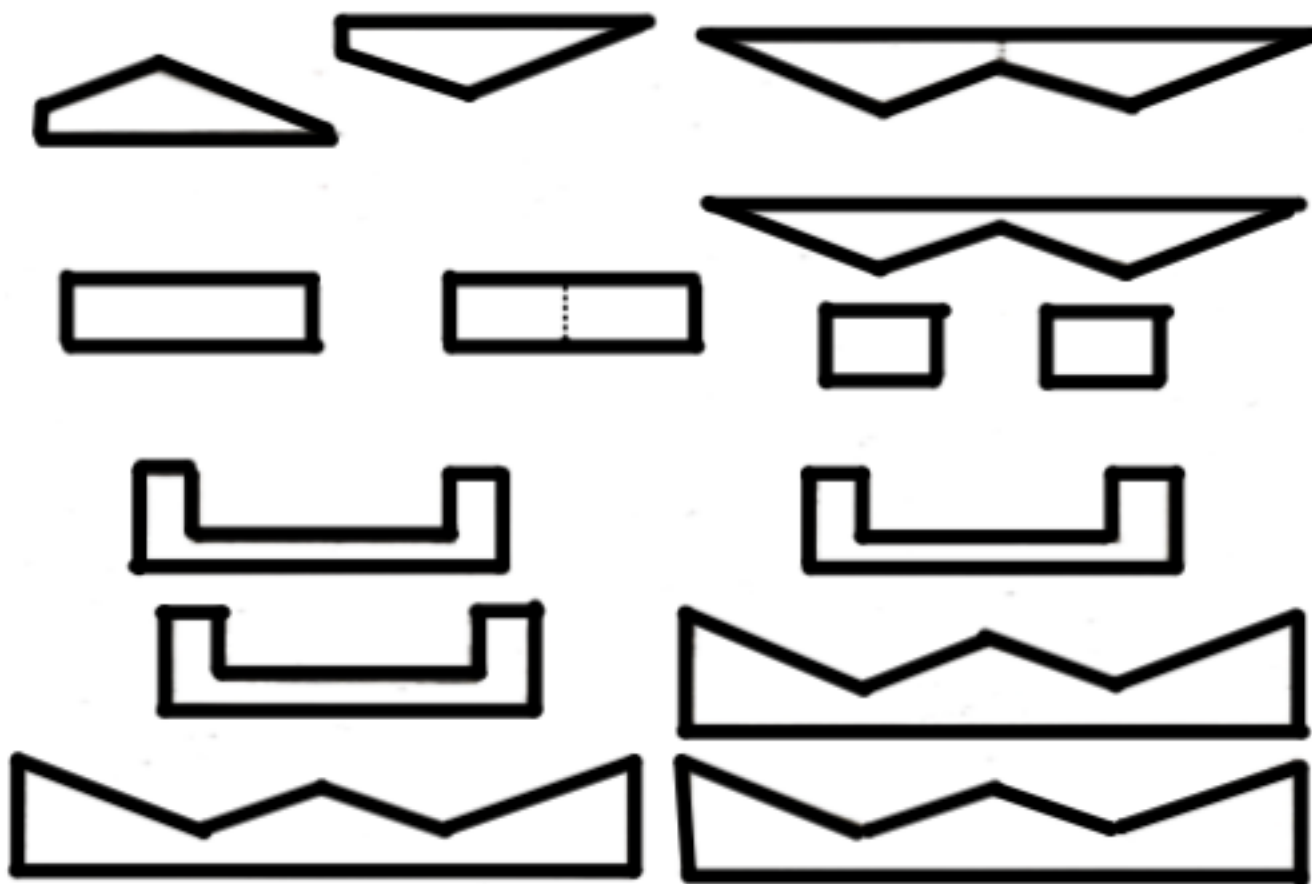
Resource Link: <http://www.tenalpscommunicate.com/clients/siemens/humanbodyOnline/##>

Task 2 Learning Target: I can use shapes to show a 3-step model that describes how enzymes work.

1. Decide which group is using which shapes and what the shapes mean.
2. Cut and paste on a new piece of paper.
3. Label your diagram and summarize each step using the following terms: **catalysis**, **enzyme**, **substrate**, **active site**, **product**
4. Use colors and be creative but be sure to make your diagram scientifically accurate.

Questions:

- a. Should the enzyme be the same color for all 3 steps. Why or why not?
- b. Should the substrate be the same color as the product? Why or why not?



	3	2	1
Diagram	Visual aid is creative, colorful, easy to read, and effectively highlights how enzymes work.	Visual aid is colorful, readable and used somewhat effectively.	Visual aid is lacking color/ is slightly difficult to read/ used somewhat effectively.
Labels	All items are labeled neatly and correctly.	Most items are labeled neatly and correctly.	Few items are labeled neatly and correctly.
Description	The topic is clear and well-focused. All steps are thoroughly and accurately described.	The topic is mostly clear. Most steps are thoroughly and accurately described.	The topic is unclear. Few steps are thoroughly and accurately described.

Task 3 Learning Target: I can use experimental evidence to explain the digestion that takes place in the mouth.

In our bodies, the process of digestion includes both physical digestion (breaking up the food mechanically) and chemical digestion (enzymes chemically breaking down the food into even smaller pieces). Both of these processes happen in the mouth...but can we prove this with experimental evidence?

Saltines contain a large carbohydrate called starch (big, (complex) sugar).

Iodine solution is an indicator for the presence of starch. If added to water, has a light orange-brown color. If it is added to a sample that contains starch, the color changes to a deep blue.

Benedict's solution is an indicator for the presence of chemically digested starch, known as glucose (a simple sugar). If the solution detects the presence of glucose, it will turn from a blue color to a lighter orange color.

Use the videos (provided in the link) to explain the digestion that takes place in the mouth using experimental evidence: <https://sites.google.com/a/ps207tigers.org/207sci/digestion-experiment>

<u>Test Description</u> <u>(What was added to the vial?)</u>	<u>Result</u> <u>(What color change(s) occurred?)</u>	<u>Explanation</u> <u>(What does this mean?)</u>
<u>Test 1:</u>		
<u>Test 2:</u>		
<u>Test 3:</u>		

Task 4 Learning Target: I can plan a model for the digestive system using household materials.

Material	How does it represent structure?	How does it represent function?

Task 5 Learning Target: I can create a writing piece that describes how a food particle moves through the digestive system.

Overview:

1. In this project, you will produce a creative writing piece in which you convey the point of view of a food particle. Your presentation may take the form of a letter, advertisement, memo, speech, or journal/diary entry. You are encouraged to be creative! Although the platform by which you choose to present is for your choice, all presentations will be held to the same standards:

Your report should demonstrate an accurate and thorough understanding of scientific concepts. The description should:

- ✓ Convey a role: Who are you?
- ✓ Relate to a target audience: Whom are you addressing in your writing?
- ✓ Assume an appropriate format: What form will your writing take?
- ✓ Effectively communicate a topic that explains how food moves through the digestive system
- ✓ Use all of the following vocabulary words and **underline** them in your writing.
 - mouth
 - villi
 - esophagus
 - nutrient
 - stomach
 - enzyme
 - small intestine
 - peristalsis
 - large intestine
 - chyme

2. You will also work to create a visual aid that illustrates a major point of your writing piece. You are expected to label and briefly describe your illustration. Be sure to follow the following guidelines:

- ✓ Your visual aid should be labeled and briefly described.
- ✓ Your visual aid should be creative, colorful, easy to read, and used effectively.

	4	3	2	1
Diagram	Visual aid is creative, colorful, and easy to read, and effectively illustrates the topic.	Visual aid is colorful, readable and used somewhat effectively.	Visual aid is lacking color, is difficult to read, and used somewhat effectively.	Visual aid is not colored, difficult to read, and/ or is not used effectively.
Labels	Every item that needs to be identified has a label. It is clear which label goes with which structure.	Most items (at least 3) that need to be identified have labels. It is clear which label goes with which structure.	Few items (at least 2) that need to be identified have labels. It is clear which label goes with which structure.	Only 1 item is identified with a label OR it is not clear which label goes with which item.
Topic	The topic is clear and well-focused. At least 3 key points are thoroughly addressed. All facts presented in the story are accurate.	The topic is clear and well-focused. At least 2 key points are thoroughly addressed. Almost all facts presented in the story are accurate.	The topic is clear and focused, however key points were only partially addressed. Most facts presented in the story are accurate.	The topic is unclear and not focused and/or only 1 key point is addressed. There are several factual errors in the story.
Creativity	The dialogue contains many creative details and/or descriptions that contribute to the reader's enjoyment. The author has really used his/her imagination.	The dialogue contains several creative details and/or descriptions that contribute to the reader's enjoyment. The author has used his/her imagination.	The dialogue contains a few creative details and/or descriptions. The author has tried to use his/her imagination.	There is little evidence of creativity in the dialogue. The author does not seem to have used much imagination.
Vocabulary	All vocabulary words were used correctly in context and underlined.	A minimum of 6 vocabulary words were used correctly in context and underlined.	A minimum of 3 vocabulary words were used correctly in context and underlined.	Only 1 vocabulary word was used correctly in context and underlined.

	I assumed the role of:
	My audience is:
	My format is:
	<p>Check the vocabulary that was used in your writing:</p> <ul style="list-style-type: none"><input type="radio"/> mouth<input type="radio"/> esophagus<input type="radio"/> stomach<input type="radio"/> small intestine<input type="radio"/> large intestine<input type="radio"/> villi<input type="radio"/> nutrient<input type="radio"/> enzyme<input type="radio"/> peristalsis<input type="radio"/> chyme
	My visual aid is labeled and briefly describes:
	My visual aid is creative, colorful, easy to read, and used effectively because it shows:

Chart the sequence of organs that food passes through during digestion.

