LESSON GUIDE

Grade Level: 3-4 grade

Key Ideas: (1) Mouth, (2) Tongue, (3) Esophagus, (4) Stomach, (5) Small Intestine, (6) Large Intestine, (7) Anus (8) Digestive System

Activity Guide

Reading Activity:

1) Pages 145 From the Buckle Down supplemental Text

Video Activity:

1) Video Analysis of MMAP Digestive System Video: http://www.youtube.com/watch?v=5jRbKtwNKeQ

Explanation Activity:

1) The Tale of the In & Out Burger (Written) & Video

Laboratory Activity:

1) See Amylase in Action Lab
2) Create a Stomach Lab

Materials: For 8 groups

STOMACH LAB
16 Small Zip lock baggies
16 Large Zip lock baggies
4 Boxes Ritzcracker
8 Bottles of water
8 plastic cups
1 half gallon orange juice

AMYLASE LAB
2 Boxes Saltine Crackers
2 Boxes Ritz Crackers
20 string cheese

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AGENDA

TIME	TASK	DESCRIPTION	NEEDS
5 min	**Introduce The Problem:** Miley's Stomach	**The Problem:** Miley Cyrus was acting crazy on the MTV music awards last week. Few people know that she was not feeling well because she had not gone to the bathroom in 3 days. She needs your advice. Although she had 3 meals per day, she did not use the bathroom. Why did this happen?	• Have this question in the workbook.
5 min	**Share Responses**	*Teacher Direction:* Have students raise their hands and share their opinion. Simultaneously, have ALL the students write their answer down.	
10 min	**Quick Read**	**Directions:** To improve your understanding of this, please read pages 45 of the handout and share your new answer with your group	• Have a handout with the reading available.
10 min	**Video Analysis: Model Building**	**Directions:** Watch this short video about the digestive system. As you watch, put together a model of the digestive system and label the parts with their names and what they do.	- Have at least 10 cut outs of the pieces of the digestive system. - Have large pieces of construction paper.
15 min	**Amylase Lab**	**Directions:** Students will complete the Amylase lab.	- have a copy of the amylase lab and the materials.
10 min	**Stomach Building**	**Directions:** Follow the directions for building a fake stomach.	
10 min	**Whole Group Explanation**	*Teacher Direction:* Ask the students if they can make a better explanation, but ask them to use words like: (1) Mouth, (2) Tongue, (3) Esophagus, (4) Stomach, (5) Small Intestine, (6) Large Intestine, (7) Anus (8) Digestive System	
10 min	**Explaining The Miley Problem**	**Directions:** We will make our final explanations of how Miley Cyrus' digestive system is working, or not working.	• We will have this on a slide or in a handout. • Have camera phones of video cam available for explanation
15 min	**Clean up**	We will clean up for the day.	

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Introducing the Problem

The Problem: Miley Cyrus was acting crazy on the MTV music awards last week. Few people know that she was not feeling well because she had not gone to the bathroom in 3 days. She needs your advice. Although she had 3 meals per day, she did not use the bathroom. Why did this happen?

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Quick Read

Directions: In the moments that follow, you will write a new explanation. In this explanation use words like

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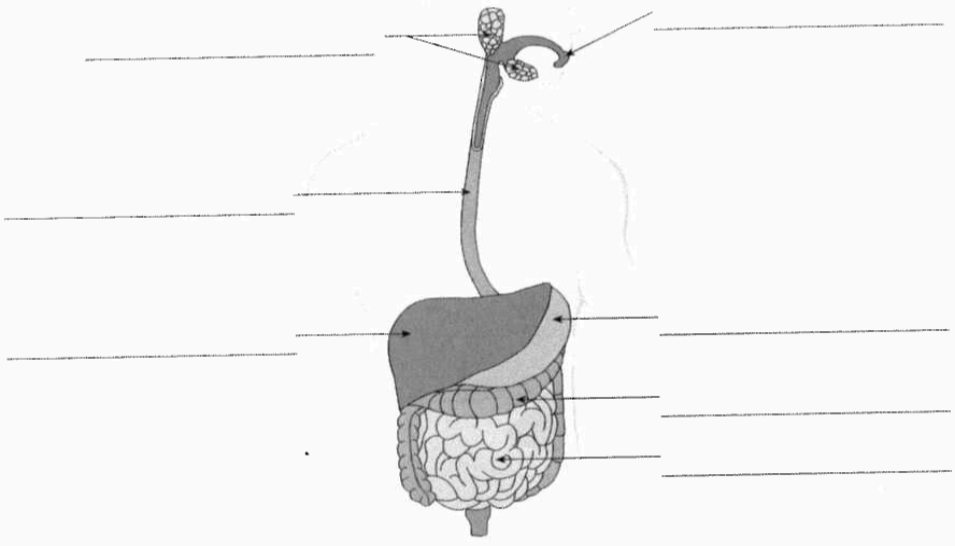
The Digestive System

Eating and digesting food and water is essential to stay alive, so it's no accident that we usually enjoy eating. The **digestive system** works to change foods into simpler substances that our bodies can use as energy and building materials. Digestion begins in the **mouth**. The tongue and lips grasp food and move it around, and the teeth cut, tear, and grind it down into small pieces. In the mouth, the food mixes with saliva. Produced by the **salivary glands**, this liquid not only makes it easier to chew and swallow, it also contains chemicals that begin to break down the food particles into molecules that the body can use.

After the food is swallowed, it passes through the **esophagus**, a food tube that connects the mouth to the stomach. Muscles line the esophagus and work to push the food toward the stomach. Once the food enters the **stomach**, it undergoes digestion by chemicals, such as acids, and by motion, as the muscles of the stomach churn the food around like a blender. Once the food is changed into a liquid form, it enters the **small intestine**. Here, the most important work of digestion occurs, as the nutrients in the food are absorbed. One of the largest organs in the body, the **liver**, releases chemicals into the small intestine that help with the digestion of fats. The liver is located to the right of the stomach. The food then enters the **large intestine** (sometimes called the colon). The last step in digestion occurs in the large intestine, which removes as much water as possible from the digested food. The remaining waste is then excreted, or sent out, from the body.

Add the appropriate labels to the following diagram of the digestive system. Use the boldfaced words above.



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Group Best Answer

Directions: In the minutes that follow, share your answer with the group. Know that you know more about the digestive system, what do you think is happening to Miley Cyrus?

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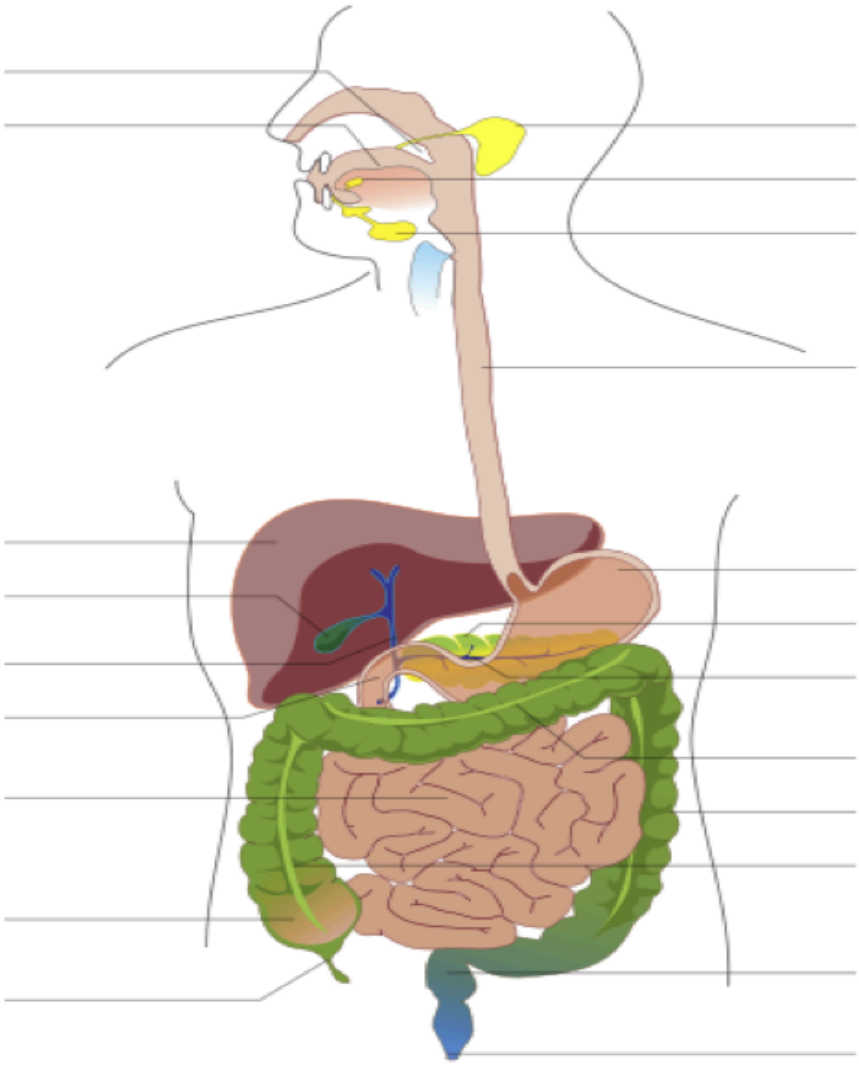
Video Analysis

Directions: Watch this short video about the digestive system. As you watch, put label the model of the digestive system and label the parts with their names and what they do.



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See Amylase In Action Lab

Amylase is a digestive enzyme found in saliva that breaks down starches. We did a simple activity to let the kids actually see and experience the way amylase works.

1. Put a small piece of saltine on the tongue.

2. Within seconds you should start to feel the cracker start to dissolve. That is the amylase breaking down the starch in the cracker.

3. Place a small piece of cheese on the tongue.

After 2o seconds remove the cheese and look at it. Besides being wet, there should be no change. There is no starch in cheese so the amylase had nothing to break down.

Needs: Saltine Crackers, Cheese,

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Quick Write: Use the space below to write your best explanation of whey Miley Cyrus is having a problem with her digestive system. Use words like (1) Mouth, (2) Tongue, (3) Esophagus, (4) Stomach, (5) Small Intestine, (6) Large Intestine, (7) Anus (8) and the Digestive System

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Create a Stomach Lab

In the next few minutes, we will model the process of digestion and create a fake stomach. To do this model, you will need :

- 2 baggies
- cracker
- tablespoon of water
- shot glass size of orange juice

(1) First, placed the cracker into the baggie and started to mash it up with their fingers.

Note: This is like the "mouth" part of digestion.

(2) Then, add water.

Note: This shows how the saliva makes the cracker mushy enough for the tongue to push it back into the esophagus.

(3) Once it enters the stomach, acid interacts with the mush. Add the OJ.

Note: This shows you how enzymes and acid (hydrochloric acid) break food down.

(4) Use your hands to kneed the baggie
Note: The muscle action of the stomach is then shown by the kids "kneeding" the baggie. This is how food is pushed through the intestines and espophogus.

(5) After the food is soft, push it from one large
To simulate the transfer from the small to the large intestine, place the food in the small the baggie and all of its contents inside of a second large baggie. This will simulate the large intestine

Teacher Notes:
Next, we talked about how that all entered the small intestine and the nutrients were absorbed. To demonstrate *why* the small intestine is all smushed up, I took a long piece of construction paper. I told them to imagine it was the small intestine. We thought back to math and our discussions on surface area. It made sense to the kids that since the nutrients were passing over the small intestine, it would want the most surface area possible to grab the important food for the cells. I then accordion folded the construction paper to show how much smaller it would become by being folded altogether. In order to take up the same length as the orginal piece, I would need to use 3 more accordion folded strips. That is 3 times the surface area to pick up nutrients. The kids had this lightbulb moment right then and there!

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cracker
tablespoon of water
shot glass size of orange juice

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Explaining

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