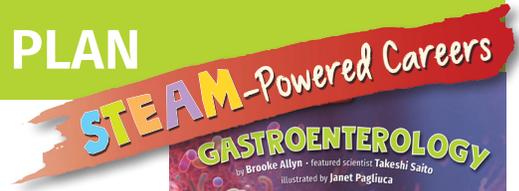


GASTROENTEROLOGY LESSON PLAN



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Subject / Grade Level: Gastroenterology / Lower elementary

Materials:

- ▶ bread slices
- ▶ bananas
- ▶ water
- ▶ orange juice
- ▶ spoons
- ▶ gloves
- ▶ scissors
- ▶ pipettes
- ▶ bowls
- ▶ pantyhose
- ▶ plastic bags
- ▶ funnels
- ▶ paper cups
- ▶ basins or aluminum pans

NGSS Essential Standards and Clarifying Objectives:

Standard: K-LS1-1: Use observations to describe patterns of what plants and animals (including humans) need to survive.

Science and Engineering Practice: Develop and/or use models to describe and/or predict phenomena.

Disciplinary Core Idea: LS1.C: Organization for Matter and Energy Flow in Organisms.

All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

Crosscutting Concept: Patterns

Lesson Objective:

- ▶ Students will be able to classify the parts of the digestive system as mechanical or chemical after simulating the digestive system by using the Digestion Experiment as a model.

Differentiation Strategies to Meet Diverse Learner Needs:

- ▶ Student groups can be arranged to create heterogeneous-ability groups.
- ▶ Students with low literacy can draw their engagement activity, while students with high literacy can include writing.
- ▶ All students are able to participate in the experiment, but students who are uncomfortable are able to observe their peers.

ENGAGEMENT

- ▶ Ask students: What do you think happens inside your body when you eat food?
- ▶ Have students create a drawing to represent their thoughts. Have 3 to 5 students share their ideas aloud with the class.

EXPLORATION

- ▶ Refer to the **Digestion Experiment Steps** to run the experiment. Try to have volunteers in the classroom when doing this activity to manage the student groups.
- ▶ Watch the video instructions for the experiment (digestive system demo):
<https://www.youtube.com/watch?v=Qsa2auNfc34>



Ask Students:

- ▶ How do you think this experiment represents what is happening in your body?
- ▶ What is happening to the food when you mash it?
- ▶ What happens when you add liquid?

EXPLANATION

- ▶ Ask students the following questions. Discuss these questions in their small groups or with the class as a whole.
 - ▶ At different stages of the experiment: What part of the digestive system does this represent? The mouth? Esophagus? Stomach? Small and large intestines? Anus?
 - ▶ What parts of the experiment represent chemical digestion? What parts represent mechanical digestion?
 - ▶ What does the end product represent?
 - ▶ In the experiment, liquid leaves the pantyhose. In our body, where does that liquid go? What is that liquid used for?

ELABORATION

- ▶ Ask students how this knowledge is applied to life.
 - ▶ Students may respond that everybody eats and this is how human bodies digest food. This could segue into the importance of eating healthy food that is full of nutrients for the body.

Vocabulary:

- ▶ **digestion** (chemical and mechanical): the breaking down of food to be turned into nutrients and energy for the human body—chemical digestion happens when the stomach acid, bacteria, and enzymes break down food; mechanical digestion is when food is smashed into tiny pieces as the organs move
- ▶ **esophagus:** a long tube in the throat that connects the mouth to the stomach; when food travels to the stomach, the esophagus squishes it into smaller pieces
- ▶ **gastrointestinal organs:** the organs in the body involved in digestion, including the mouth, esophagus, stomach, small intestine, large intestine, and anus
- ▶ **nutrients:** substances that living things need to live and grow
- ▶ **saliva:** the liquid in the mouth that helps break down food and makes it easier to swallow
- ▶ **stomach acid:** a liquid in the stomach that is full of good bacteria and enzymes that help break down food during digestion

EVALUATION

- ▶ Have students take a piece of paper and create a T-chart. Label one side Mechanical Digestion and the other side Chemical Digestion.
- ▶ Write the following words on the board or another place where students can see the word list. Scramble the words; the following list is also the answer key.

Mechanical Digestion	Chemical Digestion
teeth esophagus squishing stomach squishing intestine squishing	saliva stomach acid

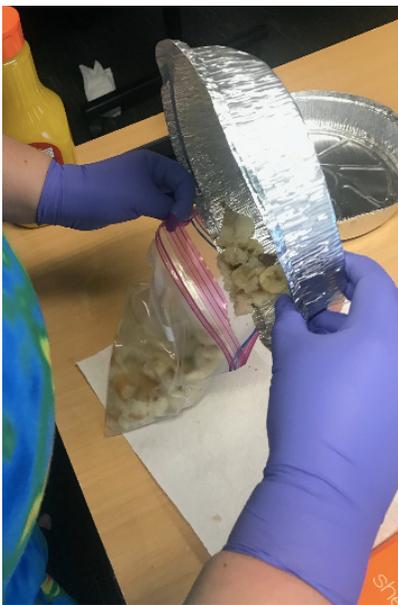
Digestion Experiment Steps

Step 1: Pass out a bowl, a banana, a slice of bread, and paper towels to each group of **4 to 5 students**. The bowl will represent the mouth. Have a TA assist each group of students.

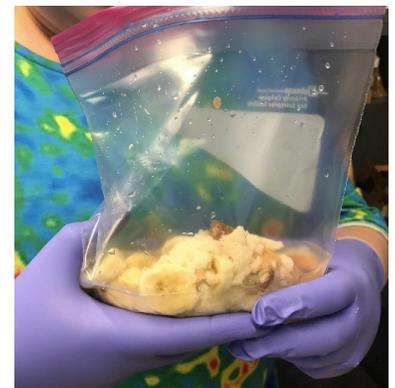


Step 2: Tell students, “We are going to pretend to eat some bread and bananas today.” Ask students, “What are the two main things in our mouth that help us break down the food?” Answer: Teeth and saliva. Tell students, “Use the scissors to cut the banana and bread into pieces. This will model how teeth break down food in your mouth.” If scissors are used, the TA should assist. Put on some gloves for these next parts because things are going to get messy!

Step 3: Give the students half a cup of water. Have them use a pipette to add water to the bowl containing the cut-up banana and bread pieces. The water represents the spit or saliva in the mouth.



Step 4: Take chunks of the bread/ banana/water concoction and put them into a plastic bag for each group of students. Tell students that the motion of moving these food items into the bag with your hand simulates the esophagus, and now the plastic bag simulates the stomach.



Step 5: Add half a cup of orange juice to the plastic bag. The stomach is filled with stomach acid that continues to break down the food. Act as the stomach muscles and smush the orange juice and the food mush together.





Step 6: Tell students, “When your food is done in the stomach, it is now time to move it to the intestines.”

a. Cut corner of the “stomach” bag.

b. Move the food mush from the plastic bag into the pantyhose using a funnel. Use a spoon to help the mush get through the funnel. At this point the pantyhose will simulate the intestines.



Step 7: Tell students to move the food from one end of the pantyhose to the other.
WARNING: This gets messy! Catch the liquid that drains out in a basin or aluminum pan.



Step 8: Once the food has moved all the way through, find another basin and have the students use the end of the pantyhose to “poop” the somewhat-dry mash into a clean aluminum bowl “toilet.”

