Lesson 2: Digestive System
How Food Is Broken Down
Level 1 Confirmation Inquiry

Grade Level: This lesson is designed for a 5th grade science classroom.

Science Concept: This lesson is focused on helping students understand how food is broken down as it passes through different organs in the digestive system, specifically looking at how snakes and humans digest food. This lesson expands upon the concepts taught in Lesson 1: Snake Digestive System.

Relationship to California Science Content Standards:
2c. Students know the sequential steps of digestion and the roles of teeth and the mouth, esophagus, stomach, small intestine, large intestine, and colon in the function of the digestive system.

Learning Objectives:
1. Students will illustrate and describe how food is broken down as it passes through a snake’s digestive system.

Evaluation Ideas:
1. formative: Teacher will evaluate student’s worksheets on the role of each digestive organ in breaking down food.

2. summative: Students will compose a comic strip that illustrates the journey through a snake’s digestive system and describes each digestive organ’s function.

Conceptual Background:
Large and small intestines are shorter than in other animals and food that goes undigested is simple expelled. Interestingly snakes lack a bladder. Waste is filtered through the kidneys and is excreted as a white, crystalline material that contains very little water, helping to conserve moisture.

Animals often have digestive systems that are adapted for the particular type of food or feeding behavior of the animal. A snake’s digestive system consists of the mouth, esophagus, stomach, small intestine, large intestine, kidneys. As the snake swallows its prey, glands in the snake’s mouth secrete digestive juices. Unlike mammals, the snake’s esophagus has very little muscle, so the snake must rely on movement of the entire body to transport the food through the esophagus to the stomach. Once the food goes
Into the stomach, pressure from squeezing muscles and special juices start to break down the food. The digestive juices in a snake’s stomach are extremely powerful and almost all of the prey is digested – even the bones and teeth. When the food is a pulpy mass, the stomach’s muscles push it into the small intestine. In the small intestine, more juices continue to break down the food to extract nutrients – proteins, carbohydrates, fats, minerals, and vitamins – to be used by the snake’s body. These nutrients are absorbed through the walls of the small intestine and flow into the snake’s bloodstream, which is then transferred to all parts of the snake’s body. Since a snake consumes a whole prey, it can survive by eating only once every couple of weeks. Instead, the snake’s body stores fat from the prey to be broken down as needed. Afterwards, the parts of the food that were not absorbed, i.e. waste, are collected in the large intestine, where water is removed and returned to the body. Kidneys also filter waste from the blood and reabsorb water back into the snake’s system. Any food that is still undigested is expelled as waste. Interestingly, snakes do not have a bladder to store waste before it is expelled, so all the waste is disposed through the cloaca.

Other organs in the digestive system include the liver, gall bladder, and pancreas. The liver is the largest internal organ in a snake and lies between the heart and stomach. One of the liver’s major functions is to produce bile, a digestive enzyme. The bile is stored in the gall bladder, which is located near the posterior tip of the liver and can be released into the small intestine when needed. The pancreas also secretes digestive enzymes into the small intestine and produces hormones that regulate blood sugar.

Materials:
1. Role of Digestive Organs Worksheet
2. Coloring utensils

Lesson Implementation Plan: This lesson will be implemented as a Level 1 inquiry activity. Students will confirm how food is broken down as it passes through a snake’s digestive system.

Engage – I will show the class a picture of a snake swallowing food and ask: “The snake’s food is larger than its body. What do you think happens to the food as it travels through the snake’s body?” Students will discuss their predictions in Think Pair Share.
Explore – I will share that both humans and snakes have digestive systems to help break down the food that we eat. I will ask students to brainstorm how our bodies break down foods and what food is broken down into (i.e. nutrients, water, waste).

Explain – I will then describe the path of food through a snake’s digestive system and explain how the food is broken down and absorbed at each stage. Students will take notes in the Role of Digestive Organs Worksheet as I describe the role and function of each digestive organ.
Elaborate – Students will plan out their comic strip by sketching a flowchart or creating a storyboard.

Evaluate –
  a. summative – Students will compose a comic strip that illustrates the journey through a snake’s digestive system and describes each digestive organ’s function.

  b. formative – Teacher will evaluate student’s worksheet on the role of each digestive organ in breaking down food.

**Differentiation Plans:**

Behavioral for Student A
  If a student is too active, I will allow him to color the snake diagram in the worksheet.

Cognitive for Student B
  If a student has a hard time keeping up, I will provide him with a scaffolded worksheet that is a partially filled in with information.

Cognitive for Student C
  If a student is ahead, I will ask him to research a human’s digestive system and compare and contrast the two.
Affective for Student D
If a student doesn't want to participate, I will allow him to color the snake diagram in the worksheet.

Language Demands for Students E, F, G
Beginner: When explaining the snake’s digestion, provide visuals of the snake's digestive organs. Use visuals, gestures, and sounds to scaffold phrases such as “break down” or “pass through.”

Intermediate: Provide sentence frames for student to describe the path of food as it travels through a snake’s digestive system. “First, the food travels to the ______. Next, the food travels through ______. Then...Afterwards...Finally, the food arrives in the ______.”

Advanced: Use complete sentences to retell teacher’s description of the path of food through a snake’s digestive system and explanation of how the food is broken down and absorbed at each stage.

References

