Potential Integration:
ELA; Math

Health
5.PCH.4.1 Summarize the functions of the organs which make up the digestive system.

Materials Needed:

Appendix 1a, b – Measuring the Digestive System
Metersticks, yardsticks
Scissors
Kidshealth video, How the Digestive System Works (5:00)
https://kidshealth.org/en/kids/dsmovie.html#catmovies
5 different colors of yarn (blue, red, green, yellow, purple)
Appendix 2 – copies of Nutrient Crossword
Appendix 3 – copies of Digestive System Diagram
Appendix 4 – copies of Digestive System Match (cut apart in envelopes), a set per three students

Focus:

Option 1
Ask these questions (and write responses on the board for later) to set up the activity:

- How long is a person's digestive system?
- Which organ is the longest? (mouth, esophagus, small intestine, large intestine)
- How long does it take for food to move through the digestive system?

Follow directions in Appendix 1a, b.
Ask how close were the estimates for the length of the digestive system?

Option 2
Students should have learned the nutrients in a previous grade level. To review the importance of good nutrition and therefore the significance of the digestive system, have students complete the Nutrient Crossword. Provide a copy of Appendix 2 to each pair of students. Give them 10 minutes to work together to fill out the crossword. Then go over the correct responses:

1. Regulate chemical reactions in the body (such as fluids), builds bones and teeth: **minerals**
2. Makes up blood, helps with waste removal, cannot live without it: **water**
3. Provides energy and helps body use vitamins and stay warm: **fats**
4. Essential for normal growth and activity of the body: **vitamins**
5. Needed for growth and for building, repairing, and maintaining body tissues: **proteins**
6. Main source of energy for the body: **carbohydrates**

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Statement of Objectives:

If it were not for the process of digestion, we could not use food for good health and to maintain life. By the end of the lesson, you will be able to list and describe all the parts of the digestive system and how they function.

Teacher Input:

Play the Kidshealth video, How the Digestive System Works (5:00)
https://kidshealth.org/en/kids/dsmovie.html#catmovies
Ask students for any questions.

Give each student a copy of Appendix 3, Digestive System Diagram. Tell them to use a red or other bright color pen to draw arrows to follow the path of digestion. Say, The digestive system breaks down food so the nutrients can be used by the body. It also allows absorption and eliminates waste. This is how all humans get energy, grow, have healthy body functions, prevent diseases, and stay alive.

Obviously, digestion begins in the mouth as we chew food and moisten it with saliva. When we swallow, the epiglottis closes to prevent food or liquid from going down the windpipe (trachea) and into the respiratory system. Chewed food travels through the pharynx and esophagus to reach the stomach, where digestive juices are added.

The stomach is lined with mucous to prevent the acids in the stomach from hurting the lining. Food stays in the stomach about four hours before the muscles force the food into the smaller intestine. The small intestine is about 21 feet long and is lined with villi (small folds in the lining which increase the surface and allow more food to be absorbed. Bile flows into the small intestine from liver to help break down fats. Also close by is the gallbladder which stores bile.

The pancreas is a gland that makes insulin and digestive enzymes. These enzymes break down proteins, starches, and fats in the small intestines.

The food that is not absorbed from the small intestines moves into the large intestine. This undigested food becomes solid waste to be eliminated from the body. It moves into the rectum, a tube at the lower end of the large intestine, then through the opening called the anus. It is important to eat sufficient fiber, get sufficient exercise, and drink adequate liquids to help this process function as it should.

Ask students to quietly study the diagram for a few minutes to prepare for an activity to assess how well they understood the parts and their functions.

Assessment:

Make sets of strips from Appendix 4 and place in envelopes. Keep one copy as the Teacher Key. Arrange students in groups of three and give each group an envelope with the cut-apart strips with organs and functions of the digestive system.

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The instructions are to sequence vertically the parts beginning with the tongue and ending with the anus. Then they are to match the definitions (purpose or function). When completed, read the correct responses so students can doublecheck their work.

Closure:

Digestion is a pretty interesting and important function for all humans. Imagine a crunchy potato chip or juicy tomato. Our bodies are able to change those foods into chemicals that provide all that is needed to nourish every cell and organ.

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Measuring the Digestive System

Background:
The digestive system is a series of organs that work together to change food so that it can be used by the body. You will be surprised at how long the digestive system is. It fits inside, because some sections are folded up. In this activity, you will create a "model" of the digestive system by measuring, cutting, and tying together yarn to represent different parts of the system.

You will work in two groups, one measuring using the metric system (in centimeters) and one using the ___ system (using feet and inches). Then we will convert our findings before comparing results.

Directions:
__1) Digestion begins in the **mouth**, so measure and cut a piece of red yarn from the front to the back of the mouth. (You can do this by stretching the yarn from the front of your lips to the back of your jaw along your cheek).

__2) Group 1 record this length in centimeters (cm) and Group 2 record this in inches in the data table on the next page.

__3) The **esophagus** is a tube that connects the mouth and stomach. Measure & cut a piece of blue yarn the length of the esophagus. (Measure from your mouth to just below your rib cage). Tie the blue esophagus to the red mouth.

__4) Group 1 record the length of this blue string in centimeters (cm) and Group 2 record this in inches in the data table on the next page.

__5) In the **stomach**, gastric juices break down solid food into a liquid. Find the length of the stomach by spreading the fingers of your hand and measuring the span from the thumb to the little finger. Measure and cut a piece of green yarn to match this length. Tie the green stomach to the blue esophagus.

__6) Group 1 is to record the length of the green string in centimeters (cm) and Group 2 is to record in inches in the data table on the next page.

__7) The **small intestine** is the longest part of the digestive system. It is folded up inside of you so it fits. Food is further digested and absorbed here. Measure your heights and multiply it by four. Use yellow yarn to represent the length of the small intestine. Tie the yellow small intestine to the green stomach.

__8) Record the length of this yellow string in centimeters (Group 1) and in feet/inches (Group 2) in the data table on page two.

__9) Last is the **large intestine**. It is much wider than the small intestine but much shorter. It is about as tall as you are. Undigested material form the small intestine moves to the large intestine before it leaves your body. Use purple yarn to represent the length of your large intestine. Then tie the purple large intestine to the yellow small intestine.

__10) Group 1 record the length of this purple string in centimeters (cm) and Group 2 record this in inches in the data table on page two.

__11) Label each segment of your digestive system model with masking tape like your teacher showed you.

DIGESTIVE ORGAN	LENGTH (CM or feet/inches)
Mouth	
Esophagus	
Stomach	
Small Intestine	
Large Intestine	

Follow-up Questions:

1) What is the TOTAL LENGTH of your digestive system?
   _____ cm or feet/inches
2) Group 1: convert the total centimeters to feet/inches. Group 2: convert the total feet/inches to centimeters. Then groups will compare their totals. Are they similar? What might account for a difference?

_____

_____

3) Why do you think your digestive system is so long?

_____

_____

_____

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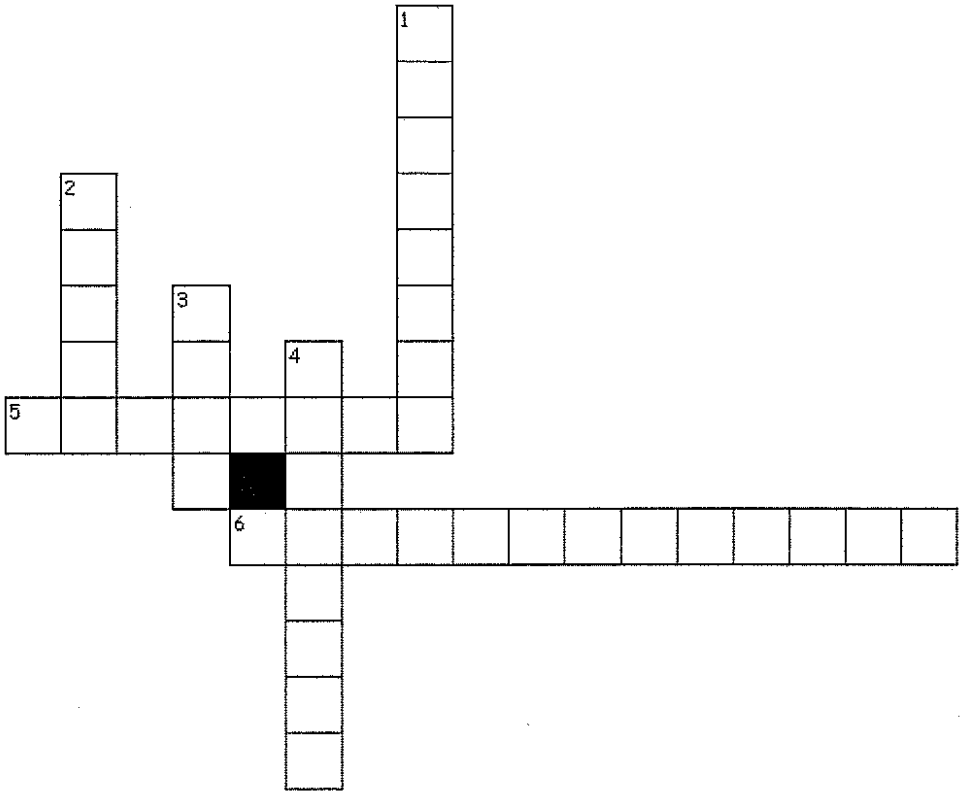
Nutrient Crossword



Across
5. Needed for growth and for building, repairing, and maintaining body tissues
6. Main source of energy for the body

Down
1. Regulate chemical reactions in the body (such as fluids), builds bones and teeth
2. Makes up blood, helps with waste removal, cannot live without it
3. Provide energy and help body use vitamins and stay warm
4. Essential for normal growth and activity of the body

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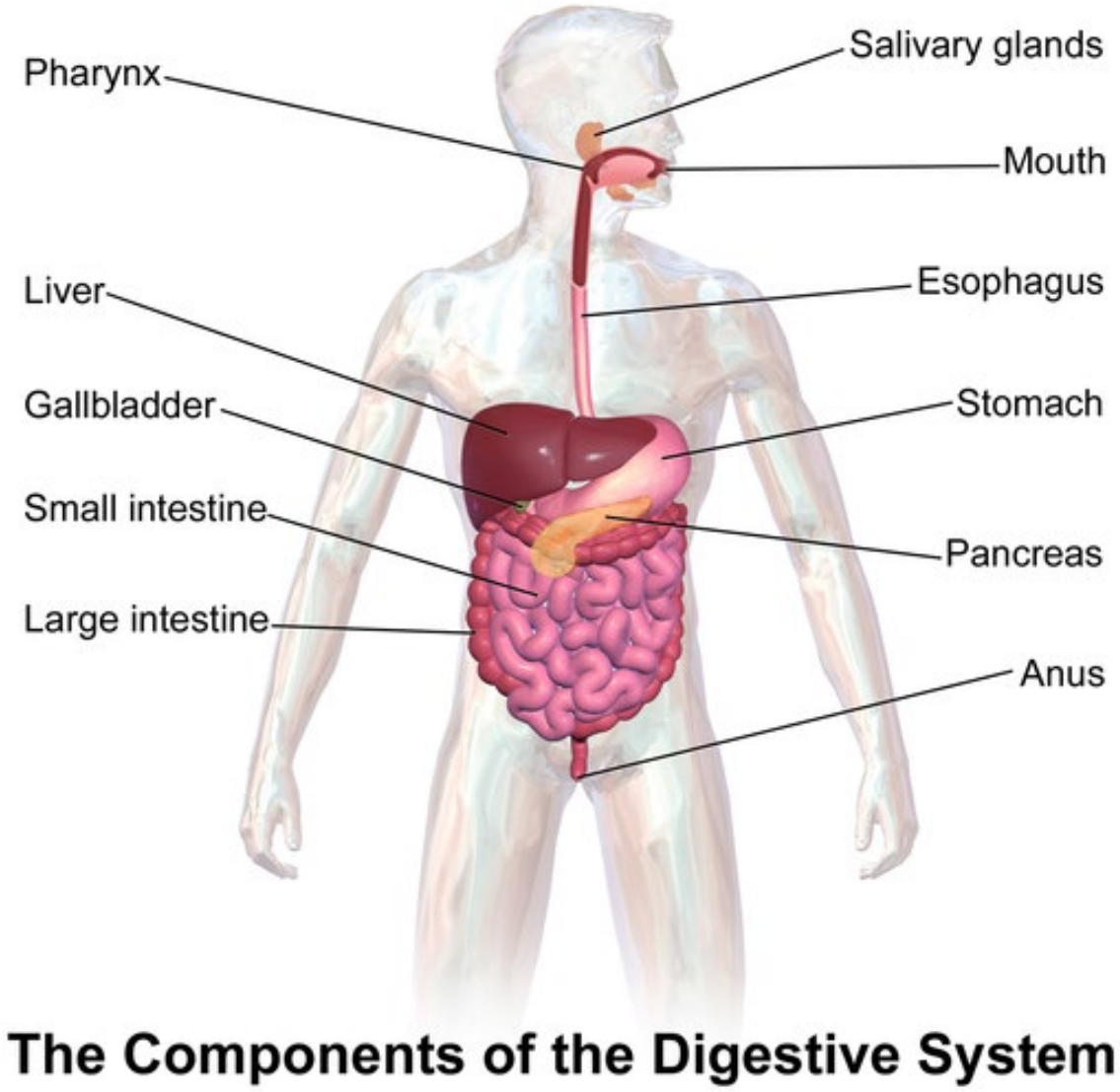
https://commons.wikimedia.org/wiki/File:Blausen_0316_DigestiveSystem.png



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Digestive System Match

Tongue	Moves food around in the mouth to aid in chewing
Salivary Glands	Release saliva to moisten and break down food in the mouth
Pharynx	Throat: leads from mouth to esophagus
Epiglottis	Covers the entrance to the trachea when a person swallows food or beverage
Esophagus	Tube connecting the mouth to the stomach
Stomach	Organ that releases acids and juices that mix with food for digestion
Liver	Gland that releases bile to help break down fats, maintain blood sugar level, and filter wastes
Gallbladder	Organ that stores bile
Pancreas	Gland that produces digestive juices and insulin
Small Intestine	Coiled tube where the greatest amount of digestion and absorption takes place
Large Intestine	Tube that extends from small intestine where undigested food is prepared for elimination from the body
Appendix	Although associated with the digestive system, does not seem to have a function
Rectum	Short tube at the end of the large intestine; stores waste temporarily
Anus	Opening to the outside of the body from the rectum