Title: The Digestive System

Introduction:

This lesson has students investigate the digestive system through a series of hands on activities and internet exploration.

Learning Outcomes:

The students will name the sequence of digestion in reference to the mouth, esophagus, stomach, small intestine, and large intestine by labeling the body parts in the order the activity was demonstrated.

The student will research and report on how the body's digestive system works to break down food physically and chemically, absorb nutrients from the food, and finally eliminate indigestible material.

The student will be able to attribute the function of each part of the digestive system to the actual organs: mouth, esophagus, stomach, small intestine, and large intestine after carrying out the digestive process with a model.

Curriculum Alignment:

Fifth Grade Science Essential Standards

5.L.1 Understand how structures and systems of organisms (to include the human body) perform functions necessary for life.

5.L.1.2 Compare the major systems of the human body (digestive, respiratory, circulatory, muscular, skeletal, and cardiovascular) in terms of their functions necessary for life.

Fifth Grade Reading Common Core

Informational Text (Craft and Structure)

Determine the meaning of general academic and domain-specific words and phrases in a text

relevant to a grade 5 topic or subject area.

Fifth Grade Informational and Technology Essential Standards

5.IN.1 Analyze appropriate strategies when reading for enjoyment and for information.

5.TT.1 Use technology tools and skills to reinforce and extend classroom concepts and activities.

National Science Standards (5-8)

Standard A : Science as Inquiry : Students develop abilities necessary to do scientific inquiry. Students develop understandings about scientific inquiry.

Classroom Time Required:

This lesson will take two 45/50 minute sessions.

Teacher Preparation:

Day One: The teacher will need to gather all materials listed for day one and have copies of the I Notice/ I wonder worksheet and the worksheet with a picture of a child with their digestive system showing. (slides 3 and 4 from ***Interactive Digestive System***) Some food in this activity may need refrigeration, so please take that into consideration.

Day Two: The teacher will need to have access to a laptop for pairs of students, or schedule time in a computer lab for students to access the Smart Notebook files. In addition, the students will need internet access to complete the internet research necessary.

Before using the entire unit, the teacher should make sure the links for Day 2 of each lesson are still active and working. The links are located in the Smart lesson and are indicated on each slide. Please check by clicking on the noted area and see if you are redirected to the correct website. If by some chance, a link does not work- changes would need to be made to match the questions on the worksheet.

Materials Needed:

(All worksheets mentioned are included with the lesson.)

Day 1:

For exploration of digestive system: (for each child)

1 small piece of bread	1 small cracker	Napkin
1 small piece of apple	1 small piece of cheese	

**Note- It is ok to change the food items as long as consideration is given to having a variety of items. Pick some items that begin breaking down in the mouth and others that need to be chewed and moved before noticeable digestion takes place. Also, try to be consistent in the sizes of the items, making them small enough to sit comfortably on a child's tongue without gagging them. ☺ If you change the foods, you will need to adjust the I Notice/I Wonder chart, or have students make their own.

For Move that Apple activity: Materials are for two groups of about 10 students each.

<u>Each group of students needs</u>:

Enough sticky labels for all students to wear: pre-label them as mouth, esophagus, stomach, small intestine, large intestine

2 Ziploc bags (for double bagging the apples)

2 apples peeled and chopped into consistent size pieces, then placed in the Ziploc. (double bag before activity)

1 water mister

2 small (4-6 oz) cups the same size (one for each group) with equal amounts of water inside (models saliva)

1 meat tenderizing mallet (models teeth)

1 plastic tube approximately 5 inches long with the diameter the size of a quarter (models esophagus)

1 plastic tube approximately 11 feet long with a diameter of about 1.5 -2 inches (models small intestine)

1 plastic tube approximately 2.5 feet long with a diameter of about 3-4 inches (models large intestine)

1 blender (I used a Magic Bullet style blender.)

1 small bucket to catch the apple/water/mush that comes out of the last tube

(All of the tubing can be found in the plumbing section of any home improvement store.)

For introduction of content vocabulary: (for groups of two)

1 set of body parts from the digestive system, 1 set of function cards to match with body parts

Day 2:

Laptops or computer lab access

Smart Notebook Lesson ***"Is There a Doctor in the House?"***

Internet access

Worksheet for recording notes from internet exploration (***Digestive System Internet Research Questions***)

Technology Resources

For Day 1 of the lesson, the teacher will need a Smart board to display slides for discussion and directions.

For Day 2 of the lesson, the students will need to either be able to use a laptop individually, with a partner, or have access to a computer lab. Students need to have Smart Notebook 10 software on the computers they are accessing, because the lesson ***("Is There a Doctor in the House Digestive?")*** is a Smart interactive lesson.

Pre-Activities for Students:

****This lesson is one of five human body lessons, and the "prior knowledge" activity could be used before any of the systems were taught. There is not a particular order for the systems to be taught, so the Circle Map would be done at the beginning of the Human Body Unit of study, before the FIRST**

system. It is not necessary to repeat this before each system, but students could be encouraged to add to their maps as part of the closing each day, then additions could be discussed prior to the start of each new system.

Prior Knowledge: Students should be introduced to the concept of the human body as many different parts that work together. Creating a Circle Map (slide one of the ***Interactive Digestive System*** Slides) to assess what students already know about the human body would be a great pre-lesson activity. This allows the teacher to be aware of what concepts, vocabulary, and possible misconceptions students may have before starting the unit.

Day 1: Before starting the lesson, use the Smart Notebook ***(Interactive Digestive System***- attached) slide to start a discussion about where food goes and ask students where they think their breakfast/ and or lunch may be in their bodies. This will lead to some funny comments and students may get a good laugh out of where they think their food is, but it will make them stop and think. The purpose of this activity is for students to become curious about their digestive systems and become interested in learning the content.

Students do not need to have any specific knowledge of the digestive system prior to this lesson. The discussion previously mentioned will help bring awareness to the concept that food moves through our bodies, but specifics are not important yet.

Activities

Day 1: Exploration and Building a Model System

1. The teacher will distribute the food items to students and provide each child with an- I Notice/I Wonder worksheet and the image of the child with their digestive system showing copied on the back (slides 3 and 4 from ***Interactive Digestive System***). During the investigation, the teacher will guide students to place a particular food item in their mouth and record what they notice and wonder. Each item will stay in their mouth for about 2 min. Go through each food item in the same manner. Allow students to share with the class or in groups what happened in each time. Have them point out similarities and differences between how food "behaved" in the mouth. "What happened to the food after you placed it in your mouth?" (was wet, got soft and soggy, was mushy, tasted _____, started to crumble, etc. *Encourage them to pay close attention to all changes taking place.) "Do you notice anything similar or different in how the (name a food) acted in your mouth compared to the (name a food)?" (the apple didn't get mushy, the cheese tasted funny, the cracker was salty and got sweet)
2. Take students back to the pre-activity questions and show them the worksheet with the body and the digestive system. Have them answer the questions on the worksheet and color or draw an arrow to where they think each item from the exploration is located now. Give time for students to come to the board and draw lines and share where they think the food is and why they think that. (Some students may focus on how food exits the body ☺, but accept their answers and make them support why they think their food would travel that quickly by asking, "What makes you think that is where the food is? If so, then where is your lunch from earlier

today (or breakfast)? Is all of it in the same place? Does anyone have a different idea about where the food is?"

3. Using Smart board lesson ***(Interactive Digestive System***), post the Learning Objectives for today's lesson. Share these with students telling them they will model each organ and its function with their activity today.
4. Tell students that we are going to divide into two groups and play a game called, "Move That Apple". Divide your students between the materials so that each person knows which piece they are working with in the obstacle course. Using the step by step guide have students move their apple through the obstacle course.

Step One: Use the mallet to mash the apple into very small bits. Mash using the mallet for around 5 minutes. Demonstrate a reasonable force for students to use. It needs to be enough force to break the apple into very small pieces.

Step Two: Push the apple through the small funnel, into the smallest tube. You may use a little water from the cup to get it through if necessary. If students decide to use water, have them move to the blender section so the apple and water can go directly into the blender's container. The apple will be going to the blender next.

Step 3: If you haven't already, pour the apple through tube 1 into the blender. Pulse apple in the blender for a count of five and repeat three more times.

Step 4: Pour the apple from the blender into the longest skinny tube. Work with your partners to get the apple through the tube. Squeeze and move the tube as necessary to get it through to the next tube. Have a student stand at the end of the tube prepared to lift it up, so that the apple matter doesn't just run out onto the floor.

Step 5: Pour the apple from the long skinny tube into the shorter, fatter tube. Push the apple through the tube. Squeeze and move as necessary to get it through and out into the bucket.

Compare the results from both groups to determine a "winner". The group with the most apple mush wins.

5. Show Smart slide with the digestive system organs labeled and the functions explained. Go through and read each function, telling students that each of them played a role in the game as one of these organs. After going through all of them, give each student a name tag that states which organ they acted out and have them go back and stand in that location. Have teams compare and discuss their decisions. Correct any errors before wrapping up.

Guided Practice

Day Two:

Orally review key functions of the body parts using slides and images from day one and distribute handouts for the web quest. Tell students that we have a patient today that is suffering from digestive issues and that it is up to us to learn more about each organ's function within the system. As her "doctor" they will need to correctly diagnose and treat her so she can continue to live a healthy life. Show students the ***"Is There a Doctor in the House Digestive?"*** Smart lesson. Tell students they are going to be "visiting" Patient 3 today and diagnosing his problem.

*At this point, have students move to computers in a lab or laptops and view the Smart lesson. Guide students to click on Patient 4 and read the patients chart. Following the directions under the chart, students will click on each of the body parts, using the text to answer the questions on the worksheet. They will continue through the worksheet clicking on the links, reading, and answering questions.

*Students will need guidance doing this if they have never done it before. It is beneficial to instruct them to read the worksheet questions before going to each link. Also, explain to them that they should read the screen in order to locate the answers properly. As students finish, the teacher should start a discussion about what the patient's problem might have been and what the proper diagnosis and treatment would be.

*Students will need guidance doing this if they have never done it before. It is beneficial to instruct them to read the worksheet questions before going to each link. Also, explain to them that they should read the screen looking for key words from the questions in order to locate the answers properly.

As students finish, the teacher should start a discussion about what the patient's problem might have been and what the proper diagnosis and treatment would be. For example, "What were some of Bobby's problems?" (in a hotdog eating contest, stomach ache) "How could you tell this was a problem with his digestive system?" (his stomach hurt) "Did anyone think Bobby's problem involved another system of the body before you started?" (students may have thought it was a problem with another part of his body) The purpose of this discussion and activity is not to have students accurately diagnose the patient necessarily, but to hypothesize and have a purpose to learn more about each organ in the digestive system. Do not be discouraged if students initially hypothesize another system- but rather, let their mistake move their thoughts toward how the systems of the body are interconnected and specialized at the same time.

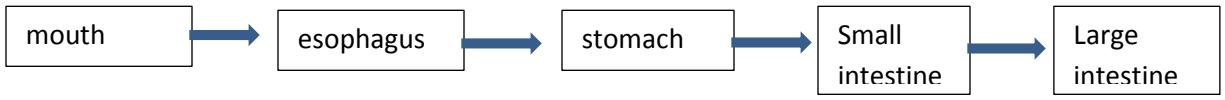
**Remember that this activity is to give them a real life application of their learning, and to give a reason to learn more about each part of the system you are focusing on today- NOT to make a perfect diagnosis. (Accept any diagnosis related to digestion, as long as students support their thinking. Ex: indigestion, diarrhea, constipation, etc.) Some treatment advice would be examples of eating healthy, fiber-rich foods, washing hands to prevent infections, and not overeating.

Assessment:

As an informal, formative assessment, students could add to their circle map from before the lesson began to show knowledge gained from the lesson. I suggest students add learned information in a different color from the prior knowledge so they can see what they are adding to the circle map.

Formative assessments can be the students writing and recording on the I Notice/I Wonder charts, digestive diagrams, from their model system activity as well as their answers to the questions from the web quest.

Students will place events in order on a flow chart identifying the sequence of digestion. Organs and processes should be included. This is an example containing the organs only. For students with written language disabilities or need to manipulate things, print out the organs and functions, and have students place them in order accurately.



Modifications:

Modifications: This lesson provides a large variety of activities appropriate for meeting the needs of multiple learning styles.

Day One:

Slides from the Notebook lesson could be printed and provided to students for support and reference . This is beneficial if students have disabilities in written language.

The class could do this activity together, with the teacher calling on volunteers to come and act out the digestive system.

Special modifications are also mentioned with assessments.

Day Two:

Some of the websites will read the text on each page aloud to students. If students need or want this modification, please provide headphones on the computer they will be working on. Students with reading disabilities will benefit from this modification because it will allow them to read the content without misunderstanding key terms from the articles. *Students that are auditory learners would benefit from this as well.

Students may work with a partner to fill out the worksheet either dividing up the questions or sections or sharing results. This will help support students with reading and or writing disabilities by reducing the amount of required reading and writing, but still providing them with opportunities to read, write, and acquire all of the content. These students also benefit from discussing content with peers.

Early finishers should move to the additional activities noted on the Smart Slides. There is an additional video and extension activities appropriate for all levels.

Students that are gifted should be challenged to create an additional patient with different problems and their specific solutions, involving the digestive system and share these with the class.

Alternative Assessments:

If the teacher had a model or poster of the digestive system, he/ she could have students move their sticky notes to the model and discuss.

A Jigsaw method could be used to share Day 2's questions with groups of 4 students assigned a link to go to and answer questions about. Students then come together with other students having the same link and share answers. Students then return to their original group and all share answers with one another to complete the worksheet.

Supplemental Information:

You may want to have students analyze their food intake for the past two days and determine what habits they have had that could be beneficial and/or detrimental to their digestive systems.

Critical Vocabulary:

Mouth: This is where digestion begins. Enzymes released here start the process.

Esophagus: This is the tube that moves food from the back of the mouth to the stomach.

Stomach: This is place where food is broken down into a pulpy liquid. It is a very acidic

Small Intestine: The long tube is where the food mixture is broken down even more so your body can absorb all the vitamins, minerals, proteins, carbohydrates, and fats.

Large Intestine: The fatter, shorter tube is where the food mixture is broken down even more, moisture is removed, and anything your body does not need passes through.

Websites:

http://www.gesa.org.au/content.asp?id=96

http://kidshealth.org/kid/htbw/digestive_system.html#

http://kidshealth.org/kid/ill_injure/aches/abdominal_pain.html?tracking=K_RelatedArticle#

http://www.uen.org/utahlink/tours/tourFames.cgi?tour_id=13125

http://kidshealth.org/PageManager.jsp?lic=1&article_set=29673&ps=110

http://www.harcourtschool.com/activity/digest/index.htm

Comments:

As students diagnose and treat the patient, it is not about that being a perfect process. The real purpose of the activity is to expose students to more informational text about each organ and provide them with an "authentic" reason to research.

Day One's activity can be messy and it may be necessary to do this on tile since spilling is a concern.

Author Info:

Tracy Pendry is a fifth grade teacher at Shoals Elementary School in Pinnacle, NC. She is a National Board Certified Teacher and has a master's degree in Educational Technology. Tracy loves teaching science as well as all other subjects daily. It gives her great pleasure to see students get excited and motivated to learn through the investigation process. She developed this lesson to spark students' interest in the body system as well as to help students' have a deeper understanding and visualization of what the digestive system does in the body. Finally, Tracy wanted students to see a personal connection to their own life as they try to diagnose and treat their patient.