

HELP! I SWALLOWED A WATERMELON SEED! OR... FOOD FOR THOUGHT: THE DIGESTIVE SYSTEM

Summary

Overview: This unit will invite students to take an action-packed journey filled with fascinating surprises as they discover the wonders of their very own digestive systems! Through the use of instructional video and hands-on interdisciplinary activities, students will have the opportunity to take a mock field trip through an animated digestive system. They will also be able to explore various functions of each organ in the digestive tract. This unit will conclude with students constructing a model or a 'map' of their own digestive system!

Time Frame

3 class periods of 45 minutes each

Group Size

Small Groups

Life Skills

Thinking & Reasoning, Communication

Materials

District/Regional Videos: Scholastic, The Magic School Bus: For Lunch
Materials: For the Class: TV/VCR watermelon (enough for one small piece per child) bag of carrot sticks (enough for one per student) variety of food samples ie; Twinkie, apple, applesauce, celery stick, 3 bananas [one for another activity ... see below 1, lettuce, licorice, watermelon seed, slice of bread, peanut butter, small box of raisins (reserve box of raisins for an additional activity), etc.) food processor or blender, one banana, strawberries (if in season), half quart cold milk, vanilla flavoring one package of very small bathroom paper cups
For Each Student: one 'Food For Thought Digest' Journal one or two gummi worms
For Each Cooperative Group) one envelope containing a 'Belly Builder' puzzle one 'Tummy Teasers' word scramble worksheet (enough for each student in each cooperative group:) scissors, crayons, markers, glue, transparent tape, craft sticks (12), 'Baggie', Pudding snack cup (any flavor), 9x12 sheet of waxed paper small bowl one cup of milk (school lunch milk would be perfect), medicine dropper, food coloring (a drop of each color), a small drop of liquid dish soap, 6 toothpicks one dry sponge, water, 5-6 raisins soft ball of clay (approximately 3-4' in diameter) small ball of string

Background for Teachers

Vocabulary: Digest To change food in the digestive tract into a form that can be easily absorbed by the body. Esophagus The tube from which food passes from the throat to the stomach. Intestine The lower portion of the digestive tract in which food passes from the stomach for further digestion Peristalsis Wavelike motion of the muscular wall of the digestive tract

Instructional Procedures

Viewing Activities: Start the video at the very beginning 'The Magic School Bus: For Lunch' where the little girl (Dorothy Ann) is saying, 'Arnold, that's brilliant!' Play through to the part where the other little girl with dark hair (Wanda) exclaims, 'It's the first step in digestion! Yeah, yeah we know, Dorothy Ann!'. Pause the video. Ask the students what the first step in digestion is. (Chewing) Have students turn to the first page of their 'Digests' (journals). Allow one minute for students to draw a picture of the

first step of digestion on the top of the page. (We'll refer to this as the 'Digestive Map'!) Remind students that this will begin the map of their worm's journey through the digestive system! Ask students to set a focus for this next segment of video by watching for a special picture in Wanda's and Arnold's classroom that resembles the digestive system! Resume the video and play through until Wanda 'dreamily' sighs, '...the ride of my dreams!'. Pause the video. Explain to the students that you are going to rewind the video just a little as they examine the 'ride of Wanda's' dream. (Action Mountain) Ask them to look closely at the ride to see what they think Action Mountain might resemble. (Model of the Digestive system) Rewind the video back just a little ways to the frame of the little girl's stopwatch. Mute the sound. Rewind and play back that very brief segment three or four times, until students begin recognizing the resemblance of Action Mountain to the Digestive System. (Chances are, no one will recognize the resemblance, due to the fact that the digestive system is just being introduced. In this case, ask the children to remember this short video segment and to be prepared to recall the picture of Action Mountain during a future activity.) Set a focus for viewing this next segment of video by asking students to keep an eye on the skeleton then be prepared to explain what the long, pink cord that the skeleton swallows is supposed to be! Resume the video and play through until the teacher (Ms. Frizzle) exclaims, 'As I always say, No guts ... No digestion!' Pause the video. Ask the students if they paid close attention to the 'pink matter' the skeleton just swallowed. Ask students to predict what they think the pink part (what Ms. Frizzle calls 'guts') of the digestive system is called and the role it might play in digestion. Discuss. Ask students to focus on the next segment of video by asking them to compare the poster that Wanda is pulling off the-wall with the poster underneath! Resume the video and play through to the segment where Wanda pulls the Action Mountain poster off the wall and sighs, 'Well ... That's the end of that!' Pause the video and again, ask students if they recognize what Action Mountain resembles now that Wanda has pulled the Action Mountain poster off the other poster of the digestive system! Discuss. Fast forward the video to the segment where Liz, the Lizard is on Arnold's head and they're waving 'Good-bye' to the busload of kids. Encourage students to focus on the next segment of video by asking, them to predict where they think the Magic School Bus will go, and what will happen once they get there! Ask students to turn to page three of their 'Digest' journals and to draw a sketch of where they think the bus is headed and/or how it will get there! (Allow about 30 seconds for this activity!). Resume the video and play through to the segment where the class all exclaims at once...'Arnold?!' Pause the video and fastforward just a little ways further to the segment where Arnold tosses an olive inside his mouth. As you are fast forwarding, explain to the students that they will now get a close-up view of the first step in the digestive system ... the mouth, teeth saliva, tongue. Ask students to focus on this next segment of video by being able to explain how teeth help in the first step of digestion. Resume the video. Play, through until Ms. Frizzle says, 'Never say 'Never', Phoebe!'. Ask students to write two important things on page three of their journals that teeth do to help in the first step of digestion. Activity: (1) Pass out a carrot stick to each student. Ask them to close their eyes and to concentrate on what happens to the carrot when they bite into it. Ask students to figure out which of their teeth are grinding the carrot, which are cutting, and which are tearing and shredding! Discuss their discoveries and compare/contrast student responses. (2) Hold up a variety of food items and ask students on page four of their 'Digests' to list each item as it is being held up then to write next to the food item what the teeth need to do to that item in order to help it get started on its way through the digestive tract. (Example: Orange ... crush and tear). *Suggested Food Items: Twinkie, apple, applesauce, slice of bread, celery stick, peanut butter, lettuce, licorice, watermelon seed, etc. Compare and contrast student responses. Set a focus for this next segment of video by explaining to the students that they are now going to be introduced to the next step in their worm's digestive journey. Ask students to be prepared to identify the next stage of the digestive journey their worm is about to take! Resume the video and play through until one of the students exclaims, 'Now that's what I call a 'belly flop!'' Pause the video. (While students are involved in the following activity, fast forward through segment where

Arnold is imagining he has broken the olive eating record. Continue fast forwarding just a little more until the frame with the boat and flag of 'Arnold' appear and a voice sings, 'Yo-ho-ho and a stomach of slop!'. Stop the video. Ask students what the second stage of the digestive process is. (swallowed food being pushed down the esophagus) Have students turn to the 'Digestive Map' on the first page in their journals and add an esophagus on to their 'mouth' sketch that they started at the beginning of this lesson. Ask students what role they think the esophagus has in the digestive process. Discuss.

Activity: Give each cooperative group a small, 'Baggie', one Snack Pudding cup, 5-6 craft sticks, and a 9x12 sheet of waxed paper.. Instruct students to cut (approximately 1 cm.) off one corner of their 'Baggie'. Each cooperative group should then spoon the contents of the pudding snack into their 'Baggie'. After each 'Baggie' has been filled with pudding, instruct students to take turns in their groups, trying to push the pudding out of the small hole in the 'Baggie' and onto the waxed paper! Explain to the students that the food we eat gets squeezed through the esophagus and into the stomach ... (this process is called 'peristalsis'...the involuntary movement of the esophagus pushing food down to the stomach). After cooperative groups have pushed out all the pudding onto the waxed paper, allow students to take a craft stick and to draw a picture with the pudding. (The Magic School Bus going from Arnold's mouth, down his esophagus, and into his stomach would make a fun 'pudding picture!'). Help students to focus on the next segment of video by asking them to be ready to explain what is eating the Magic School Bus as it floats around Arnold's stomach. Resume the video and play through until Ms. Frizzle exclaims, 'You haven't seen anything yet!' Pause the video. (While students are involved in the next two activities, Fast forward the video past the segment showing Arnold stuffing pens into his pocket and have it ready to start on the frame where Arnold's pocket protector has just exploded and video flashes next frame of the bus headed for a big, pink hole. (valve entering small intestine) Stop the video. Ask students what was eating the bus. (stomach acid) Help students recall the segment of video where they show a diagram (United Digestion and Stomach Central) of exactly what is happening to the food through the first through steps of digestion. Review the steps of digestion that help break down the food into liquid. Activity: Ask students to watch closely as you take a firm (peeled) banana and put it into a food processor, blender, or chopper. Ask students to predict what they think will happen to the banana once the appliance is turned on. Turn on appliance to slowest speed for approximately 5 seconds (just enough to chop the banana). Ask students what step in the digestive process this reminds them of. (crushing and grinding). Turn the appliance on again to a medium speed for approximately 5 seconds. Just enough to make the banana a 'paste-like' consistency. Ask students what step in the digestive process this reminds them of. (swallowed food being pushed down the esophagus) Now turn the appliance on to the highest speed possible, for 5-20 seconds until the banana has 'liquefied'. Ask students what part of the digestive process this reminds them of. (food being broken down into a liquid state inside the body. Add strawberries, milk, vanilla, and ice cubes (if possible), and blend into a tasty fruit shake. Give each student a small sample of the shake in a small bathroom paper cup. Enjoy! Experiment: Ask each cooperative group to pour their container of milk into a small bowl. Instruct each group to select one or two members to place one small drop of each color food coloring into the bowl of milk. Students should discuss their observations. Ask each group to select a volunteer to place a drop of dish soap into the bowl of milk and food coloring. Group members should then feel free to take a toothpick and explore the chemical change that is happening inside the bowl of milk. (Explanation): Due to surface tension, the food coloring adhered to the surface of the milk. The dish soap broke the surface tension and helped to dissolve the food coloring into the milk. Discuss the experiment with the students. Ask students how this experiment might remind them of the digestive processes going on inside the stomach. (Even though surface tension does not play a large role in the digestive process, through this small experiment, students will be able to have a better picture of how chemical changes inside the stomach help to dissolve food inside the stomach, preparing it to enter into the small intestine). Have students return to the first page in their 'Food For Thought Digest' journals and add a

stomach to their sketch of the digestive system map! Ask students to set a focus for the next segment of video by being prepared to explain what will happen to the food after it has been changed inside the walls of the stomach! Resume the video and play through until Ralphie exclaims..... what else is there left to do?' Pause the video and fast forward a little ways ahead to the frame where students are scuba diving around big, pink cactus-like plants (villi) *As you are fast forwarding, tell students that in a minute, they will see children scuba diving around funny-looking pink cactus-like plants. Ask them to be ready to tell their cooperative groups what these funny pink 'plants' are really called. Resume the video and play through to the segment where one of the students asks, 'Speaking of energy where's Wanda?'. Pause the video and fast forward to the frame where boys are looking at a map of the small intestine. Resume the video and play just a little further, until the frame of Wanda screaming and keeping her balance on top of the big, blue wad of Arnold's gum is shown and the kids are exclaiming, 'There she is!'. Stop the video. Ask students what the rubber, pink cactus-like plants inside the small intestine are really called. Discuss with students what the function of these villi inside the small intestines are. (absorb nutrients and deliver them into the blood stream to all the other parts of the body) Activity: Give each cooperative group a dry sponge. Ask one student from each cooperative group to empty and rinse out their bowl of milk/food coloring left over from the prior activity. After the bowl has been cleaned out, ask these students to fill their group's bowl with a half cup of water. (While bowls are being prepared, ask the rest of the class to hypothesize what they think they will be doing with a bowl of water and a sponge.). When the bowls of water have been returned to the cooperative groups, instruct students to place their dry sponge into the bowl and to observe what is happening. Discuss. (Ask students to wring their water-soaked spon-es back into the bowl to use for another activity). Encourage students to compare/contrast their sponge observations with the function of the villi in the small intestines! Discuss. Activity: Give each cooperative group a soft ball of clay and a ball of string. Each group can divide the clay into equal parts so that each student will be able to have his/her own piece to work with. Ask students to rapidly roll the clay between their hands to make a long, worm. Have students observe the various lengths and widths of each worm in their group Tell the students that each group will be putting their individual worms together into one big 'group worm'! Before students fasten their worms together, ask them to predict how long they think their group worm will be by cutting off a long piece of string to represent the predicted length! Allow a few minutes for students to fasten their worms together. (Be sure to emphasize the importance of not getting clay on clothing or carpets!) Ask students to take their string predictions and to compare the two lengths! Discuss group observations. Explain to the students that our small intestine is a long tube that is curved back and forth (like a curvy mountain road) inside our abdominal wall (muscles). Explain to the students that if our intestines were stretched out instead of being curved, there would not be enough room for them to fit and/or to do the important job of digestion they are supposed to be doing inside of our bodies! Ask each cooperative group to curve their clay worms back and forth to make them fit into a smaller space just like our small intestines! Compare and contrast, discuss, and especially ... ENJOY!!! Encourage students to turn back to the 'Digestive Map' on page one in their 'Digests' and to add on a sketch of the small intestine to the stomach. Tell students to set a focus for viewing the next part of the video by asking them to be prepared to explain to their cooperative (Groups what the next part of the digestive process is, and ... why does this part of the digestive tract smell so bad? Resume the video and play through until one of the girls says, 'At least it's a lot drier in here!' Pause the video. (During brief discussion, fastforward video just a little ways to the frame where the students are back in the bus looking around at the walls of the large intestine). Ask the students what part of the digestive tract they are looking at now? (large intestine) Encourage students to come up with a good explanation of why it's a lot drier in the large intestine and also ... why it smells so bad in that organ of the body. Resume the video and play through until Wanda exclaims, 'Saved me? ... I was having a blast!' Stop the video. Activity: Ask each cooperative group to wring out their water-drenched sponges back into the bowl. Give 5-6 raisins to

each group and have them drop these raisins into their bowl of water. Instruct each group to again, put their sponge into the water and to observe what is happening. (the sponge is absorbing all the water, but leaving all the solids behind.) Ask students to compare their sponge/water/raisin observations with the activities of the large intestine. Ask students if they have discovered why it smell so badly in the large intestine. (waste products are forming ... left overs from digestive process) Encourage students to turn back to the first page of their 'Food For Thought Digest' journals and to add the large intestine to their picture of the 'digestive map' in order to complete their diagram! Ask students to focus on the last segment of video by deciding how the busload of Ms. Frizzles class is going to get out of Arnold's digestive tract without leaving through the normal path of the large intestine. Resume the video and play through until one of the girls exclaims, 'Never say 'Never', Ms. Frizzle!' Pause the video. (During the activity, fast forward the video to the frame where students are pedaling the bus and Ms. Frizzles is saying, 'She'll Be Comin' 'Round the Mountain'). Stop the video. Discuss with the class what they think would be the best solution as to how they should leave Arnold's digestive tract. (emphasize discreet answers!) Ask students to predict how they think the Magic School Bus will leave Arnold's digestive system. Resume the video and play through until one of the girls says, '...and if Arnold eats lunch, there's going to be tons of food raining down on us!' Pause the video. (Fast forward to the frame where Arnold picks up a bottle of soda pop). While video is fast forwarding, tell students that Wanda is going to encourage Arnold to drink her soda pop. Ask students what they think Wanda's plan might be. Discuss. Resume the video and play through until the Magic School Bus gets 'belched' out of Arnold's mouth! Stop the video. Ask students to explain Wanda's plan to the rest of the class. Activity: Ask cooperative groups to take the raisins out of their bowls and to wring the water from the sponges back into the bowl. Explain to the students that they are going to pretend that they are the children in the Magic School Bus right after Arnold has swallowed a bottle of soda pop. Instruct students to drop a small amount of dish soap into the bowl of water then to each take a straw and start to blow bubbles. Ask students to compare the bubbles they have blown with the gas bubbles Wanda and the other kids on the Magic School Bus were creating. Encourage students to explain just what happens when a person gets indigestion. (Stomach irritation forms gas bubbles which builds up pressure and air ... pressure is alleviated through air escaping from the body [burping]) Ask students to explain how gas bubbles help Arnold 'burp' the bus out! Explain to students that sometimes the stomach will reject food we eat. Sometimes we may eat something unhealthy for us or we may get an intestinal virus, or we may react to another illness or injury which causes us to throw-up (vomit). In this situation, the movement in the esophagus works in reverse push the food back up the digestive tract and out of the body. Sometimes reactions and/or intestinal irritations from sickness, shock, injury, or food cause the intestines to form a loose, watery waste. Emphasize to students the importance of good health and good eating habits and the important role digestion has in keeping the rest of the human body healthy, happy, and mentally alert. Post-Viewing Activities: Ask students to turn back to the second page of their 'Food For Thought Digests'. Briefly review the 'ALREADY KNOW' and the 'WHAT I WANT TO KNOW' columns with the class. (Refer to prior responses written on the chalkboard or the chart paper). Ask students to locate the third column of their 'Knowledge Chart' and to write at least three new facts they have learned about the human digestive system. (Allow one to two minutes for this activity). Following the writing activity, conduct a class discussion of what the students NOW know about the human digestive system. Complete the third column on the chalkboard or chart paper model by listing responses of the students during the class discussion. Provide special arts and crafts materials (ie; poster board, clay, pipe cleaners, material, paper cups, 'Baggies', paint, crayons, scissors, glue, etc.) for each cooperative group. Allow enough time (20-30) minutes for each cooperative group to construct a model or 'map' of the human digestive system. (Students may want to refer to their 'Digestive Maps' from the first page in their 'Food For Thought Digest' journals Encourage each group to be as creative as possible and to be prepared to share their digestive tract 'masterpieces' with the rest of the class!

At the conclusion of this activity, allow plenty of time for each cooperative group to share and 'demonstrate' their model digestive tracts! This should be a fun learning experience to culminate this unit on the digestive system!

Extensions

Action Plan: Invite a dietitian or an internist to visit with the students to discuss the importance of developing good eating habits. These guests should explain to the students how food breaks down into specific nutrients which travel through the bloodstream to help feed and nourish every part of the body. A food pyramid along with slides and/or a video presentation would also be very effective. Discuss with students the importance of consuming nutritious food. In order to emphasize the important role nutritious food plays in the digestive system, review the route through the digestive tract in which the food takes. Explain to students that several people all over the world and in our own communities do not have the means to or knowledge of a healthy lifestyle of eating. Several individuals are homeless and are becoming extremely ill due to lack of proper nutrition. After discussing the benefits of good nutrition and the consequences of malnutrition, arrange with the principal and/or PTA for the student body to sponsor a food drive for unfortunate families in the community or to help donate funds to a worthy cause (such as sponsoring a child from a third-world country who may need nutritious food, warm clothing, and proper health care).

Extensions: Language Arts/Art: Ask students to imagine that they are a tiny, black water-melon seed that accidentally gets swallowed one fine Fourth of July Day. Ask students to write an account of their 'traumatic' or 'adventurous' day as a swallowed watermelon seed! Following a written account of their 'seedy' experience, ask students to create a gameboard game of the travel route the seed took through the digestive system! (Emphasize discreteness, when it comes to the 'ending' processes of digestion!) Students might make a spinner, use dice, or make up 'instruction' (like the Candyland game) cards for their games! Painted lima beans, old jewelry, or small 'mini' toys make great place markers! Each student should make their game an 'eye-catcher' by designing a clever gameboard and card/dice/spinner/placemaker holder. Allow students the opportunity to review the rules of their game with the class, then to demonstrate how the game is played. Encourage students to share their games with several different groups of class members. Invite another class in for a 'rainy day' or 'just-for-fun' game sharing session!

Creative Writing/Music/Drama: Teach or review the song, 'I Know an Old Lady Who Swallowed a Fly'. Ask students how many animals the old lady swallowed all together. Ask students why they think that situation could not really happen in 'real life' Ask students to return to their seats and to draw a picture of an animal (or creature) that is not mentioned in the 'I Know an Old Lady...' song! Remind students to label the type of animal they have drawn on the bottom of their picture! Allow approximately 5-10 minutes for students to complete their pictures. Call up seven volunteers and assign each of those volunteers a number '1-7'. Sing the 'I Know an Old Lady...' song substituting the seven new animals the students have drawn. (If there are any duplicate animals, invite all students with that particular animal to stand together and ask the class to 'pluralize' that animal. Or...include animals that are the same to be used the next time you sing the song over again! At the conclusion of the singing session, divide the students into cooperative groups and assign each group to write their own version of the 'I Know an Old Lady...' song. Invite these groups to sing their version to the class! Encourage student volunteers to act out the various animals as the songs are being sung, so every student will have an opportunity to become involved!

TUMMY TEASERS WORD SCRAMBLER Directions: Unscramble these words to help you discover what we're going to be learning about! casothm ethet ienntiset wech egttsi tomhu ghpseusao livii tae repsitsalsi dofo sabrob wswoall quidli sag tunritnio Word bank: nutrition esophagus swallow stomach villi chew intestine peristalsis teeth liquid food mouth eat absorb swallow gas

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