

Bay Area Scientists in Schools Presentation Plan

Lesson Name _____ Digestive System _____
 Presenter(s) _____ Leera Rahman and Asha Harikrishnan _____
 Grade Level _____ 5 _____ Standards Connection(s) _____ Digestive System _____

California Science Standards: 5th Grade Life Science

2. Plants and animals have structures for respiration, digestion, waste disposal, and transport of materials. As a basis for understanding this concept:

a) Students know many multicellular organisms have specialized structures to support the transport of materials.

c) 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.

Next Generation Science Standards - 4th Grade

4-LS1. From Molecules to Organisms: Structures on Processes

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. <ul style="list-style-type: none"> Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) 	LS1.A: Structure and Function <ul style="list-style-type: none"> Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) 	Systems and System Models <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (4-LS1-1), (4-LS1-2)

Common Core Standards:

ELA/Literacy:

SL.4.2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

SL.4.4. Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an

understandable pace. **SL.4.6.** Differentiate between contexts that call for formal English (e.g. presenting ideas) and situations where informal discourse is appropriate (e.g. small group discussion); use formal English when appropriate to task and situation.

FOSS Connections:

Grade 5 Module: *Living Systems*

Investigation 1: *Living Cells*

Part 2: Digestion

Objective:

Students will learn the role and sequence of the various digestive organs and understand the process of digestion.

Vocabulary/Definitions: 3 – 6 important (new) words

- mouth
- esophagus
- stomach
- small intestine
- large intestine (colon)
- absorption of nutrients
- mechanical and chemical digestion

Materials:

What will you bring with you?

- Worksheets
- Ziploc Bags
- Crackers
- "Digestive Juices"
- Plates
- Paper Towels
- "parts of digestive system" (paper tube, balloon, plastic tubes)

What should students have ready (pencils, paper, scissors)?

- Paper
- Pencil

Classroom Set-up:

Students will be seated in groups of 4 or 5 around their desks.
5 minutes set up time, and 10 min clean up time

Classroom Visit

1. Personal Introduction: 2 Minutes

We are both scientists (science educators) who live in Berkeley. We love to share our passion for science with children.

Topic Introduction: 5 Minutes

Can you name some of the parts/organs of the digestive system? What happens to food in the stomach? What happens in the small intestine? How do you get energy from what you eat?

2. Learning Experience(s): 35 min Minutes

We will draw a diagram of the digestive system on the board, explain the digestive process, learning the sequence of the important parts.

Activity #1: Children will work in groups and learn about the role of the stomach. They will use a zip loc bag (with crackers and vinegar+baking soda) to simulate the stomach. Vinegar simulates acid. Squeezing the sealed ziploc represents the stomach muscles mixing the contents (both chemical and mechanical digestion). Students will cut a corner of the bag and squeeze out the contents onto a plate. This simulates emptying the contents of the stomach into the small intestine. **8 min**

Activity # 2: Sequence together the parts of the digestive system in the correct order – we will give them the “parts” that represent the esophagus, stomach, small and large intestines. **5 min**

Worksheets: (a) draw the digestive system and label the parts.
(b), (c) worksheets to test understanding. **12 min**

(d) Draw a cartoon, of a slice of pizza making its journey through the digestive system and show what happens to the pizza in each part of the digestive system. **10 min**

3. **Wrap-up: Sharing Experiences** 5 Minutes

We just learned how we digest our food. Different organs make up the digestive system and each one plays an important role. Each part has a specialized structure so that it can perform its unique function. What is unique about the mouth, the stomach, the small and large intestines? For example, in the mouth and in the stomach there is both mechanical and chemical digestion. The small intestine is the place where the good stuff is absorbed to give you energy. The colon is where the waste goes and water is absorbed.

4. **Connections & Close:** 8 Minutes

What actually happens when you swallow something the “wrong way”?
How long do you take to digest food?
Other examples? (?discuss what happens when your stomach is upset)

Total 55 – 60 Minutes

Follow-up – After Presentation

Suggest students write a letter explaining “How we learned about the digestive system.”

Send to:

Asha and Leera
c/o Community Resources for Science
1611 San Pablo Ave Suite 10 B
Berkeley, CA 94702

Follow-Up Activities:

- Fun activities and information for kids about the human body at: <http://kidshealth.org/kid/htbw/>
- **Travelling Tapeworm** - In this "gross" activity (on pages 34-46), learners make a life-size model of a human digestive tract, and follow the life of a beef tapeworm as it makes its way through. In Part One, learners color, cut out, and assemble the parts of the digestive system, including full-length small and large intestines. In Part Two, learners cut out pictures of the stages of tapeworm development, and tape them within the model. A beef tapeworm life cycle diagram helps put the human host period within a larger system. <http://wonderwise.unl.edu/02teach/paraact.pdf#page=34>
- **Spit Test** - In this biology activity (page 8 of the PDF), learners will explore how saliva assists in the beginning of the digestive process. By comparing chewed and unchewed crackers, they will see first hand that saliva changes the starch in food into sugar. Although this activity was included as a post-vist for a workshop about the human body, it also makes an excellent stand alone activity! <http://smile.cosi.org/grossscienceteacherpacket.pdf#page=8>
- **What Makes Flatulence?** - Learners recreate the digestion process that takes place within their large intestines. They mash up bananas into mush, then place it in an Erlenmeyer flask covered with a balloon. Learners observe the banana for three to five days, and watch as gas is produced which inflates the balloon. <http://www.asm.org/index.php/component/content/article/23-education/k-12-teachers/8213-what-makes-flatulence>

Non-Fiction Reading Connections:

- The Complete Human Body by Alice Roberts DK Publishing. 512pp. Trade ISBN 9780756667337, \$50. (6–12) DVD enhanced, this ambitious volume examines human evolution, anatomy, function, reproduction, and disease in an orderly, up-to-the-minute visual format. Glossary, Index. (NHM) IV. Supplemental Material: Virtual labs on cardiology, neurology and other topics (The Howard Hughes Medical Institute) <http://www.nsta.org/recommends/ViewProduct.aspx?ProductID=20606>
- The Digestive System (TIME for Kids Nonfiction Readers) by Jennifer Prior. Think about biting into a sandwich. You chew and swallow. What happens next? How does the food get broken down? How are the nutrients absorbed by your body? Discover the journey that your food



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takes through your amazing digestive system! <http://www.amazon.com/Digestive-System-TIME-Nonfiction-Readers/dp/1433336774/>

- The Digestive System (True Books) by Christine Taylor-Butler. Did you know that your nerve impulses are 1,000 times SLOWER than your computer? Or that it's normal to fart - as often as 20 times a day? Get the buzz on health and the human body with this fun and fascinating series. <http://www.amazon.com/Digestive-System-True-Books/dp/0531207315/>

Fiction Reading Connections:

- The Magic School Bus Inside the Human Body by Joanna Cole. Arnold has swallowed the Magic School Bus! Now, instead of seeing an exhibit of the human body at a museum, the class is taking a look at Arnold's stomach, his intestines, his bloodstream, and more from the inside on this heart-stopping fieldtrip - one the reluctant Arnold would be happy to miss. <http://www.amazon.com/Magic-School-Inside-Human-Body/dp/0590414275>



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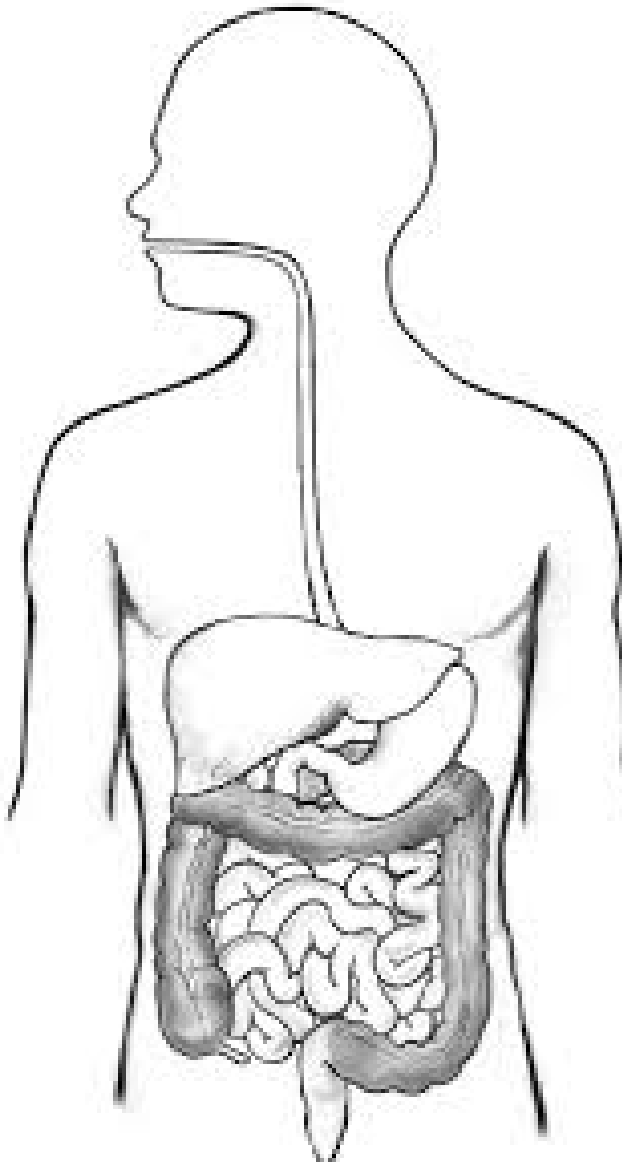
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Name: _____

Date: _____

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Digestive System Worksheet

(a) Label the parts of the digestive system on the following diagram.



Word Bank

- mouth
- stomach
- large intestine
- esophagus
- small intestine

Name: _____

Date: _____

Bay Area Scientists in Schools
Digestive System Worksheet

(b) Match the parts of the digestive system with their function

1) Stomach	A) chewing and mixing food with saliva
2) Esophagus	B) absorption of nutrients into blood
3) Large intestine	C) peristalsis moves food
4) Mouth	D) water is absorbed and the rest is waste
5) Small intestine	E) acid is made here and food is churned

(c) Fill in the word "mechanical" **OR** "chemical" to say what kind of digestion takes place.

1. Stomach muscles help churn the food, and help with _____ digestion of food.
2. The acid and enzymes in the stomach help with _____ digestion of food.
3. Teeth in the mouth help grind the food into smaller pieces and help with _____ digestion.
4. Saliva has enzymes and helps with _____ digestion of food.

Name: _____

Date: _____

Bay Area Scientists in Schools
Digestive System Worksheet

(d) Draw a cartoon of a slice of pizza making its way through the digestive system. Show what happens to the pizza in each part of the digestive system.

