Curriculum Units by Fellows of the Yale-New Haven Teachers Institute
2013 Volume IV: Asking Questions in Biology: Discovery versus Knowledge

Just Let It Go!

Curriculum Unit 13.04.04
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Introduction

Teaching 3rd grade can be a challenge! My class of 26 energetic students keeps me on my toes. Teaching students in two consecutive years has its benefits though. The major benefit is students are comfortable and trusting with me and their classmates. Most students have a high confidence level because of the classroom culture I was able to create having ample time to get to know my students. In turn, they were given time to learn about and from each other. As a result the classroom was an atmosphere of risk taking, acceptance, and trust. My students are accustomed to my rules, routines, and procedures due to me looping up from 2nd grade to 3rd grade. There is only one phenomenon that can disrupt my plans and distract my students. That phenomenon is flatulence, more commonly known as intestinal gas. My students would roar in laughter and look curiously around to locate the culprit. The passing of gas was more smelly than noisy. I decided to have a discussion about passing gas to minimize the distraction and inquire what students knew about the process.

Breaking wind, passing gas, farting, pooting, cutting the cheese, dropping a bomb, making a stink, letting one go, and silent but deadly are all colorful common terms used to describe flatulence. Flatulence is one of those occurrences that people deem embarrassing and taboo to speak about in public. Students love saying "eeeewwww" or "what's that smell" when they hear someone passing gas. Some students laugh in hysterics when the sound of flatulence is emitted. Even though students are aware that everyone "does it", the background knowledge of how and why flatulence is formed is obscure.

Who? What? When Where? Why? How? are the basic questions students learn to ask to deepen their comprehension on any given subject. Although inquiry is encouraged in science, these questions are mostly taught and emphasized during language arts instruction. My goal is to utilize and transfer these questions into science resulting in students becoming more curious about how and why things work. I want students to ponder and contemplate on parts and functions of their body and how their choices to treat their body affect their health.

I anticipate students will develop questions around topics they find interesting and enjoy. Students typically enjoy talking and learning about staying healthy, foods and eating, animals, and keeping the environment clean. Keeping these ideas in mind, I plan to develop a curriculum unit around a topic that truly interests my students. Additionally, I will infuse their curiosity with a deeper understanding of their body and how some

body parts function. The most befitting topic I envisioned teaching my students is an occurrence that takes place every day and to everyone. My unit will address the phenomenon of flatulence!

Objectives

Students will be able to ask questions deriving from curiosity to research and experiment possible solutions.

Students will be able to record information and use data to support a hypothesis or

findings.

Students will be able to conduct research on a topic using primary and secondary resources.

Students will be able to engage in meaningful discourse and communicate thoughts and ideas effectively.

Students will be able to analyze data and interpret results.

Teaching Strategies

I intend to teach students the relationship between their diet and digestive system. My unit will delve into the process foods go through in the large intestine and how bacteria help to break down food particles. My unit will stretch into understanding how gas forms when certain foods cannot be digested and the process gas goes through to finally get released.

My goal for the unit is to get students asking questions about a subject that they find humorous and shy away from because it's an "uncomfortable" incident to talk about. My intention is to reassure students that flatulence deserves discussion because it is a part of health that we must keep in mind when making choices about what food and drinks we put into our bodies and how everyone's digestive systems are not the same. This unit will encourage students to examine how the digestive system functions and analyze how the breakdown of food may affect others differently. I anticipate students' curiosity to expand since the effect of foods and gas differs from person to person. Students should probe, and conduct investigations to answer their question.

Students will learn how to effectively ask questions that extend beyond recall and definition. Students will research topics and information to distinguish facts from opinions. Hands-on activities and experiments will reinforce the functions of the digestive system to increase students' curiosity.

Additionally, my unit will connect with other academic subjects to increase more inquiry and further analysis about flatulence and the digestive system. Students can apply their mathematical skills by conducting investigations and tracking their data through tables, charts and graphs. Students can question and

hypothesize if exercise during gym class affects their flatulence in any way. Further exploration and research can extend to animals and how flatulence develops in their digestive system. Students can compare and contrast human and animal flatulence, diets, and digestive systems. In writing, students will be able to compose expository reports to explain their findings and strengthen their writing communication skills. Lastly, my unit will excite students about reading nonfiction text to discern fact from opinion while researching.

Questioning

"Curiosity spawns questions [1]." In order to guide students into formulating questions, teachers must first foster students' curiosity. We must encourage students to wonder and validate their questions. We must emphasize that asking questions is just as important as finding the answer. Teachers must model both asking and answering questions. We have to instill that asking questions develops comprehension and helps construct meaning. Questioning helps with researching for answers which may lead to the development of additional questions and probing. There are several strategies teachers can employ to initiate question-asking by students.

There are various types of questions teachers and students focus on in the classroom. Two types of questions that we will refer to are assessment questions and sincere questions. Assessment questions are used to check understanding and the answer is known. In primary grades, assessment questions can be referred to as checking questions. The teacher knows the answer and checks to see if students know. Sincere questions activate wonder and ponder the possible solutions. Thus, sincere questions require further research. The teacher does not know the answer but suggests the class finds the answer. Sincere questions enable students to make connections by activating prior knowledge, generate new ideas, ask more questions, and visualize and infer to clarify confusion and find answers. Students can enhance understanding and construct meaning. Both types of questions are equally important; therefore, teachers must find a balance between the two during instruction [2].

Teachers must first introduce and model how to question. We can model questioning with a personal book that we are reading (student appropriate!) and sticky notes. We can model to students how we became confused, meaning was not clear, or something was intriguing and we want to learn more. Modeling for students lets them know that even adults have questions. If students observe the teacher asking questions for more information and clarity, in turn students will replicate the teacher's actions and realize they can generate questions too [3].

There are two types of questions students can utilize to organize thoughts and information, thick and thin questions. Thick questions are global questions used to address large universal concepts and typically begin with: how come?, why?, and I wonder? The answer(s) to thick questions are often long and require further research and discussion. Thick questions align with asking sincere questions. Thin questions are smaller clarification questions. Thin questions are utilized to clarify confusion, understand concepts, and access objective content. The answer to thin questions is short and may only require a yes or no [4].

Lastly, teachers need to communicate to students that some questions may not need an answer. Questions without a definite answer lead to inferential thinking. There are questions that guide to inferring and relying on interpretation. Students may have differing opinions or explanations to questions that prompt inferring.

Inferring stirs students to open their minds, view information in a new way, and deepen meaning to result in an inspiring conversation. Thus, research will commence and there may be more questions asked than answered definitively. Students become more willing to take risks in asking questions through inferring and interpreting information guided by research [5].

Digestion

Digestion begins when food enters the mouth and is chewed and swallowed. Parts of the digestive system work together to chop, churn, and squeeze the nutrients from food. Nutrients become energy for the body to grow, and to fix broken bones and torn tissue. The teeth tear and grind food to mix with saliva (spit). The enzymes in saliva help break down food, making pieces of food easier to swallow. The tongue pushes food from the mouth to the esophagus, a 10 inch tunnel. The muscles surrounding the esophagus squish the mushy food to the stomach. A small flap covers the windpipe that keeps food and liquids from going the wrong way. If food or liquids slip into the windpipe, the body coughs it out quickly. The stomach stretches like a balloon to hold food and the stomach's wrinkled walls unfold as food slide in. Muscles wrap around the stomach in different directions that squeeze, twist and crunch food. Muscles also mix in gastric juices that process food into a thick soup. Slimy mucus protects stomach walls from gastric juices. The stomach churns a meal for about 4 hours into a soup-like mixture. The mixture oozes into the small intestine, a 20 foot (6 meters) tube. Enzymes break off food's tiny nutrients that pass through the intestinal walls and into the blood. Unused food moves into the large intestine which is much shorter than the small intestine, but is twice as wide. The large intestine connects to the rectum which pushes out feces or gas. The liver aids in digestion by making bile which squirts into the small intestine to digest fatty foods. The liver receives nutrients from the small intestine to make proteins. Additionally, the liver cleans the blood and removes poisons (drugs and alcohol) from the body [6].

The Digestive System

The Mouth

The teeth tongue and saliva begins the process of digestion before food is swallowed. The teeth break food into smaller pieces. Saliva acts chemically on food to make it easier to swallow. The food is further broken down in the stomach and small intestine. The mouth is the only part of the digestive system that a person can control. The other parts work automatically [7].

The Teeth

Children have a set of 20 deciduous teeth known as baby or primary teeth. At the age of 6 or 7, these teeth come out and are replaced with adult teeth, or permanent teeth. Adults have a set of 32 teeth in which 16 each are fixed firmly along the upper and lower jaws by long roots. In the front of the mouth are 8 incisors and 4 canines. These sharp front teeth are used for tearing and biting bits off of food. Behind the incisors and canines are 8 premolars which mash up food. Moving toward the back are 12 molars which grind up food [8].

The Tongue

The tongue is a muscle that moves food around in the mouth. Clumps of food are moved toward the back so the teeth can chew and grind the clumps into smaller pieces. When the tongue pushes the chewed food to the back of the mouth, a lump of chewed food called a bolus is formed. The tongue has the ability to discern different tastes because it is covered with taste buds. The first defense of the digestive system is taste. If food tastes bad, the food is less likely to get swallowed [9].

Saliva

The salivary glands, located under the tongue and back of the mouth create watery liquid called saliva. When a person smells or tastes food, salivation occurs. Saliva is released through ducts inside the mouth. Saliva is a lubricant that softens food to ease chewing and swallowing. Additionally, saliva contains an enzyme called ptyalin that commences the chemical breakdown of starch in food. A person can produce approximately 2.5 pints (1.2 liters) of saliva a day [10].

Stomach

The stomach works automatically. It is a strong muscle shaped in the form of a bag or sack. It is controlled by nerves and hormones. The stomach releases chemicals and activates when food is smelled, tasted, and when nerves detect food in the mouth. Food passes into the stomach when it arrives at the bottom of the esophagus. The stomach expands so a meal of food can fit. The stomach's main function is to act as a storage place for food and begin digesting food with chemicals. After eating a meal, food can spend anywhere between 3 to 5 hours in the stomach. Food from the esophagus goes into the cardi which is the top region of the stomach. Then, food gradually moves into the pylorus which is the lower region of the stomach. Strong bands of stomach muscles move to grind food. The stomach walls expand to hold food until it is ready to steadily release into the intestines.

The stomach lining is full of tiny glands that make liquids which are released into the stomach and combine into a fluid called gastric juice. The gastric juice mixes with food when the stomach turns and squeezes. Gastric juice is a mixture of different chemicals. Some of these chemicals form hydrochloric acid, which aids in breaking up food and killing harmful microorganisms (bacteria) that food may contain.

Other chemicals begin to break down chemicals in food. Pepsinogen combines with stomach acid to form the chemical called pepsin. Pepsin breaks up chemicals in food called proteins in order for the body to use them. Gastric juice contains a chemical called intrinsic factor which allows the body to use a vitamin, B12, also found in food. The mixture of partly digested food and gastric juice is called chyme [10].

Small Intestine

The longest part of the digestive system is the small intestine. It is approximately 22 feet (7 meters) long and 1 inch (2.5 cm) in diameter. In comparison to the wider large intestine, the small intestine gets its name because it is narrower. The small intestine is coiled into the abdomen. Nutrients are absorbed into the blood in the small intestine. More digestion occurs in duodenum.

The duodenum is the first part of the small intestine. It is about 10 inches (25 cm) long. Chyme from the stomach is squirted into the duodenum through the pyloric sphincter valve. Other fluids are added in the duodenum to the chyme. Bile comes from the gall bladder, a small pouch-shaped organ. It breaks-up fat into

droplets in order for chemicals to break up fat more easily. Pancreatic juice from the pancreas contains a mix of digestive chemicals that break up proteins, carbohydrates, and fats. Pancreatic juice contains alkalis, substances that neutralize or stop the effect of acid that comes from the stomach.

Nutrients, such as sugars, are made by digestion and absorbed into the blood stream and lymphatic system through the lining of the small intestine. Millions of villi, fingerlike tufts, cover the surface of the lining. This massive surface area aids in the body's ability to absorb large amounts of nutrients faster. The villi swim around stirring the contents of the intestines, which helps the nutrients to be absorbed. Within about 4 to 5 hours, food passes through the small intestine [12].

Pancreas

The pancreas is important in the digestive process because it produces pancreatic juice which flows into the duodenum and controls the amount of sugar in the blood. The pancreas is a gland that is comparable to the shape of a carrot and is about 6 to 8 inches (15 to 20 cm) long. The wide end of the pancreas is located next to the duodenum.

Pancreatic juice is made by a host of cells called acini. The juice follows through narrow tubes that connect to the pancreatic duct which connects to the alimentary canal in the duodenum. Pancreatic juice is a combination of various digestive chemicals. Trypsin and chymotrypsin break up protein; amylase breaks up starches; and lipase breaks up fat. In addition, pancreatic juice contains alkalis which neutralize stomach acid. The chemicals in the pancreatic juice are very potent. They begin to react when mixed with the alkalis; otherwise the chemicals would digest the pancreas itself [13].

Liver

Although the liver is not a part of the alimentary canal, it is another important part of the digestive system. The liver is a chemical-processing system. It takes chemicals that were absorbed in the small intestine and turns them into chemicals that the body uses and stores for future use. The liver makes bile and cleans the blood.

The liver is shaped almost like a triangle. It is about 8 inches long and weighs approximately 3 pounds. There are 4 parts to the liver called lobes. The liver contains thousands of lobules. Lobules are comprised of hundreds of liver cells located around a central blood vessel that carries blood to and from cells. Blood streams into the liver through two blood vessels, the portal vein and the hepatic artery. The portal vein brings nutrient-rich blood from the intestines. The hepatic artery brings oxygen-rich blood from the heart. These blood vessels divide into thousands of tiny blood vessels that pump blood into spaces in the liver called sinusoids. Food and oxygen are taken from the blood flowing through the sinusoids to fuel liver cells. The hepatic vein that carriers blood away from the liver is formed from blood vessels joining together from the lobules. Approximately 3 pints of blood is processed by the liver every minute.

Food molecules that came from the intestines are processed by liver cells. Liver cells break down molecules into simpler ones and create nutrients from them. Some of the nutrients are stored in the liver, while others are placed in the blood to be streamed to other parts of the body. The liver is responsible for turning glucose into glycogen and storing it. When the body is ready, glycogen can turn back into glucose and used for energy [14].

Large Intestine

The large intestine is the last part of the alimentary canal. The large intestine is shorter but wider than the small intestine. The large intestine absorbs water and small amounts of minerals from the watery material that enters from the small intestine. The water and minerals pass into the blood and leaves a firm material called feces that passes out of the body.

The large intestine is made up of the cecum, the colon, and the rectum. The short and wide cecum joins the small and large intestine together. The colon is comprised of four sections, the ascending colon, transverse colon, descending colon, and sigmoid colon. The large intestine receives a slushy mixture of water and undigested material through a valve that connects to the small intestine. The small intestine has had time to remove most nutrients from food and to keep some useful minerals. These minerals pass into the blood through the walls of the large intestine. Most of the water in the mixture is absorbed. Approximately 4 pints enters the large intestine daily and 3.6 pints of it are absorbed.

The material left over after the minerals and water have been removed is called feces. Two-thirds of fecal matter is made up of water. The other one-third is solid material, made of mostly undigested plant fiber, bacteria, bile, mucus, and old cells from the lining of the alimentary canal. Feces are stored in the rectum and released through the anus [15].

Flatulence

The main components of rectal gas are oxygen, nitrogen, carbon dioxide, hydrogen, methane. The odor comes from sulfur picked up from bacteria in the large intestine. Three-fourths of flatulence is hydrogen, methane, and CO2 which are odorless bacterial gases. Gas can comes from swallowed air passed through the rectum or a breakdown of undigested nutrients. Bacteria in the large intestine digest foods that the small intestine cannot break down. During this process, the large intestine produces gas and the contractions of muscles in the intestine eventually cause some of this gas to pass out through the rectum to form a "fart". Passing gas 13-21 times a day is normal. Foods that produce gas in one person may not cause gas in another. Beans and legumes are major hydrogen gas producers because they contain a special type of carbohydrate that's poorly absorbed but quickly digested by bacteria in the intestines. Sulfur-containing proteins and amino acids produce gas with a potent odor [16].

Here is a list of flatulence-causing food and drinks [17]:

cabbage

broccoli

brussels sprouts

cauliflower

dried apricot

beans

fiber

corn

grapes/raisins

onions

turnips

cucumber

nuts

oats

pancake/waffle syrup

apples

cherries

peaches

pears

"sugar-free" items

Beverages – apple juice, orange juice, milk, carbonated drinks, wine

Animals and Flatulence

Animals are big contributors to climate change through burps and flatulence. A significant source of greenhouse gas is diffused from methane gas. Cattle (cows) and sheep produce large amounts of methane through flatulence. Methane is approximately twenty times more heat trapping than carbon dioxide. The kangaroo has a stomach that contains bacteria to counteract the methane gas. Scientists in Australia are experimenting to replicate a kangaroo-like stomach in cows and sheep. It takes approximately three years to isolate the bacteria in the kangaroo. Once the bacterium is isolated, scientists can then begin developing ways of transferring the bacteria to cattle and sheep. This is by far a challenging and lengthy process. In retrospect, cattle and sheep will have a more efficient digestive process in which farmers would save money spent on feed and methane emission is reduced. Another possible solution is feeding cattle and sheep grass as opposed to corn to decrease belching which contains methane gas. Alternatively, people can change their diets and substitute beef and lamb for kangaroo meat, which is a controversial solution [18].

Classroom Activities

Activity 1

KWL Chart

To begin the unit students brainstorm what they know about passing gas: all answers accepted and charted.

Students will brainstorm questions they have about passing gas. If students seem reluctant or stuck, teacher will model start with a question to motivate student response. Students may write on paper and questions added to chart. Small groups can be formed to brainstorm questions. For example, can animals pass gas?

In the last column, the teacher tells students one thing they will learn: that from now on everyone will say flatulence instead of passing gas, farted or other names they may label it.

As the unit is being taught, make sure the KWL chart is updated with questions and information that answers the question. A separate charted can be made and titled, Interesting Information. This chart is for questions that did not ask on the KWL chart but discovered during research.

Activity 2

The Strategy of Questioning

Create a poster for posting of codes

A= Answered

BK = Background Knowledge

I = Inferred from research

D = Discussion

RS = More Research

Huh? Or C = Confusion

The teacher will read a text from the reading list ("My Noisy Body" the section on farts) and model how to use codes. Questions are written on a sticky note as students are reading and researching about flatulence. Once students find an answer, they can use the appropriate letter code to denote how the answer was derived.

The teacher will model questioning after reading using sticky notes to keep track where meaning breaks down. The teacher will emphasize that everyone has questions even adults.

Sticky notes should be placed on pages where questions arise. Model reading further and when a question is answered from the text write answers and place a sticky note in the text where the question is answered.

Although some questions may not be answered, the students will see that teacher has questions. In turn, they

will recognize they can have questions too.

Thick and Thin Questions

The teacher will introduce thick and thin questions to students. An anchor chart can be created for students to refer to.

Thin questions are the basic questions: who?, when?, where?, what?, and how many?

The answer to a thin question is short, basic knowledge, and requires recall. For examples:

How many days of the week are there?

Who is the president of the United States?

Where do you live?

What color is the sky?

To check understanding, tell students to write more examples of thin questions. This can be done individually, in pairs, or small groups.

Thick questions are questions that require thought and research. The answer to a thick question involves deep thinking, analyzing, argument, and providing evidence to defend a position. For examples:

Why do you think…?

What if?

How would you feel if?

What might…?

To check understanding, tell students to write more examples of thick questions. This can be done individually, in pairs, or small groups.

Let students know that they will use thick and thin questions while keeping a nutrition diary, analyzing their data, doing their research, and during group discussions. Students can practice asking thick and thin questions by writing more for homework.

Activity 3

"*What's Eating You?*"

Students will keep a nutrition diary for at least two weeks (time span is flexible). Every day the students will write down everything they eat. Students will also track how many times a day they have flatulence, whether it has a smell or no smell, and whether it is silent or noisy.

Students will tally the number times per day that they have flatulence and analyze the data.

Foods Eaten	Flatulence Tally Marks	Smell	Noise
Morning		y n	y n
Afternoon			
Evening/ Night			

Students will answer the question: what can you conclude from your data?

Students will pair with another student to compare their data and formulate a list of questions to research possible solutions from their results. Students will begin to question the effect of certain foods and drinks that give them flatulence, whether the time of day effects their flatulence, and why certain foods and drinks cause them flatulence and no other student(s). The teacher will encourage students to come up with as many questions as they can, individually and in student pairs. Students will utilize teacher-approved websites, books from the reading list, and resources from the library. Students will summarize their findings and share the information in a small group of 4-6 students. Students may ask additional questions in their small group to promote discourse and further research. Remind students to categorize and code questions, as well as ask thick and thin questions.

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Peikin, Dr. Steven R. *Gastrointestinal Health* . New York: HarperCollins Publishers, Inc., 2004. This book describes digestive problems and a nutritional program remedy.

Wilcox, Kate. "Flatulence Fighter." *Scientific American* , 2009, http://www.nature.com/scientificamerican/journal/v19/n2s/full/scientificamericanearth0609-6c.html. An article on reducing methane gas in cattle.

Reading List

Digestion by Tracy Maurer

Describes the parts of the digestive system and how they work to help the body process and use nutrients.

Eating and the Digestive System by Julie K. Lundgren

Describes the process of digestion and how food is processed in people and animals that are herbivores and/ or carnivores.

Eats Rights by Matt Doeden

Describes how people can make good food choices and maintain a healthy diet.

My Noisy Body by Liza Fromer and Francine Gerstein MD

Describes the digestive system and explains the noises created.

Fartiste by Kathleen Krull and Paul Brewer

A book about Joseph Pujol who perfected the art of the fart (Joe, the fartiste)

Guts: Our Digestive System by Seymour Simon

Describes the digestive system and how it works

Walter the Farting Dog by William Kotzwinkie and Glenn Murray.

A story about a family taking in a dog from the pound, but there is one problem, he has excessive gas.

Walter the Farting Dog: Trouble at the Yard Sale by William Kotzwinkie and Glenn Murray.

There are no customers at the yard sale and Walter the farting dog wonders why.

The Digestive System by Chelsea House Publishers

Describes the parts of the digestive system and how each part functions.

Good Families Don' t by Robert Munsch

A funny story about a family and farts!

Web Sources

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http://kidshealth.org

http://kidshealth.org/kid/talk/yucky/fart.html

http://www.harcourtschool.com

http://www.niddk.nih.gov

Appendix-Implementing District Standards

Connecticut has implemented the Common Core State Standards (CCSS) to better prepare students for college and rigorous learning. The CCSS blends with disciplinary core ideas and crosscutting concepts across k-12. The standards connection across school curricula and promotes classroom discourse. Connecticut is also shifting toward The Next Generation Science Standards to advance a quality science education. The main standards this lesson will focus on are:

S1 Ask questions and define problems

S3 Plan and carry out investigations

S4 Analyze and interpret data

S7 Engage in argument from evidence

S6 Construct explanations and design solutions

S8 Obtain evaluate, and communicate information

W 3.7 Conduct short research projects that build knowledge about a topic

Students will learn the strategy of asking questions which will engage students in research, independent learning, and communication. Students will learn how to hypothesize and support that hypothesis with evidence. Furthermore, students will learn to think analytically and provide rich explanations to interpret data. The goal is to equip students with higher order thinking skills.

Notes

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[1] Stephanie Harvey, " *Strategies That Work,* " 81.

[2] Stephanie Harvey, " *Strategies That Work* ," 92-94.

[3] Stephanie Harvey, " *Strategies That Work* ," 82-84.

[4] Stephanie Harvey, " *Strategies That Work* ," 89-90.

[5] Stephanie Harvey, " *Strategies That Work* ," 90-91.

[6] World Book, Inc., " *The Digestive System/The Urinary System,* " 5, 8-9.

[7] World Book, Inc., " *The Digestive System/The Urinary System,* " 6.

[8] World Book, Inc., " *The Digestive System/The Urinary System,* " 6-7.

[9] World Book, Inc., " *The Digestive System/The Urinary System,* " 7.

[10] World Book, Inc., " *The Digestive System/The Urinary System,* " 7.

[11] World Book, Inc., " *The Digestive System/The Urinary System,* " 12-13.

[12] World Book, Inc., " *The Digestive System/The Urinary System,* " 14-15.

[13] World Book, Inc., " *The Digestive System/The Urinary System,* " 16-17.

[14] World Book, Inc., " *The Digestive System/The Urinary System,* " 20-21.

[15] World Book, Inc., " *The Digestive System/The Urinary System,* " 24-25.

[16] http://www.nlm.nih.gov/medlineplus/gas.html

[17] Norton Greenberger, " *4 Weeks to Healthy Digestion,* " 21-22.

[18] http://www.treehugger.com/clean-technology/the-flatulence-battle-kangaroos-vs-cattle-and-sheep.html.