UNIT OVERVIEW

SEEDS OF SCIENCE/ROOTS OF READING®

DIGESTION AND BODY SYSTEMS

The Grade 3-4

Digestion and Body Systems kit components:

Materials and equipment—Each kit contains a set of high-quality materials and equipment for a class of 32 students. Consumable items are provided for two classes. Refill packages are available.

Teacher’s Guide—A comprehensive teacher’s guide provides easy-to-use, step-by-step instructions for presenting the unit. The guide includes a number of optional presentation approaches to meet the unique needs of your students.

Student Books—Eighteen copies of each of four student books are included with the kit.

Summative Assessment Booklet—Contains a set of pre-post assessments designed to enable teachers to measure student gains over the course of a unit.

Investigation Notebook—The Investigation Notebook can be duplicated, or additional copies may be purchased separately and provided to each student.

Copymaster Booklet—A copymaster booklet is provided in each kit with full-size copymasters, including transparencies, and student handouts.
What's in the *Digestion and Body Systems* Unit?

*Digestion and Body Systems* is 20 sessions in length. It immerses students in learning about systems, the relationship between structure and function, the parts and functions of the human digestive system, and other important body systems that help humans survive and grow. There are two investigations—each with 10 sessions. Firsthand activities, instructional routines, and five student books involve students in doing, talking, reading, and writing about key science concepts, inquiry abilities, and literacy skills.

**Investigation 1—Digestion as a System.** Students discuss systems, focusing on a cherry pitter, its parts, and the ways its parts interact. They travel to stations, observing and analyzing household devices as systems. In reading the book *Systems* students learn more about systems, and how they are usually part of larger systems. Students practice visualizing to help them understand what they read. They invent and diagram dish-cleaning systems, then build systems to sort Styrofoam balls. After a series of guided observations, each student writes a descriptive paragraph about the mouth. They learn about the esophagus by observing and reading, then write another descriptive paragraph. From *Secrets of the Stomach*, students learn how the stomach functions, how scientists investigated it, and that scientific explanations include claims and supporting evidence. They use the strategy of visualizing to better understand the investigations described in the book. Students practice using evidence to make explanations about the stomach, and write a third descriptive paragraph. At the end of Investigation 1 they reflect on how they’ve acted like scientists, diagram the digestive system, and conduct a Discourse Circle.

**Investigation 2—Digestion and Other Body Systems.** Students investigate the small intestine and large intestine, using three different models. They read *Voyage of a Cracker*, and observe photographs of the insides of different organs in the digestive system. Students complete their final two descriptive paragraphs, about the small intestine and large intestine. They walk through a large model of the digestive system, and discuss ways the model was inaccurate. They skim the *Handbook of Body Systems*, then do some activities and decide which body systems are involved. Expert Groups focus on individual body systems, then share what they’ve learned with other students. As a class, students participate in activities that involve multiple body systems, and conduct a Discourse Circle about which is the most important system in the human body. They read *What's The Diagnosis?* to learn about how a doctor uses evidence to make a diagnosis. Students use the strategy of visualizing in a new way, focusing on how they can connect what they visualize to their own prior knowledge to enhance their comprehension. Then students make their own diagnoses of two different patients. The unit ends when students discuss the structure and function of some artificial body parts, identify body systems at work in everyday activities, then reflect on the unit and how they’ve acted like scientists.
What Students Do

Investigation 1—Digestion as a System

Students begin the unit by exploring simple systems such as a cherry pitter. The class discusses what they think the systems do based on their observations of the systems’ structure. They read *Systems* and practice the strategy of visualizing. The teacher introduces diagrams and the class makes one based on systems in the book. Students design dish-cleaning systems, and create diagrams of their designs. The class does a shared writing to describe one of the dish-cleaning diagrams. Students explore a wheel, and discuss the relationship between structure and function. They use a collection of parts to build a system that sorts pom-pom balls by size. Students hold a Discourse Circle on the prompt “Is a piece of paper a system?” Students begin their investigations of the digestive system by observing their mouths and focusing on structure and function. They make diagrams and write descriptive paragraphs about their mouths. Students visualize the esophagus, then make diagrams and write a second descriptive paragraph. Students read *Secrets of the Stomach*, seeking evidence about how the stomach works and reading about the scientists’ claims and evidence that made up their scientific explanations. Students then work in groups to find evidence to make explanations about the stomach. They write a third descriptive paragraph about the stomach and create a concept map connecting vocabulary of the week. Students reflect on how they have acted like scientists and hold another Discourse Circle on “Are the functions of the mouth and stomach similar?”

Investigation 2—Digestion and Other Body Systems

Students continue their investigation of the digestive system by using models of the small intestine and large intestine, evaluating each model for accuracy. After reading *Voyage of a Cracker* students focus on how nutrients are absorbed by the digestive system and again practice visualizing as a comprehension strategy. They use what they’ve learned about the small intestine and large intestine to write two more descriptive paragraphs, this time largely independently. They walk through a large model of the digestive system and evaluate the model’s accuracy. They again visualize and diagram the digestive system and discuss how, like scientists, they revise understanding as they learn more. After skimming *Handbook of Body Systems*, students visit stations and decide which body systems are involved at each station’s activity. Students focus on one of the body systems and read about it in the *Handbook*. They share what they’ve learned with students who focused on other body systems, and then hold another Discourse Circle about the question “Which body system is the most important one in the human body?” They read *What’s the Diagnosis?* and discuss how doctors use evidence to make diagnoses. Students then practice making diagnoses during a role-playing activity. Finally students reflect on the unit, read an account of a girl eating dinner and identify body systems involved, and review how they acted like scientists.
What Students Learn

Investigation 1—Digestion as a System

During the opening sessions, students learn about the concept of systems—a system has parts that interact, and scientists investigate those parts and interactions. Students learn a system can stop working if a part breaks or changes, that a system can be made of smaller systems, that each part has its function, and that its shape, or structure, matches its function. Meanwhile, students are learning about diagrams and descriptive writing and about their use by scientists. Students also learn that visualizing is a strategy used by good readers and good scientists to aid understanding, and that a concept map shows how words and ideas are connected. As students begin their investigation of the digestive system, they learn about the structure and function of mouth parts. Students also learn about aspects of descriptive paragraph writing in science that make it an important and unique writing genre. Next students learn about the structure and function of the esophagus and stomach. Students learn about scientists who discovered the inner workings of the stomach, while also learning about the relationship between claims and evidence in science. Throughout the unit, students deepen understandings that scientists make explanations based on evidence, revise explanations based on new evidence, and that the best explanations take into account all of the available evidence. Students increase their awareness that scientists have certain ways of doing, talking, and thinking about things, and use specific language during discussion and disagreement.

Investigation 2—Digestion and Other Body Systems

Students learn that nutrients are absorbed in the small intestine and passed into the bloodstream, and that water is absorbed from food in the large intestine. They also learn that that solid waste is pushed out of the end of the digestive system through the anus. As students finish writing descriptive paragraphs about the digestive system, they learn to take on more responsibility for writing all aspects of each paragraph. Students learn to identify when and where visualizing might be most helpful in aiding comprehension. In addition, students learn that good learners pause periodically to consider what they know and wonder about something, that drawing a diagram assists in communicating a system's structure to others, and that writing is easier and more successful when time is spent beforehand preparing ideas. They learn that the digestive system is part of a larger system—the human body—and that there are many systems in the human body, including the circulatory, nervous, musculo-skeletal, renal, and respiratory systems. Students learn about, and teach one another about, the functions and parts of these systems. They learn how to use features of reference books such as table of contents, index, headings, and diagrams. In the last few sessions, students learn that doctors use evidence from their patients' body systems to explain health problems and that doctors and scientists rely on evidence they observe themselves and evidence they read in books. Students also learn how to make a diagnosis themselves.
**About the Student Books**

Below are short descriptions of the five full-color *Digestion and Body Systems* student science books:

*Systems* develops the concept of systems through an analysis of parts that interact to create a whole. Photographs, diagrams, and tables convey the structure and function of a bicycle wheel and a bicycle. The book illustrates how parts work together—a bicycle is a collection of interacting parts including a seat, handlebars, a frame, a chain, pedals, and wheels. It shows how you can change a bicycle system so it works differently and you can change a bicycle system in ways that cause it not to work. The book goes on to discuss systems more broadly—the human body, a dishwasher, the Solar System. Triangle diagrams are used to show how different systems work together to form larger systems. This book helps students understand an important scientific concept and apply it in a variety of situations.

*Secrets of the Stomach* describes the work of three scientists who investigated how the stomach digests food. It outlines how each of them found evidence that added to the scientific community’s understanding of digestion. By reading this book, students learn that scientists base their explanations on evidence and that the best explanations are those that take into account all of the evidence. After looking at several explanations, students learn that acid juices in the stomach aid in the digestion of food. This book models how to make explanations based on evidence and how to revise explanations when new evidence is discovered.
**Voyage of a Cracker** follows the path a cracker takes as it is eaten and travels through the digestive system. Each page spread includes a real photograph that was taken inside the body, as well as a diagram indicating the part’s position in the body. As the students read the description of where the cracker has traveled, they are prompted to make inferences about which digestive organ is being described. This book provides images and context to deepen students’ understanding of a system that is largely unseen and helps to summarize what they have learned.

**Handbook of Body Systems** is a reference book with a section about each of the six most important systems in the body: the circulatory, digestive, musculo-skeletal, nervous, renal, and respiratory systems. Each section tells about the function and main parts of the system and briefly describes how the system works. Common problems that can occur within or between each system’s organs are also mentioned. Students use the book to learn basic information about several body systems.

**What’s the Diagnosis?** tells about Elaine Davenport, a real doctor who specializes in pediatric medicine. The book’s introduction describes how an important part of Dr. Davenport’s job is making diagnoses when patients are sick. The book presents two fictional accounts that are based on Dr. Davenport’s real experiences. In the first scenario, Dr. Davenport makes a diagnosis of the cause of a boy’s sore throat. As Dr. Davenport gathers evidence for the diagnosis, students learn the process involved in making a diagnosis. The second scenario introduces a patient who has an upset stomach. Students learn how to use the evidence collected by Dr. Davenport to make their own diagnosis of this patient.
### Unit Overview

**Science Knowledge/Conceptual Vocabulary**

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<th>Session</th>
<th>Knowledge</th>
<th>Vocabulary</th>
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<tr>
<td>1.1 Introduction to Systems</td>
<td>Science</td>
<td>Unit-specific digested digested function interaction structure system</td>
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<tr>
<td>1.2 Systems</td>
<td>Learning, PAGE 30</td>
<td>claim diagram evidence</td>
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<tr>
<td>1.3 Designing Dish-cleaning Systems</td>
<td>Literacy DEVELOPMENT, PAGE 44</td>
<td>investigation investigation observe observation</td>
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<td>1.4 Building Sorting Systems</td>
<td>Science/Literacy, PAGE 60</td>
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<td>1.5 Making Sense of Systems</td>
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<td><strong>WEEK 2</strong></td>
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<tr>
<td>1.6 Investigating the Mouth</td>
<td>Science</td>
<td>Unit-specific absorbed digested digestion esophagus function interaction nutrients organ stomach structure system</td>
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<tr>
<td>1.7 Writing About the Mouth and Esophagus</td>
<td>Literacy DEVELOPMENT, PAGE 104</td>
<td>claim diagram evidence</td>
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<td>1.8 Secrets of the Stomach</td>
<td>Reading, PAGE 112</td>
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<td>1.9 Making Explanations About the Stomach</td>
<td>Science/Literacy, PAGE 122</td>
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<tr>
<td>1.10 Making Sense of the Digestive System</td>
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### Science Inquiry/Reading Comprehension

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<tr>
<th>Inquiry</th>
<th>Reading</th>
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<tbody>
<tr>
<td>making observations</td>
<td>discussing words and their meanings</td>
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<tr>
<td>investigating scientific questions</td>
<td>interpreting visual representations</td>
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<tr>
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### Nature and Practices of Science/Oral and Written Discourse

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<tr>
<th>How Science Works, What Scientists Do</th>
<th>Writing, Listening/Speaking</th>
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<tbody>
<tr>
<td>scientists make explanations based on evidence</td>
<td>representing information visually</td>
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<tr>
<td>scientists use both descriptive writing and diagrams to communicate their ideas</td>
<td>writing descriptions</td>
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<tr>
<td>evidence is clues that help explain something or answer a question</td>
<td>writing explanations</td>
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<td>scientists discuss their investigations and ideas with one another in specific ways</td>
<td>recording information</td>
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<tr>
<td>scientists support their explanations with evidence</td>
<td>using science vocabulary</td>
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<tr>
<td>scientists discuss their investigations and ideas with one another in specific ways</td>
<td>participating in discussions</td>
</tr>
<tr>
<td>scientists support their explanations with evidence</td>
<td>presenting information</td>
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<tr>
<td>scientists discuss their investigations and ideas with one another in specific ways</td>
<td>making connections</td>
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<tr>
<td>scientists support their explanations with evidence</td>
<td>writing to communicate</td>
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<tr>
<td>scientists discuss their investigations and ideas with one another in specific ways</td>
<td>building on others’ ideas</td>
</tr>
<tr>
<td>scientists support their explanations with evidence</td>
<td>writing actively</td>
</tr>
<tr>
<td>scientists discuss their investigations and ideas with one another in specific ways</td>
<td>supporting claims with evidence</td>
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<tr>
<td>scientists support their explanations with evidence</td>
<td>posing and answering questions</td>
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### Session Details

- **WEEK 1**
  - **1.1 Introduction to Systems**
  - **1.2 Systems**
  - **1.3 Designing Dish-cleaning Systems**
  - **1.4 Building Sorting Systems**
  - **1.5 Making Sense of Systems**

- **WEEK 2**
  - **1.6 Investigating the Mouth**
  - **1.7 Writing About the Mouth and Esophagus**
  - **1.8 Secrets of the Stomach**
  - **1.9 Making Explanations About the Stomach**
  - **1.10 Making Sense of the Digestive System**
### At-a-Glance Chart

**Unit Overview**

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<td>2.1 Modeling the Small and Large Intestines <strong>SCIENCE INQUIRY, PAGE 160</strong></td>
<td>Science Knowledge/Conceptual Vocabulary</td>
<td>Science Inquiry/Reading Comprehension</td>
<td>Nature and Practices of Science/Oral and Written Discourse</td>
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<td><strong>WEEK 4</strong></td>
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<td><strong>WEEK 5</strong></td>
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**Science Knowledge/Conceptual Vocabulary**

- **Knowledge**
  - digested food from the stomach travels first into the small intestine, and then into the large intestine
  - ring-shaped muscles in the intestines help the food move through the intestines
  - the small intestine absorbs nutrients from food
  - the large intestine absorbs water from food
  - sphincters are ring-shaped muscles that close and open, found between some digestive system organs
  - nutrients are things absorbed by the digestive system that help the body grow and survive
  - blood carries nutrients to all parts of the body
  - each body system has a function that helps the body work
- **Vocabulary**
  - Unit-specific terms
  - absorb
  - digest
  - esophagus
  - function
  - interact
  - small intestine
  - large intestine
  - nutrients
  - organ
  - stomach
  - structure
  - system

**Science Inquiry/Reading Comprehension**

- Inquiry
  - using models
  - critiquing models
  - investigating scientific questions
  - accessing and applying prior knowledge
  - visualizing and using mental models
  - using features of informational text to locate information
  - making connections
- Reading
  - locating information in text
  - discussing words and their meanings
  - making inferences
  - visualizing
  - using text features
  - using a glossary
  - interpreting visual representations
  - recognizing text genres
- How Science Works, What Scientists Do
  - models can help make things easier to understand or investigate
  - scientists use different models to help them investigate the same thing in different ways
  - models are similar to the real thing in certain ways, but are different from the real thing in other ways
- Writing, Listening/Speaking
  - recording information
  - participating in discussions
  - making connections
  - gathering information
  - listening actively
  - taking notes
  - using features of informational text to locate information
  - making connections
  - using evidence to make a diagnosis is a common process in medicine
  - making explanations is a similar process across different areas of science
  - asking questions, conducting investigations, and making explanations are things scientists do in a specific way

**Science Inquiry/Reading Comprehension**

- Science Inquiry
  - claim
  - diagram
  - investigate/investigation
  - observe/observation
  - model
- Reading Comprehension
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