Sample Pages from

Created by Teachers for Teachers and Students

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Content and Literacy in Science

Grade 5

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Kit Components

Life Science books

Physical Science books

Earth and Space Science books

Scientific Practices book

Teacher’s Guide

Digital and Audio Resources

How to Use This Product
Observing Bounces

Before Reading

Materials list
Vocabulary Word Bank
Elaborate on the concept with a vocabulary and a prereading activity

During Reading

Introductory Activity
Lab Activity

After Reading

Materials list
Elaborate with an After Reading activity on Day 4
Evaluate with Assessments on Day 5

Student Reproducibles and Assessments

Clear directions
Multiple-choice quiz
Data Analysis activity
Pacing Plan

The following pacing plan shows an option for using this product. Teachers should customize this pacing plan according to their students’ needs. One lesson has been included for each of the 16 books. Each day of the lesson requires 30 to 45 minutes of time and spans 5 instructional days, for a total of approximately 40–60 hours over the course of 80 days.

<table>
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<th>Frequency</th>
<th>Setting</th>
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<td>30–45 min/day</td>
<td>5 days/week</td>
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Lab Safety

To ensure safety in the science classroom, a Science Safety Contract has been provided in the Digital Resources (safety.pdf). Distribute copies of this contract to students prior to beginning any science instruction. Discuss with students how to be respectful and responsible during science activities. Ask students and their parents/guardians to sign and return the contract for your records.
Science Strands

The books and lessons in this kit cover the three strands of science which encompass the Disciplinary Core Ideas. The icons in the lessons and on the back of the books denote each strand. One book in this kit is devoted completely to scientific practices. This book describes how to think like a scientist and study the natural world.

Differentiation

Students learn best when material is scaffolded appropriately. If a student is confronted with material that is too difficult, he or she may become frustrated and give up. However, if a student is not challenged enough, he or she may become bored and lose interest in the subject. Differentiation is not about making the work easy for students. Instead, it is about challenging all students appropriately.

The books in this kit are leveled to target and support different groups of learners. The chart on page 26 contains specific information on the reading levels of the books included in this kit. The lesson plans for these books have differentiation strategies to help above-, on-, and below-level learners comprehend the material. These strategies will ensure that students are actively engaged in learning while receiving the support or enrichment that they need.

English language learners have different instructional needs. Although these students may struggle with reading, that is not always the case. English language learners need different support depending on their level of English proficiency. The lesson plans in this kit offer suggestions to differentiate instruction for the unique needs of English language learners.

Differentiation Tools in This Kit

• Audio recordings of texts model fluency and support auditory learners.
• An Interactive eBook for each book supports students through video, audio, and other digital functions.
• Graphic organizers support visual learners and language learning.
• Hands-on lab activities engage tactile learners.
• Leveled books support above-, on-, and below-level learners.
• Differentiation strategies embedded in each lesson support a variety of learners.
Assessment

Assessment is an important part of this unit of study. The Science Readers series offers multiple assessment opportunities. You can gain insight into students’ learning through multiple-choice quizzes, small-group observations, analysis of written assignments, and a culminating activity. These formal and informal assessments provide you with the data needed to make informed decisions about what to teach and how to teach it. This is the best way for you to know who is struggling with various concepts and how to address the difficulties that students are experiencing with the curriculum.

Multiple-Choice Quizzes—At the end of each book’s lesson in this Teacher’s Guide is a short quiz with multiple-choice questions. These short assessments may be used as open-book evaluations or as review quizzes in which students read and study the content prior to taking the quiz. Additionally, the quizzes may be used as a more formal assessment to provide evidence of learning.

Data Analysis Activities—Each activity includes content-related data and text-dependent questions. These questions help students develop and strengthen critical thinking skills.

Culminating Activity—The culminating activity asks students to apply what they have learned throughout the units in an engaging and interactive way. Students use what they have learned to create new ideas in a real-life context.

Progress Monitoring—There are several points throughout each lesson where useful evaluations can be made. These evaluations can be made based on group, paired, and individual discussions and activities.
Technology Connections

The amount of information that is available to students through books, media, and the Internet is rapidly growing every day. Technology plays a key role in students’ ability to access that information, but teachers play a key role in helping develop students’ tools for understanding and using that information. Thus, it is vital that technology be integrated into the curriculum. According to the Partnership for 21st Century Skills (2009), the use of technology in the classroom can support effective curriculum implementation to do the following:

- promote greater student achievement
- increase student engagement
- assess student performance
- facilitate communication and collaboration
- build student proficiencies in 21st-century skills

Audio

This kit includes professional audio recordings for each of the 16 books to serve as a model of fluent reading. A detailed listing of the audio tracks is on page 237.

16 professional recordings (1 for each book)

Digital Resources

This kit includes the digital resources listed below. A more detailed listing is on pages 234–237.

- PDF versions of each book
- Microsoft Word® documents of the body text for each book
- student reproducible pages
- multiple-choice quizzes (one for each book)
- data analysis activities
- Interactiv-eBooks (one for each book)
Using Interactiv-eBooks

Interactiv-eBooks offer educators the unique opportunity to integrate technology into their curriculum for reading or content-area literacy instruction. Interactiv-eBooks guide students toward independent reading while exploring core concepts.

Teachers can determine whether to use Interactiv-eBooks in place of the print version of books or to supplement the use of the print version of books. Additionally, the use of Interactiv-eBooks will depend on the electronic resources available to both teachers and students (e.g., the availability of a projector, the number of student computer stations), and the method of use (e.g., whole-class, small-group, or individual-learning opportunities).

Interactiv-eBooks can benefit student learning in a variety of instructional settings, support English language acquisition, and further content and literacy learning. They are also perfect for lessons on an interactive whiteboard. The following best practices for reading and responding to literature can guide teachers to effectively incorporate Interactiv-eBooks into the curriculum and optimize learning.

Features for the Interactiv-eBooks

Navigation
- Prerecorded audio leads students through the text.
- A search bar helps easily locate key words and main ideas.

Tools That Make Sense

- **Pen**—Record notes directly on the page in the margins or annotate a picture.
- **Highlighter**—Highlight the sentence that tells the main idea.
- **Spotlight**—Examine graphic aids and develop visual literacy.
- **Notes**—Record and save thoughts and observations about the text.
- **Print**—Keep a printed record of student notes.
- **Zoom**—Look more closely at a graphic element (such as an illustration) for analysis and inference.
- **Record Audio**—Have students record themselves and analyze their fluency or record personal responses to text as they read.
Interactiv-eBooks and Interactive Whiteboards

Teachers who use Interactiv-eBooks with interactive whiteboards have the double advantage of using both the Interactiv-eBook functions and the interactive whiteboard functions, such as touch-screen navigation, the ability to hide projected text or images with screen shades (for prediction purposes), or the interactive keyboard to type notes exclusively on the board. All the interactive whiteboard functions that teachers have come to rely on can be used in conjunction with the Interactiv-eBooks.

Features for Building Literacy

Interactiv-eBooks have a wide variety of features that build literacy and engage readers.

- **Text-to-audio highlighting** supports struggling readers.
- **Professional audio recordings** promote fluency and vocabulary development.
- **Interactive activities and response-to-literature prompts** enrich the reading experience.
- **Whiteboard tools** offer opportunities to interact with the text and build key comprehension skills.
- **A writing activity** offers opportunities to make the reading-writing connection with support for **below-level students** and **English language learners**.

Features for Building Content Learning

- **Activities** bridge the gap between students’ background knowledge and the content presented in the book.
- **Easy-to-use tools** give students the power to increase their comprehension and master vocabulary.
Using Interactiv-eBooks (cont.)

Interactiv-eBooks and Whole-Class Instruction

Whole-class instruction is best suited for introducing a text to students or for teaching specific strategies or content-area concepts as they apply to instructional standards and benchmarks. Every student engages with the same text at the same time. Interactiv-eBooks support whole-class instruction in the following ways:

• Projected on the board, they create a large canvas for a shared literacy experience.

• Interactive features include the ability to highlight, circle, zoom, and make notes within the text:
  ➢ Teachers can provide student practice with before-reading tasks such as making predictions, and identifying and discussing key vocabulary words.
  ➢ Teachers and students can zoom in on specific words or images in the text.
  ➢ Teachers can write questions in the margins of the text for students to answer.
  ➢ Students can highlight key words and leave notes for further discussion.

• The pen tool can be used to model note-taking skills.

• The zoom tool can be used to draw attention to key aspects of the text.

• The audio feature allows students to hear the correct pronunciation of words.

• The text-to-speech audio highlighting allows students to see which words are being read and can be used as a model for fluent reading.

Interactiv-eBook and Small-Group Instruction

Interactiv-eBooks provide support for teachers who want to work with a specific group of students on a targeted comprehension or content skill. Choosing to use Interactiv-eBooks in this setting can greatly benefit instruction when compared to using individual print books only. For example:

• Students can quickly link to a projected Interactiv-eBook page. This limits transition times and fosters engagement.

• When identifying targeted vocabulary, students can use the following:
  ➢ the highlighter, pen tool, shape tool, and note tool to support making connections and internalizing essential terms
  ➢ the visuals in the text to further support their vocabulary development
  ➢ the zoom tool to focus on key aspects of a visual feature that communicates vocabulary, such as the labels on a diagram

• Text-to-audio highlighting can be used to support struggling readers in practicing fluency.

• Each Interactive-eBook provides accompanying interactive activities that can be used to strengthen and support student acquisition of essential concepts and vocabulary.

• Using Interactiv-eBooks in conjunction with print books allows teachers to demonstrate and model reading skills and strategies or teach content using the interactive features while students read and follow along in their own printed text.
Interactiv-eBooks and Independent Practice

Students can engage independently in Interactiv-eBooks to build fluency, comprehension, and vocabulary skills. They can use the tools in Interactiv-eBooks to navigate the books on their own. The interactive features included increase rigor and allow students to extend their own knowledge. For example:

- Students can use the audio and text highlighting features to listen to and reread the text in the Interactiv-eBook several times to improve their sight-vocabulary acquisition, automaticity, and accuracy.
- Students can record themselves reading the text (microphone required) using the Interactiv-eBook’s record function and can then listen to their reading to reflect on their reading.
- Students can practice vocabulary and build comprehension skills by completing the vocabulary and comprehension activities at the end of each Interactiv-eBook. Students can use the print function after completing the writing activity so answers can be assessed.
- Use these activities in conjunction with supplemental, paper-pencil, or digital vocabulary or comprehension tasks for additional learning opportunities.

Interactiv-eBooks and English Language Support

The Interactiv-eBooks provide support for English language learners through the following:

- Text features such as labels, captions, and vocabulary pop-ups support vocabulary acquisition and language development.
- Interactive activities support language acquisition and comprehension building.
- Text-to-audio highlighting models fluency and rate of speech.
- Audio recording allows students and teachers to reflect on student pronunciation and fluency.
Learning Objectives

Students will:

• identify cause-and-effect relationships in the text.
• write an opinion paragraph on whether we should do more space exploration.
• investigate how scientists compare light from different stars.

Standards

• **Reading**: Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.
• **Writing**: Write opinion pieces on topics or texts, supporting a point of view with reasons and information.
• **Content**: Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
• **Language**: Communicate information, ideas, and concepts necessary for academic success in the content area of Science.

Lesson Timeline

**Day 1**

**Task**

*Introductory and Lab Activities (page 183)*

**Summary of Student Learning Activities**

Observe patterns from different light sources.

**Day 2**

**Task**

*Before Reading (page 184)*

**Summary of Student Learning Activities**

Find cause-and-effect signal words in the text.

**Day 3**

**Task**

*During Reading (page 185)*

**Summary of Student Learning Activities**

Identify cause-and-effect relationships in the text, and write an opinion paragraph.

**Day 4**

**Task**

*After Reading (page 186)*

**Summary of Student Learning Activities**

Identify a cause with multiple effects in the text.

**Day 5**

**Task**

*Activity from the Book (page 186) and Assessments (pages 191–192)*

**Summary of Student Learning Activities**

Observe and record the stars, and take the assessments.
Materials

- copies of the Types of Light activity sheet (page 187)
- 2 light sources, such as a lamp and a flashlight
- boxes (cube-shaped is best)
- cardboard tubes
- CDs
- duct tape
- paper
- thin cardboard
- transparent, milky, plastic film such as tape or a white grocery bag

1. Illuminate both light sources. Ask students to compare and contrast the light from each source.

2. Explain to students that light coming from different stars can also be compared and contrasted. Tell students that they will learn how scientists observe light from stars.

Lab Activity

1. Place students in small groups. Distribute a box, a cardboard tube, a CD, duct tape, paper, cardboard, plastic film, and copies of the Types of Light activity sheet (page 187) to each group. Note: You may wish to distribute precut boxes and have students reference the illustrated directions on page 29 of the Stars book.

2. Have students tape paper over most of the CD, leaving a small section uncovered. Have students tape the CD inside the box so that the uncovered section is aligned with a corner of the box. Across from the uncovered section, have students cut a small hole about 5 centimeters (2 inches) in the box.

3. Have students tape two pieces of cardboard over the hole to create a small vertical slit about 1 millimeter (0.04 in.) wide. Have them tape the film over the slit.

4. On the side of the box adjacent to where the CD is exposed, have students cut a small hole and tape the cardboard tube around the hole to create an eyepiece.

5. Have students tape the box closed. Have them shine light from different sources through the slit, view them through the eyepiece, and record their observations.

6. Ask questions to guide students to the idea that light from different sources has different observable properties.
   ➢ How does the light from different sources differ?
   ➢ What do you think makes them appear different?
   ➢ How might this be useful to scientists?

7. Bring the class together for instruction. Clarify misconceptions by having students explain their understandings using logic and evidence to support their ideas.
Materials
- Stars books
- copies of the Signal Words activity sheet (page 188)
- chart paper

Vocabulary Word Bank
- constellations
- latitude
- light years
- nuclear fusion
- satellites

1. Write the vocabulary words on the board, and discuss their meanings. Show students pictures related to the words (pictures from the book may be used), use gestures to represent the words, or use the words in sentences that provide context for the meanings of the words. Then, write the following related words on the board: stars, distance, moon, shapes, gravity, Earth, fuel, and position. Ask students which words relate to each vocabulary word. Accept any as solutions as long as students can provide a logical explanation.

2. Display the Stars book for students. Show students a few of the images and other text features in the book. Tell students that there are many cause-and-effect relationships in this book. Explain that identifying the relationships between ideas in the text can help a reader better understand the text.

3. Read the sidebar on page 6 aloud. Tell students that in this piece of text, the cause is that talking about large distances can be overwhelming, and the effect is that astronomers measure distances in light years.

4. Help students create a list of signal words that identify cause-and-effect relationships. Record the words on a sheet of chart paper. Include words such as because, affect, since, so, if, when, and why. Note: Save this list for later use.

5. Distribute copies of the Signal Words activity sheet (page 188) to students. Have students use the book to complete the activity sheet. Discuss the signal words that students found most often. If students identify additional signal words, record these on the list.

➢ You may wish to have students digitally annotate the PDF of the text by circling cause-and-effect signal words.
Materials

- Stars books
- copies of the Exploring Space activity sheet (page 189)
- list of cause-and-effect signal words from the Before Reading activity

During Reading

1. Review the list of cause-and-effect signal words from the Before Reading activity. Distribute the Stars books to students. Read the book aloud as students follow along for the first reading. Pause periodically to point out cause-and-effect relationships and signal words in the text. For example, after reading page 7, explain to students that studying the sun is the cause, and astronomers learning things about stars is the effect.
   ➢ You may choose to display the Interactiv-eBook for a more digitally enhanced reading experience.

2. Have students read in small groups for the second reading. Have group members take turns reading paragraphs aloud. Ask them to discuss additional cause-and-effect relationships in the text. Tell students that they can identify connections in diagrams, sidebars, captions, and body text.
   ➢ For below-level learners and English language learners, you may choose to play the audio recording as students follow along to serve as a model of fluent reading. This may be done in small groups or at a listening station. The recordings will help struggling readers practice fluency and aid in comprehension.

3. As a class, discuss the connections students found. Add new signal words to the list, if needed.

4. Distribute copies of the Exploring Space activity sheet (page 189) to students. Discuss arguments for and against more space exploration, including potential discoveries and the cost of space exploration. Then, have students outline their paragraphs. Encourage students to reference the book, if needed. Have students use their outline to write a paragraph on a separate sheet of paper.
   ➢ Help below-level learners and English language learners locate sections in the book that might support their opinions.
   ➢ Have above-level learners include answers to possible objections in their paragraphs.
1. Play a short game to review the vocabulary words. Divide the class into two teams. Choose an artist from each team. Invite them to the front of the room, and show them one of the vocabulary words. Have each artist draw his or her own representation of the word on the board. Award a point to the team that guesses correctly first. You may choose to add other context-related words to make the game more challenging.

2. As a class, discuss the cause-and-effect relationships in the Stars book. Explain to students that one cause can have multiple effects. Provide real-life examples, such as if a boy tripped over his shoelaces, he could drop what he was holding and bump into another person. Explain how the effects happened at the same time and were caused by one event.

3. Distribute the Stars books and copies of the Many Effects activity sheet (page 190) to students. Have students reread the sidebar and study the image on page 15 of the book. Then, have them complete the activity sheet. Have students share their ideas with the class.

Activity from the Book

Read the Your Turn! prompt aloud from page 32 of the Stars book. Have students look at the night sky through an empty tube and count the stars they see.

1. A short posttest, Stars Quiz (page 191), is provided to assess student learning from the book.

2. A data analysis activity, Planet Days and Years (page 192), is provided to assess students’ understanding of how to analyze scientific data. Explain to students that the chart shows how long each day and year is on various planets compared to those on Earth.

3. The Interactiv eBook activities may be used as a form of assessment (optional).
### Types of Light

**Directions:** Record the light sources you test and your observations.

<table>
<thead>
<tr>
<th>Light Source</th>
<th>Observations</th>
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</table>
**Signal Words**

**Directions:** Skim the text to find cause-and-effect signal words. Use the chart below to record words you find.

<table>
<thead>
<tr>
<th>Word</th>
<th>Page</th>
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</tbody>
</table>
Exploring Space

Directions: Write a paragraph explaining whether we should do more space exploration. Use the chart below to outline your paragraph.

Opinion

Reason

Evidence

Reason

Evidence
Many Effects

Directions: Reread the sidebar and study the image on page 15 of the text. Label the cause and the effects. Then, describe how one cause had multiple effects.

_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
_________________________________________________________________
Stars Quiz

Directions: Read each question. Choose the best answer. Fill in the bubble for the answer you have chosen.

1. What causes a star to die?
   - A. It evaporates.
   - B. It is launched out of a black hole.
   - C. Other stars get too close to it.
   - D. It runs out of hydrogen, or fuel.

2. What is the effect of nuclear fusion in a main sequence star?
   - A. The star burns out.
   - B. It releases a massive amount of heat and energy.
   - C. Hydrogen atoms explode.
   - D. Hydrogen atoms move away from each other.

3. Why was it easy to see stars long ago?
   - A. There were more stars.
   - B. The stars were not so far away.
   - C. There were no bright city lights.
   - D. People used advanced telescopes.

4. What object has such strong gravity that even light cannot escape it?
   - A. black hole
   - B. supernova
   - C. galaxy
   - D. protostar

5. What works together to keep a star stable?
   - A. heat and light
   - B. nuclear fusion and light
   - C. nuclear fusion and gravity
   - D. magnetism and gravity

6. An object in space that orbits another object is a ________.
   - A. constellation
   - B. satellite
   - C. dwarf
   - D. supernova
Planet Days and Years

Directions: The chart shows days (one full rotation) and years (one full revolution around the sun) on other planets in relation to Earth. It also shows their distances from the sun in kilometers and miles. Use the data to answer the questions.

<table>
<thead>
<tr>
<th>Planet</th>
<th>Day</th>
<th>Year</th>
<th>Distance from Sun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mercury</td>
<td>59 days</td>
<td>88 days</td>
<td>57 million km (35 million mi.)</td>
</tr>
<tr>
<td>Venus</td>
<td>243 days</td>
<td>225 days</td>
<td>108 million km (67 million mi.)</td>
</tr>
<tr>
<td>Earth</td>
<td>24 hours</td>
<td>365 days</td>
<td>150 million km (93 million mi.)</td>
</tr>
<tr>
<td>Mars</td>
<td>25 hours</td>
<td>687 days</td>
<td>228 million km (142 million mi.)</td>
</tr>
<tr>
<td>Jupiter</td>
<td>10 hours</td>
<td>12 years</td>
<td>779 million km (484 million mi.)</td>
</tr>
<tr>
<td>Saturn</td>
<td>11 hours</td>
<td>29.5 years</td>
<td>1.43 billion km (889 million mi.)</td>
</tr>
<tr>
<td>Uranus</td>
<td>17 hours</td>
<td>84 years</td>
<td>2.88 billion km (1.79 billion mi.)</td>
</tr>
<tr>
<td>Neptune</td>
<td>16 hours</td>
<td>165 years</td>
<td>4.50 billion km (2.8 billion mi.)</td>
</tr>
</tbody>
</table>

1. Which planet has the longest year? ____________________________
2. Which planet has the longest day? ____________________________
3. What planet has a rotation and revolution that are almost the same? How can you tell?
   __________________________________________________________
   __________________________________________________________
4. What is the connection between the distance from the sun and the length of the year on other planets?
   __________________________________________________________
   __________________________________________________________
Have you ever looked up at the night sky and been amazed by the scattered twinkling lights? You are not alone! People have been captivated by the stars for thousands of years. Some were so starstruck that they studied their every move.

Early stargazers learned the stars could provide useful information. Ancient Egyptians planned their lives around Sirius, the Dog Star. Egyptian farmers knew they could plant crops in the moist soil after Sirius rose in the sky. The ancient Phoenicians (fi-NEE-shuhnz) navigated the seas using the night sky. They learned the annual patterns of the stars. At certain times of the year, the sun and the stars would be at fixed distances from the horizon. They used their fingers to measure the stars’ positions. The Greeks named the stars after gods, heroes, and animals from their stories. The Chinese from the Han Dynasty grouped the constellations by the four directions—East (Dragon), West (Tiger), North (Tortoise), and South (Scarlet Bird). The Native American Tewa tribe named the Milky Way the “Endless Trail.” They saw the constellation Orion as Long Sash, a hero who led his people away from their troubles on the Endless Trail.
Ancient and modern navigators have used stars and fascinating tools to guide their travels at night. The kamal is an early device that measures **latitude**. The astrolabe (AS-truh-leyb) is used to locate and predict positions of the sun, moon, planets, and stars. The sextant is one-sixth of a circle and measures the angle between an object in the sky and the horizon.