INTRODUCTION

Each FOSS investigation follows a similar design to provide multiple exposures to science concepts. The design includes these pedagogies.

- Active investigation, including outdoor experiences
- Writing in science notebooks to answer focus questions
- Reading in FOSS Science Resources
- Assessment to monitor progress and motivate student reflection on learning

In practice, these components are seamlessly integrated into a continuum designed to maximize every student’s opportunity to learn. An instructional sequence may move from one pedagogy to another and back again to ensure adequate coverage of a concept.

The FOSS instructional design recognizes the important role of language in science learning. Throughout the pedagogical design elements, students engage in the practices of the Common Core State Standards for English Language Arts. The purpose of this chapter is to provide the big picture of how FOSS provides opportunities for the development and exercising of these practices through science. The following pages have a table that identifies these opportunities in the three FOSS modules for the fourth grade.
Guiding Principles

When integrating language-arts instruction with FOSS, keep in mind these guiding principles:

• FOSS investigations follow a clear and coherent conceptual flow and a consistent instructional design. Students develop science knowledge by building a framework of concepts and supporting ideas.

• Common Core State Standards for ELA are introduced, developed, and practiced in the context of learning science content and engaging in the science and engineering practices. Students read and comprehend complex science texts related to their prior experience and knowledge. They write informational/explanatory texts, arguments to support claims, and narratives about experiences in science. They engage in collaborative discussions about science and learn new vocabulary and language structures in context.

• The decision to use additional science texts, writing tasks, oral discourse opportunities, and vocabulary development activities is based on how well they address the science as well as the ELA standards.

• Instruction is differentiated to meet the needs of all students; the linguistic accommodations that are made for English learners support comprehensible input and accelerate academic language development. Language objectives for English learners in science instruction include the application of strategies that support construction of meaning from academic discussions and complex text, participation in productive discourse, and the ability to express ideas in writing clearly and coherently according to task, purpose, and audience.

• Formative assessment tools are used routinely to measure progress toward science understanding, use of science and engineering practices, and meeting literacy and language development goals. Assessment is viewed as a way to make student thinking visible and to determine next steps for instruction for both science and literacy. Instruction includes opportunities for students to assess themselves and peers.

Adhering to these guiding principles optimizes instructional time and, most importantly, benefits student learning by providing authentic and relevant contexts for building content knowledge, applying meaning-making strategies, and developing language and literacy skills.

Fourth grade marks an important transition to using literacy skills as tools for making meaning in content areas. Fourth graders read widely and deeply from a range of challenging informational texts that support
their content learning and expand their vocabulary. They communicate in more complex and flexible ways that demonstrate understanding of purpose and audience. Fourth graders are expected to use the science and engineering practices to demonstrate their understanding of the core ideas. To accomplish this, students apply language structures for sequencing, comparing and contrasting, determining cause-and-effect relationships, and problem-solving.

**Instructional Flow**

In almost all investigations, the instructional flow is the same and provides these opportunities for effective integration of ELA standards.

- When **setting the context** for the lesson, students activate prior knowledge through class or small-group discussions where they recount an experience using appropriate facts and relevant, descriptive details (SL 4).

- During the **active investigation**, students are expected to work with partners and in collaborative groups, and to engage in teacher-led discussions where they build on each other’s ideas and express their own clearly (SL 1).

- In the **data management** phase, students make observations, and then routinely record and organize data in their notebooks (W 10). The notebook provides a space for students to recall information from experience, gather information from print and other media, take notes, and categorize information (W 8) and to acquire and use general academic and domain-specific words and phrases (L 6).

- The **analysis** phase involves discussing data, constructing and writing explanations, and engaging in argumentation. Here, students are making meaning by writing explanatory texts (W 2), writing opinion pieces supporting a point of view with reasons (W 1), or conducting short research projects that build knowledge through investigation of different aspects of a topic. (W 7).

- **Reading** articles in *FOSS Science Resources* and other recommended readings provides a plethora of opportunities to address all the fourth-grade reading standards for informational text.

- Lastly, the **assessment** tools and next-step strategies for engaging students in high-level critical thinking support the development of the Common Core State Standards capacities of the literate individual: demonstrate independence, build strong content knowledge, comprehend as well as critique, and value evidence.

Again, we have provided you with some examples of how FOSS connects to the fourth-grade ELA standards; there are many more opportunities waiting to be created and explored by you and your students.
<table>
<thead>
<tr>
<th>Standard</th>
<th>Energy Module</th>
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</table>
| 1. Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text. | Discuss articles in FOSS Science Resources  
Inv 1, Part 1, Step 21; Inv 1, Part 2, Step 26  
Inv 1, Part 3, Step 29; Inv 1, Part 4, Step 13  
Inv 2, Part 2, Step 26; Inv 2, Part 3, Step 23  
Inv 3, Part 1, Step 19; Inv 3, Part 3, Step 15  
Inv 4, Part 2, Steps 17, 18; Inv 4, Part 3, Step 19  
Inv 5, Part 1, Step 21; Inv 5, Part 2, Step 30  
Inv 5, Part 3, Step 24 |
| 2. Determine the main idea of a text and explain how it is supported by key details; summarize the text. | Discuss and review articles in FOSS Science Resources  
Inv 1, Part 2, Step 25; Inv 1, Part 3, Step 29  
Inv 2, Part 2, Step 26; Inv 2, Part 3, Step 22  
Inv 3, Part 1, Step 18; Inv 3, Part 2, Step 14  
Inv 4, Part 1, Steps 15, 16; Inv 4, Part 3, Step 21  
Inv 5, Part 2, Steps 24, 29, 30; Inv 5, Part 3, Step 23 |
| 3. Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text. | Discuss articles in FOSS Science Resources  
Inv 1, Part 1, Step 21; Inv 1, Part 2, Step 26  
Inv 1, Part 3, Step 30; Inv 1, Part 4, Step 13  
Inv 2, Part 2, Step 26; Inv 2, Part 3, Steps 19, 20, 23  
Inv 3, Part 1, Step 19; Inv 3, Part 2, Step 16; Inv 3, Part 3, Step 15; Inv 4, Part 1, Step 15; Inv 4, Part 2, Step 19; Inv 4, Part 3, Step 19; Inv 5, Part 1, Step 21  
Inv 5, Part 2, Steps 24, 30; Inv 5, Part 3, Step 24 |
| 4. Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a grade 4 topic or subject area. | All investigations provide opportunities for students to determine the meaning of academic and science-specific words and phrases while reading articles in FOSS Science Resources.  
Selected examples  
Inv 1, Part 1, Step 21; Inv 1, Part 2, Step 25  
Inv 2, Part 2, Step 25; Inv 3, Part 1, Step 19  
Inv 4, Part 2, Steps 17, 18; Inv 4, Part 3, Steps 21-25  
Inv 5, Part 1, Steps 19–20; Inv 5, Part 2, Step 2 |
| 5. Describe the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in a text or part of a text. | Discuss text structure in FOSS Science Resources  
Inv 1, Part 3, Step 30; Inv 1, Part 4, Step 12  
Inv 2, Part 3, Steps 18, 20, 21  
Inv 3, Part 3, Step 14  
Inv 4, Part 2, Step 18  
Inv 5, Part 3, Step 25 |
# Reading Standards for Informational Text

## Environments Module

<table>
<thead>
<tr>
<th>Discuss articles in FOSS Science Resources</th>
<th>Discuss and review articles in FOSS Science Resources</th>
<th>Discuss text structure in FOSS Science Resources</th>
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</thead>
<tbody>
<tr>
<td>Inv 1, Part 1, Steps 19, 36; Inv 1, Part 2, Steps 16, 28</td>
<td>Inv 1, Part 1, Steps 19, 36; Inv 1, Part 2, Steps 28, 29; Inv 1, Part 3, Step 13</td>
<td>Inv 1, Part 1, Step 17; Inv 1, Part 2, Step 16</td>
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<tr>
<td>Inv 1, Part 3, Step 16</td>
<td>Inv 2, Part 1, Steps 23; Inv 2, Part 2, Steps 19, 20, 22</td>
<td>Inv 2, Part 1, Step 21; Inv 2, Part 2, Steps 18, 20</td>
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<td>Inv 3, Part 3, Step 13; Inv 3, Part 4, Step 18</td>
<td>Inv 4, Part 1, Steps 46, 49, 51; Inv 4, Part 2, Step 17</td>
<td>Inv 4, Part 1, Steps 46, 50; Inv 4, Part 2, Step 16</td>
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## Soils, Rocks, and Landforms Module

<table>
<thead>
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<th>Discuss and review articles in FOSS Science Resources</th>
<th>Discuss text structure in FOSS Science Resources</th>
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<tbody>
<tr>
<td>Inv 1, Part 1, Step 21; Inv 1, Part 3, Step 20</td>
<td>Inv 1, Part 1, Step 21; Inv 2, Part 1, Step 19; Inv 2, Part 4, Steps 17, 18</td>
<td>Inv 1, Part 1, Step 20</td>
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<td>Inv 2, Part 1, Step 20; Inv 2, Part 4, Steps 18, 21</td>
<td>Inv 2, Part 1, Step 20; Inv 2, Part 4, Steps 17, 18</td>
<td>Inv 2, Part 1, Step 20; Inv 2, Part 4, Steps 17, 18</td>
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<td>Inv 3, Part 1, Step 22; Inv 3, Part 2, Step 14</td>
<td>Inv 3, Part 1, Step 22; Inv 3, Part 2, Step 14</td>
<td>Inv 3, Part 1, Step 22; Inv 3, Part 2, Step 14</td>
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<td>Inv 3, Part 4, Step 11</td>
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<td>Inv 4, Part 1, Steps 11, 13; Inv 4, Part 2, Step 11</td>
<td>Inv 4, Part 1, Steps 11, 13; Inv 4, Part 2, Step 11</td>
<td>Inv 4, Part 1, Steps 11, 13; Inv 4, Part 2, Step 11</td>
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<td>Inv 4, Part 3, Step 16</td>
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<td>Inv 4, Part 3, Step 16</td>
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## Additional Information

- **All investigations provide opportunities for students to determine the meaning of academic and science-specific words and phrases while reading articles in FOSS Science Resources.**
  - Selected examples:
    - Inv 1, Part 1, Steps 18, 19; Inv 1, Part 2, Step 16
    - Inv 2, Part 2, Step 18; Inv 2, Part 4, Steps 20-24
    - Inv 3, Part 1, Step 15; Inv 3, Part 2, Steps 9, 17
    - Inv 4, Part 1, Step 51; Inv 4, Part 2, Step 17

- **All investigations provide opportunities for students to determine the meaning of academic and science-specific words and phrases while reading articles in FOSS Science Resources.**
  - Selected examples:
    - Inv 1, Part 1, Step 20; Inv 1, Part 3, Step 20
    - Inv 2, Part 4, Step 22; Inv 3, Part 2, Step 13
    - Inv 4, Part 1, Step 12; Inv 4, Part 2, Step 11
    - Inv 4, Part 3, Step 16
## READING STANDARDS FOR INFORMATIONAL TEXT

<table>
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<tr>
<th>Standard</th>
<th>Energy Module</th>
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<tr>
<td>6. Compare and contrast a firsthand and secondhand account of the same event or topic; describe the differences in focus and the information provided.</td>
<td>Read and compare articles in FOSS Science Resources to the active investigation. Selected examples Inv 1, Part 1, Step 21 Inv 2, Part 2, Step 25 Inv 3, Part 1, Step 17; Inv 3, Part 3, Step 15 Inv 4, Part 1, Steps 14, 15; Inv 4, Part 2, Step 19 Inv 4, Part 3, Step 17 Inv 5, Part 1, Step 20</td>
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<td>7. Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.</td>
<td>Analyze and discuss illustrations used to support understanding in FOSS Science Resources. Selected examples Inv 1, Part 1, Step 19; Inv 1, Part 2, Step 24 Inv 1, Part 3, Step 29; Inv 1, Part 4, Step 12 Inv 2, Part 2, Step 25; Inv 2, Part 3, Steps 21, 22 Inv 3, Part 1, Step 17; Inv 3, Part 2, Step 16 Inv 4, Part 1, Steps 13, 15; Inv 4, Part 2, Steps 17, 18 Inv 4, Part 3, Steps 17, 18, 21, 24 Inv 5, Part 3, Step 25</td>
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<tr>
<td>8. Explain how an author uses reasons and evidence to support particular points in a text.</td>
<td>Read and discuss articles in FOSS Science Resources Inv 1, Part 3, Step 29 Inv 2, Part 3, Steps 21, 22 Inv 4, Part 3, Step 22</td>
</tr>
<tr>
<td>9. Integrate information from two texts on the same topic in order to write or speak about the subject knowledgeably.</td>
<td>Students can read their FOSS Science Resources as well as readings suggested on FOSSweb. Using these two texts, students integrate the information when speaking and writing about science content. Selected examples Inv 1, Language Extensions. Read Dear Mr. Henshaw Inv 3, Part 3, Step 16 Inv 4, Part 3, Step 22 Inv 5, Language Extensions. Travel through the looking glass</td>
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<tr>
<td>10. By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.</td>
<td>All investigations provide opportunities for students to develop their ability to read and comprehend complex informational science text such as FOSS Science Resources.</td>
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<tr>
<td>Environments Module</td>
<td>Soils, Rocks, and Landforms Module</td>
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| Read and compare articles in *FOSS Science Resources* to the active investigation.  
Selected examples  
Inv 1, Part 2, Steps 27, 29; Inv 1, Part 3, Step 16  
Inv 2, Part 4, Step 22  
Inv 3, Part 1, Step 14; Inv 3, Part 2, Steps 9, 15, 17  
Inv 4, Part 1, Step 48 | Read and compare articles in *FOSS Science Resources* to the active investigation.  
Selected examples  
Inv 1, Part 1, Step 20  
Inv 2, Part 1, Step 19; Inv 2, Part 4, Step 18  
Inv 3, Part 1, Step 21 |
| Analyze and discuss illustrations used to support understanding in *FOSS Science Resources*.  
Selected examples  
Inv 1, Part 1, Steps 17-19, 34; Inv 1, Part 2, Steps 14, 27  
Inv 2, Part 1, Steps 20, 21, Inv 2, Part 2, Steps 18, 19, 21  
Inv 2, Part 3, Step 22; Inv 2, Part 4, Steps 20, 23  
Inv 3, Part 1, Steps 14-15; Inv 3, Part 2, Steps 7, 15  
Inv 3, Part 4, Step 17  
Inv 4, Part 1, Steps 48, 50; Inv 4, Part 2, Step 16 | Analyze and discuss illustrations used to support understanding in *FOSS Science Resources*.  
Selected examples  
Inv 1, Part 1, Step 20; Inv 1, Part 3, Steps 19, 20  
Inv 2, Part 1, Step 18; Inv 2, Part 4, Steps 17, 20, 21  
Inv 3, Part 1, Step 21; Inv 3, Part 2, Step 14  
Inv 3, Part 4, Step 10  
Inv 4, Part 1, Steps 10, 14; Inv 4, Part 2, Step 10  
Inv 4, Part 3, Steps 12, 14 |
| Read and discuss articles in *FOSS Science Resources*  
Inv 1, Part 1, Step 36  
Inv 2, Part 3, Step 25; Inv 2, Part 4, Step 24  
Inv 4, Part 1, Step 50 | Read and discuss articles in *FOSS Science Resources*  
Inv 1, Part 1, Steps 20, 21; Inv 1, Part 3, Step 19  
Inv 2, Part 4, Step 20 |
| Students can read *FOSS Science Resources* as well as readings suggested on FOSSweb. Using these two texts, students integrate the information when speaking and writing about science content.  
Selected examples  
Inv 1, Part 3, Step 17  
Inv 2, Part 2, Step 24; Inv 2, Part 3, Steps 15, 24  
Inv 3, Part 3, Step 15  
Inv 4, Part 1, Step 50; Inv 4, Part 2, Step 18 | Students can read *FOSS Science Resources* as well as readings suggested on FOSSweb. Using these two texts, students integrate the information when speaking and writing about science content.  
Selected example  
Inv 3, Part 2, Step 15 |
| All investigations provide opportunities for students to develop their ability to read and comprehend complex informational science text such as *FOSS Science Resources*. | All investigations provide opportunities for students to develop their ability to read and comprehend complex informational science text such as *FOSS Science Resources*. |
### Standard 3: Know and apply grade-level phonics and word analysis skills in decoding words.

- **a.** Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

### Energy Module

All investigations provide opportunities for students to apply decoding skills while reading articles in FOSS Science Resources.

**Selected example**

Inv 1, Part 1, Step 21

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### Standard 4: Read with sufficient accuracy and fluency to support comprehension.

- **a.** Read grade-level text with purpose and understanding.
- **b.** Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.
- **c.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

### Energy Module

All investigations provide opportunities for students to practice reading with accuracy and fluency.

**Selected examples**

Inv 1, Part 1, Step 20; Inv 1, Part 2, Step 25
Inv 1, Part 3, Step 29; Inv 1, Part 4, Step 12
Inv 2, Part 2, Step 25; Inv 2, Part 3, Steps 19, 22
Inv 3, Part 1, Step 19; Inv 3, Part 2, Steps 14, 16
Inv 3, Part 3, Step 14
Inv 4, Part 1, Step 14; Inv 4, Part 2, Step 18
Inv 4, Part 3, Steps 18, 21, 24
Inv 5, Part 1, Step 19; Inv 5, Part 2, Steps 23, 26, 29
Inv 5, Part 3, Steps 23, 25
### Environments Module

All investigations provide opportunities for students to apply decoding skills while reading articles in *FOSS Science Resources*.

Selected examples
- Inv 1, Part 1, Steps 17, 18; Inv 1, Part 2, Step 16
- Inv 2, Part 4, Step 22

### Soils, Rocks, and Landforms Module

All investigations provide opportunities for students to apply decoding skills while reading articles in *FOSS Science Resources*.

Selected examples
- Inv 1, Part 1, Step 20; Inv 1, Part 3, Step 20
- Inv 2, Part 4, Step 22

### Reading Standards: Foundational Skills

#### 3. Know and apply grade-level phonics and word analysis skills in decoding words.

- **a.** Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

All investigations provide opportunities for students to apply decoding skills while reading articles in *FOSS Science Resources*.

Selected examples
- Inv 1, Part 1, Step 20; Inv 1, Part 3, Step 20
- Inv 2, Part 4, Step 22

#### 4. Read with sufficient accuracy and fluency to support comprehension.

- **a.** Read grade-level text with purpose and understanding.
- **b.** Read grade-level prose and poetry orally with accuracy, appropriate rate, and expression on successive readings.
- **c.** Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

All investigations provide opportunities for students to practice reading with accuracy and fluency.

Selected examples
- Inv 1, Part 1, Step 20; Inv 1, Part 2, Step 25
- Inv 1, Part 3, Step 29; Inv 1, Part 4, Step 12
- Inv 2, Part 2, Step 25; Inv 2, Part 3, Steps 19, 22
- Inv 3, Part 1, Step 19; Inv 3, Part 2, Steps 14, 16
- Inv 3, Part 3, Step 14
- Inv 4, Part 1, Step 14; Inv 4, Part 2, Step 18
- Inv 4, Part 3, Steps 18, 21, 24
- Inv 5, Part 1, Step 19; Inv 5, Part 2, Steps 23, 26, 29
- Inv 5, Part 3, Steps 23, 25

All investigations provide opportunities for students to practice reading with accuracy and fluency.

Selected examples
- Inv 1, Part 1, Step 18; Inv 1, Part 2, Steps 15, 28
- Inv 1, Part 3, Steps 14, 15
- Inv 2, Part 1, Step 21, 22; Inv 2, Part 2, Step 18
- Inv 2, Part 3, Steps 22, 25; Inv 2, Part 4, Steps 21, 23
- Inv 3, Part 1, Step 15; Inv 3, Part 2, Steps 6, 15, 16
- Inv 3, Part 3, Step 12; Inv 3, Part 4, Step 17
- Inv 4, Part 1, Steps 46, 48, 50; Inv 4, Part 2, Step 16
- Inv 4, Part 1, Step 19; Inv 4, Part 2, Step 20
- Inv 2, Part 1, Step 19; Inv 2, Part 4, Steps 17, 21
- Inv 3, Part 1, Step 21; Inv 3, Part 2, Step 13
- Inv 3, Part 4, Step 10
- Inv 4, Part 1, Step 10; Inv 4, Part 2, Step 10
- Inv 4, Part 1, Step 10; Inv 4, Part 2, Step 10
### Writing Standards

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<th>Standard</th>
<th>Energy Module</th>
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| 1. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.  
   a. Introduce a topic or text clearly, state an opinion, and create an organizational structure in which related ideas are grouped to support the writer’s purpose.  
   b. Provide reasons that are supported by facts and details.  
   c. Link opinion and reasons using words and phrases (e.g., *for instance, in order to, in addition*).  
   d. Provide a concluding statement or section related to the opinion presented. | All investigations provide opportunities for students to write their opinion, or claim, supported by reasons. Students answer questions (focus question, response sheets, assessments) by stating their claim supported by evidence and reasoning.  
Selected example  
Inv 1, Part 4, Step 10 |
| 2. Write informative/explanatory texts to examine a topic and convey ideas and information clearly.  
   a. Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.  
   b. Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.  
   c. Link ideas within categories of information using words and phrases (e.g., *another, for example, also, because*).  
   d. Use precise language and domain-specific vocabulary to inform about or explain the topic.  
   e. Provide a concluding statement or section related to the information or explanation presented. | All investigations provide opportunities for students to write explanatory texts to examine the science topic they are learning. In every part, students write an explanation as part of their answer to the focus question or the response sheet.  
Selected examples  
Inv 1, Part 1, Step 16; Inv 1, Part 2, Step 22  
Inv 1, Part 3, Steps 14, 26, 27, 30  
Inv 2, Part 1, Step 17; Inv 2, Part 2, Steps 22, 23  
Inv 2, Part 3, Step 17  
Inv 3, Part 1, Step 15; Inv 3, Part 2, Step 11  
Inv 4, Part 2, Step 19; Inv 4, Part 3, Step 15  
Inv 5, Part 2, Step 20  
Students write a summary paragraph in the Wrap-up section at the end of every investigation. |
| 3. Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.  
   a. Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.  
   b. Use dialogue and description to develop experiences and events or show the responses of characters to situations.  
   c. Use a variety of transitional words and phrases to manage the sequence of events.  
   d. Use concrete words and phrases and sensory details to convey experiences and events precisely.  
   e. Provide a conclusion that follows from the narrated experiences or events. | All investigations provide opportunities for students to write narratives. Students describe their observations and experiences with the science ideas they are exploring.  
Selected examples  
Inv 1, Language Extensions. Imagine no electricity  
Inv 2, Language Extensions. Write a story  
Inv 3, Part 3, Step 12 |
<table>
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<td><strong>Environments Module</strong></td>
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<tr>
<td><strong>Selected examples</strong></td>
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<tr>
<td>Inv 1, Part 2, Steps 19, 33, 36, 37</td>
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<tr>
<td>Inv 2, Part 2, Step 22; Inv 2, Part 4, Step 19</td>
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<tr>
<td>Inv 3, Part 3, Step 8</td>
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<td>All investigations provide opportunities for students to write explanatory texts to examine the science topic they are learning. In every part, students write an explanation as part of their answer to the focus question or the response sheet.</td>
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<td><strong>Selected examples</strong></td>
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<tr>
<td>Inv 1, Part 1, Steps 19, 24; Inv 1, Part 3, Step 10</td>
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<tr>
<td>Inv 1, Language Extension, Write organism booklets</td>
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<td>Inv 2, Part 1, Step 9; Inv 2, Part 2, Step 12</td>
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<td>Inv 2, Part 3, Step 19; Inv 2, Part 4, Steps 19, 22</td>
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<td>Inv 3, Part 1, Step 13</td>
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<td>Inv 1, Language Extension. Write soil stories</td>
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<td>Inv 2, Part 2, Step 23; Inv 2, Part 3, Step 10</td>
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<td>Inv 3, Language Extension. Create maps of fictional places</td>
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### WRITING STANDARDS (continued)

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| 4. Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3.) | All investigations provide opportunities for students to record and organize their data in their science notebooks. Based on their data, students construct and write their explanations.  
Selected examples  
Inv 1, Part 1, Step 16; Inv 1, Part 2, Steps 22, 24; Inv 1, Part 3, Steps 11, 14, 30; Inv 1, Part 4, Step 10  
Inv 2, Part 1, Step 17; Inv 2, Part 2, Steps 20, 22, 23  
Inv 2, Part 3, Step 17; Inv 2, Language Extensions.  
Write directions for compass use  
Inv 3, Part 2, Step 11; Inv 3, Part 3, Step 12  
Inv 4, Part 2, Step 14; Inv 4, Part 2, Step 19 |
| 5. With guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, and editing. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 4.) | The Wrap-up/Warm-up section of each investigation part provides the opportunity for students to strengthen their notebook entries by revising and adding in new information.  
Inv 1, Part 1, Step 37  
Inv 2, Part 1, Step 12; Inv 2, Part 2, Steps 20, 22  
Inv 2, Part 4, Step 22  
Inv 3, Part 2, Step 31  
Inv 4, Part 1, Step 49  
The Wrap-up review focus question section at the end of each investigation and next-step strategies after answering the response sheets or taking the I-Check also serve as a method for strengthening writing.  
Inv 3, Part 2, Step 13  
Inv 4, Part 2, Step 19 |
| 6. With some guidance and support from adults, use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of one page in a single sitting. |  
Full Option Science System |
### Environments Module

All investigations provide opportunities for students to record and organize their data in their science notebooks. Based on their data, students construct and write their explanations.

Selected examples
- Inv 1, Part 1, Steps 19, 24; Inv 1, Part 2, Steps 19, 33
- Inv 1, Part 3, Step 10
- Inv 2, Part 1, Step 9; Inv 2, Part 2, Steps 12, 19
- Inv 2, Part 4, Steps 18, 19, 22
- Inv 3, Part 1, Step 13; Inv 3, Part 2, Step 13
- Inv 3, Part 3, Steps 8, 10
- Inv 4, Part 2, Steps 14, 15

The Wrap-up/Warm-up section of each investigation part provides the opportunity for students to strengthen their notebook entries by revising and adding in new information.

- Inv 1, Part 1, Step 37
- Inv 2, Part 1, Step 12
- Inv 2, Part 3, Step 23
- Inv 2, Part 4, Step 22
- Inv 3, Part 2, Step 31
- Inv 4, Part 1, Step 49

The Wrap-up review focus question section at the end of each investigation and next-step strategies after answering the response sheets or taking the I-Check also serve as a method for strengthening writing.

### Soils, Rocks, and Landforms Module

All investigations provide opportunities for students to record and organize their data in their science notebooks. Based on their data, students construct and write their explanations.

Selected examples
- Inv 1, Part 1, Step 17; Inv 1, Part 2, Steps 6, 8
- Inv 2, Part 1, Step 14; Inv 2, Part 2, Steps 7, 13, 15, 20-21, 23;
- Inv 2, Part 3, Steps 4, 10, 11; Inv 2, Part 4, Step 14
- Inv 3, Part 1, Steps 18, 20; Inv 3, Part 2, Step 10
- Inv 3, Part 3, Step 13; Inv 3, Part 4, Step 7
- Inv 4, Part 1, Steps 8, 9; Inv 4, Part 3, Step 11

The Wrap-up/Warm-up section of each investigation part provides the opportunity for students to strengthen their notebook entries by revising and adding in new information.

- Inv 1, Part 1, Step 22
- Inv 2, Part 1, Step 21; Inv 2, Part 2, Steps 20, 28
- Inv 2, Part 4, Step 19

The Wrap-up review focus question section at the end of each investigation and next-step strategies after answering the response sheets or taking the I-Check also serve as a method for strengthening writing.
## WRITING STANDARDS (continued)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Energy Module</th>
</tr>
</thead>
<tbody>
<tr>
<td>7. Conduct short research projects that build knowledge through investigation of different aspects of a topic.</td>
<td>All investigations provide opportunities for students to further investigate different aspects of the science topic.</td>
</tr>
<tr>
<td></td>
<td>Inv 1, Part 1, Step 21; Inv 1, Part 2, Step 12</td>
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<tr>
<td></td>
<td>Inv 1, Part 3, Steps 21, 22, 30; Inv 1, Environmental Literacy Extensions. Research solar cell technology</td>
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<td></td>
<td>Inv 2, Science and Engineering Extensions. Conduct more force investigations</td>
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<tr>
<td></td>
<td>Inv 3, Language Extensions. Research forms of code, Investigate emergency codes</td>
</tr>
<tr>
<td></td>
<td>Inv 4, Language Extensions. Research safety technologies, Research roller coasters</td>
</tr>
<tr>
<td>8. Recall relevant information from experiences or gather relevant information from print and digital sources; take notes and categorize information, and provide a list of sources.</td>
<td>All investigations provide students with the opportunity to write about their science experiences and record their observations in their science notebooks.</td>
</tr>
<tr>
<td></td>
<td>Students also take notes and organize information when reading articles in FOSS Science Resources.</td>
</tr>
<tr>
<td></td>
<td>Selected examples</td>
</tr>
<tr>
<td></td>
<td>Inv 1, Part 1, Steps 15, 16, 20; Inv 1, Part 2, Steps 12, 16, 22, 24</td>
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<tr>
<td></td>
<td>Inv 1, Part 3, Steps 11, 14, 20, 22, 23, 26-28, 30</td>
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<td>Inv 1, Part 4, Steps 6, 10</td>
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<td>Inv 2, Part 1, Steps 11, 15, 17, 21, 25</td>
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<td>Inv 2, Part 3, Steps 6, 12, 14, 16, 21</td>
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<td>Inv 3, Part 1, Steps 8, 10; Inv 3, Part 2, Steps 10, 11, 14</td>
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<td>Inv 3, Part 3, Step 14</td>
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<td></td>
<td>Inv 4, Part 1, Steps 5, 12, 14, 17; Inv 4, Part 2, Steps 14, 19</td>
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<td>Inv 4, Part 3, Steps 8, 15, 25</td>
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<td>Inv 5, Part 1, Step 17; Inv 5, Part 2, Step 20</td>
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<tr>
<td></td>
<td>Inv 5, Part 3, Step 21</td>
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<tr>
<td>9. Draw evidence from literary or informational texts to support analysis, reflection, and research.</td>
<td>All investigations provide opportunities to use the FOSS Science Resources as a source from which to draw evidence to support their ideas (e.g., discussion questions at the end of the articles).</td>
</tr>
<tr>
<td>a. Apply grade 4 Reading standards to literature (e.g., “Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text [e.g., a character’s thoughts, words, or actions]”).</td>
<td>Selected examples</td>
</tr>
<tr>
<td></td>
<td>Inv 1, Part 3, Step 30</td>
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<tr>
<td></td>
<td>Inv 2, Part 3, Step 23</td>
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<td>Inv 3, Part 3, Step 15</td>
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<td>Inv 4, Part 2, Step 19</td>
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<tr>
<td>b. Apply grade 4 Reading standards to informational texts (e.g., “Explain how an author uses reasons and evidence to support particular points in a text”).</td>
<td></td>
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</tbody>
</table>
## Writing Standards

### Environments Module

All investigations provide opportunities for students to further investigate different aspects of the science topic.

| Inv 1, Part 1, Steps 12, 13, 29; Inv 1, Part 2, Steps 6, 11, 17-19, 20-26, 30-33; Inv 1, Science and Engineering Extensions, Research pheromones | Inv 2, Part 4, Step 22; Inv 2, Language Extension, Describe aquatic environments |
| Inv 3, Part 2, Steps 20-22; Inv 3, Science Extension, Observe the life cycle of brine shrimp | Inv 4, Part 1, Steps 10-13 |

Students also take notes and organize information when reading articles in FOSS Science Resources.

**Selected examples**

- Inv 1, Part 1, Steps 5, 13, 18, 20, 24; Inv 1, Part 2, Steps 9, 11, 15, 19, 28, 30, 33, 34; Inv 1, Part 3, Steps 7, 10
- Inv 2, Part 1, Steps 1, 7, 9, 14, 20-23
- Inv 2, Part 2, Steps 12, 18, 20, 22
- Inv 2, Part 3, Steps 16, 17, 19; Inv 2, Part 3, Step 21
- Inv 2, Part 4, Steps 18, 19, 22-24
- Inv 3, Part 1, Steps 13, 15; Inv 3, Part 2, Steps 3, 5, 9, 16, 22, 26
- Inv 3, Part 3, Step 8; Inv 3, Part 4, Step 16
- Inv 4, Part 1, Steps 23, 29, 30, 33, 44, 48, 49
- Inv 4, Part 2, Steps 14, 15; Inv 4, Part 3, Steps 3, 6

### Soils, Rocks, and Landforms Module

All investigations provide opportunities for students to further investigate different aspects of the science topic.

| Inv 4, Part 2, Step 11; Inv 4, Language Extension, Research natural resources in your region |

Students also take notes and organize information when reading articles in FOSS Science Resources.

**Selected examples**

- Inv 1, Part 1, Step 17; Inv 1, Part 2, Steps 6, 8
- Inv 1, Part 3, Step 15; Inv 1, Part 4, Steps 9, 13, 15
- Inv 2, Part 1, Steps 5, 14; Inv 2, Part 2, Steps 7, 13, 15, 20-21, 23
- Inv 2, Part 3, Steps 4, 10; Inv 2, Part 4, Steps 14, 16, 20, 21
- Inv 3, Part 1, Steps 18, 21; Inv 3, Part 2, Steps 10, 13, 14
- Inv 3, Part 3, Steps 12, 13; Inv 3, Part 4, Steps 3, 4, 9, 11
- Inv 4, Part 1, Steps 2, 11; Inv 4, Part 2, Step 10
- Inv 4, Part 3, Steps 3-5, 8

### FOSS and Common Core ELA — Grade 4

All investigations provide opportunities to use the FOSS Science Resources as a source from which to draw evidence to support their ideas (e.g., discussion questions at the end of the articles).

**Selected examples**

- Inv 1, Part 1, Steps 29, 37; Inv 1, Part 3, Step 16
- Inv 2, Part 1, Steps 12, 23; Inv 2, Part 2, Steps 18, 20, 22
- Inv 2, Part 3, Step 23; Inv 2, Part 4, Step 22
- Inv 3, Part 1, Step 15; Inv 3, Part 2, Step 17
- Inv 3, Part 4, Step 18
### SPEAKING AND LISTENING STANDARDS

<table>
<thead>
<tr>
<th>Standard</th>
<th>Energy Module</th>
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</table>
| 1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others’ ideas and expressing their own clearly.  
   a. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.  
   b. Follow agreed-upon rules for discussions and carry out assigned roles.  
   c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.  
   d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion. | All investigations provide students ample opportunities to engage in a range of collaborative discussions. Students discuss before, during, and after the active investigation and during the Wrap-up/Warm-up section.  
Selected examples  
Inv 1, Part 1, Steps 9, 13, 16, 22, 23; Inv 1, Part 2, Steps 8, 13, 17-19, 24, 27; Inv 1, Part 3, Steps 1, 6, 7, 9, 14, 16, 17, 23, 32; Inv 1, Part 4, Steps 4, 5, 7, 8  
Inv 2, Part 1, Step 27  
Inv 2, Part 2, Steps 10, 13, 15, 20, 30  
Inv 2, Part 3, Steps 3-5, 11, 13  
Inv 3, Part 1, Steps 10, 13, 20  
Inv 3, Part 2, Steps 2, 9; Inv 3, Part 2, Step 17  
Inv 3, Part 3, Step 18  
Inv 4, Part 1, Step 10; Inv 4, Part 2, Steps 5, 7  
Inv 4, Part 3, Steps 4, 10, 15  
Discuss articles in FOSS Science Resources  
All investigations provide students with the opportunity to discuss the readings in pairs, small groups, and whole class.  
Selected examples  
Inv 1, Part 1, Step 21; Inv 1, Part 3, Steps 28, 29  
Inv 1, Part 4, Step 13  
Inv 2, Part 2, Step 26; Inv 2, Part 3, Step 20  
Inv 3, Part 1, Step 19; Inv 3, Part 3, Steps 14, 15  
Inv 4, Part 1, Step 15; Inv 4, Part 3, Step 19  
Inv 5, Part 1, Step 20; Inv 5, Part 2, Steps 24, 27, 30 |
| 2. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. | Discuss articles read aloud in FOSS Science Resources and online activities.  
Selected examples  
Inv 1, Part 1, Steps 15, 18  
Inv 1, Part 2, Steps 21, 23; Inv 1, Part 4, Step 11  
Inv 2, Part 1, Step 26; Inv 2, Part 2, Step 29  
Inv 3, Part 1, Step 12; Inv 3, Part 2, Steps 12, 16  
Inv 4, Part 3, Step 19  
Video discussions  
Inv 2, Part 2, Step 28  
Inv 4, Part 3, Step 26  
Inv 5, Part 1, Step 15; Inv 5, Part 2, Step 18 |
## Speaking and Listening Standards

### Environments Module

All investigations provide students ample opportunities to engage in a range of collaborative discussions. Students discuss before, during, and after the active investigation and during the Wrap-up/Warm-up section.

**Selected examples**
- Inv 1, Part 1, Steps 12, 37; Inv 1, Part 2, Step 6
- Inv 2, Part 1, Steps 11, 12, 16, 17, 25
- Inv 2, Part 2, Steps 32, 33; Inv 2, Part 3, Step 17
- Inv 3, Part 1, Steps 4, 6, 9, 17; Inv 3, Part 2, Steps 10-12, 30-31; Inv 3, Part 3, Steps 4, 9, 16
- Inv 4, Part 1, Steps 13, 18, 22, 40, 52; Inv 4, Part 2, Step 19

Discuss articles in **FOSS Science Resources**

All investigations provide students with the opportunity to discuss the readings in pairs, small groups, and whole class.

**Selected examples**
- Inv 1, Part 1, Steps 19, 36; Inv 1, Part 3, Step 16
- Inv 2, Part 1, Step 23; Inv 2, Part 2, Steps 20-23
- Inv 2, Part 3, Step 23; Inv 2, Part 4, Step 24
- Inv 3, Part 1, Steps 14, 15; Inv 3, Part 2, Steps 9, 17
- Inv 3, Part 3, Step 13; Inv 3, Part 4, Step 18
- Inv 4, Part 1, Step 51; Inv 4, Part 2, Step 17

### Soils, Rocks, and Landforms Module

All investigations provide students ample opportunities to engage in a range of collaborative discussions. Students discuss before, during, and after the active investigation and during the Wrap-up/Warm-up section.

**Selected examples**
- Inv 1, Part 1, Steps 8, 14, 18, 22; Inv 1, Part 2, Steps 3, 14, 15
- Inv 1, Part 3, Steps 7, 8, 15, 16; Inv 1, Part 4, Steps 3, 14
- Inv 2, Part 1, Step 7; Inv 2, Part 2, Steps 3, 16-21, 28
- Inv 2, Part 3, Steps 9, 13; Inv 2, Part 4, Step 12
- Inv 3, Part 1, Step 23; Inv 3, Part 2, Step 8
- Inv 3, Part 3, Steps 1-3, 12, 14
- Inv 4, Part 1, Steps 4, 15; Inv 4, Part 3, Steps 9-11

Discussing articles in **FOSS Science Resources**

All investigations provide students with the opportunity to discuss the readings in pairs, small groups, and whole class.

**Selected examples**
- Inv 1, Part 1, Steps 20, 21; Inv 1, Part 3, Steps 20, 24
- Inv 2, Part 1, Steps 20, 21; Inv 2, Part 4, Steps 18, 20, 22
- Inv 4, Part 2, Step 16

Discuss articles read aloud in **FOSS Science Resources** and online activities.

**Selected examples**
- Inv 1, Part 1, Step 20; Inv 1, Part 3, Step 20
- Inv 2, Part 1, Step 19; Inv 2, Part 4, Step 18

**Video discussions**
- Inv 1, Part 3, Step 23; Inv 1, Part 4, Step 16
- Inv 2, Part 2, Step 27; Inv 2, Part 4, Steps 5, 6
- Inv 3, Part 2, Step 16; Inv 3, Part 3, Steps 7, 11
- Inv 4, Part 1, Steps 6, 14

Discuss articles read aloud in **FOSS Science Resources** and online activities.

**Selected examples**
- Inv 1, Part 1, Step 20; Inv 1, Part 3, Step 20
- Inv 2, Part 1, Step 19; Inv 2, Part 4, Step 18

**Video discussions**
- Inv 1, Part 3, Step 23; Inv 1, Part 4, Step 16
- Inv 2, Part 2, Step 27; Inv 2, Part 4, Steps 5, 6
- Inv 3, Part 2, Step 16; Inv 3, Part 3, Steps 7, 11
- Inv 4, Part 1, Steps 6, 14
### SPEAKING AND LISTENING STANDARDS (continued)

<table>
<thead>
<tr>
<th>Standard</th>
<th>Energy Module</th>
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| 3. Identify the reasons and evidence a speaker provides to support particular points. | All investigations provide students with the opportunity to identify the reasons and evidence their peers and the teacher provide to support their ideas (e.g. students compare their responses to the focus question and the response sheets during the Wrap-up/Warm-up section).  
Selected examples  
Inv 1, Part 1, Step 10; Inv 1, Part 3, Steps 19, 20  
Inv 4, Part 3, Step 19  
Other opportunities arise when students present information to their group or the whole class. |
| 4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. | All investigations provide students with the opportunity to report on their results. In the Wrap-up/Warm-up section students recount what they did in the investigation and share their answers to the focus question. Students report on what they learn from the text when discussing the articles in FOSS Science Resources.  
Selected examples  
Inv 1, Part 1, Steps 1, 3, 7, 19; Inv 1, Part 2, Steps 1, 2, 6, 11, 26; Inv 1, Part 3, Steps 10, 29  
Inv 1, Part 4, Steps 2, 8  
Inv 2, Part 1, Steps 6, 7, 12, 16, 24; Inv 2, Part 2, Steps 3, 11, 14, 16; Inv 2, Part 3, Steps 1, 6, 16, 20  
Inv 3, Part 1, Steps 3, 7; Inv 3, Part 2, Step 6  
Inv 3, Part 3, Steps 6, 7, 14  
Inv 4, Part 1, Steps 1, 5, 12; Inv 4, Part 2, Steps 4, 10  
Inv 4, Part 3, Steps 5, 11, 17  
Inv 5, Part 1, Step 9; Inv 5, Part 3, Steps 6, 7 |
### Environments Module

All investigations provide students with the opportunity to identify the reasons and evidence their peers and the teacher provide to support their ideas (e.g., students compare their responses to the focus question and the response sheets during the Wrap-up/Warm-up section).

Selected examples
- Inv 1, Part 1, Step 10
- Inv 1, Part 3, Steps 19, 20
- Inv 2, Part 1, Step 10
- Inv 2, Part 3, Step 19
- Inv 3, Part 2, Step 31; Inv 3, Part 3, Step 16
- Inv 4, Part 2, Step 19

Other opportunities arise when students present information to their group or the whole class.

### Soils, Rocks, and Landforms Module

All investigations provide students with the opportunity to identify the reasons and evidence their peers and the teacher provide to support their ideas (e.g., students compare their responses to the focus question and the response sheets during the Wrap-up/Warm-up section).

Selected examples
- Inv 1, Part 2, Steps 11, 15; Inv 1, Part 3, Step 20
- Inv 2, Part 2, Step 28

Other opportunities arise when students present information to their group or the whole class.

### Speaking and Listening Standards

4. Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

All investigations provide students with the opportunity to report on their results. In the Wrap-up/Warm-up section students recount what they did in the investigation and share their answers to the focus question. Students report on what they learn from the text when discussing the articles in FOSS Science Resources.

Selected examples
- Inv 1, Part 1, Steps 1, 3, 7, 19; Inv 1, Part 2, Steps 1, 2, 6, 11, 26; Inv 1, Part 3, Steps 10, 29
- Inv 1, Part 4, Steps 2, 8
- Inv 2, Part 1, Steps 6, 7, 12, 16, 24; Inv 2, Part 2, Steps 3, 11, 14, 16; Inv 2, Part 3, Steps 1, 6, 16, 20
- Inv 3, Part 1, Steps 3, 7; Inv 3, Part 2, Step 6
- Inv 3, Part 3, Steps 6, 7, 14
- Inv 4, Part 1, Steps 1, 5, 12; Inv 4, Part 2, Steps 4, 10
- Inv 4, Part 3, Steps 5, 11, 17
- Inv 5, Part 1, Step 9; Inv 5, Part 3, Steps 6, 7

Selected examples
- Inv 1, Part 1, Steps 1, 3, 4, 21; Inv 1, Part 2, Steps 4, 7
- Inv 1, Part 3, Step 19; Inv 1, Part 4, Step 1
- Inv 2, Part 1, Step 12; Inv 2, Part 3, Steps 1, 2, 7-9
- Inv 2, Part 4, Steps 2, 3, 18
- Inv 3, Part 1, Step 1; Inv 3, Part 2, Steps 13-15
- Inv 3, Part 3, Steps 9, 12; Inv 3, Part 4, Steps 5, 10, 11
- Inv 4, Part 1, Steps 1, 10, 13, 14; Inv 4, Part 2, Steps 10, 11
- Inv 4, Part 3, Steps 1, 12, 14, 16
### SPEAKING AND LISTENING STANDARDS (continued)

<table>
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<tr>
<th>Standard</th>
<th>Energy Module</th>
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</table>
| 5. Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. | Inv 1, Part 2, Step 26; Inv 1, Part 3, Steps 18, 31  
Inv 1, Environmental Literacy Extensions. Make a poster  
Inv 2, Part 3, Steps 16, 20  
Inv 3, Part 1, Step 19; Inv 3, Part 2, Step 16  
Inv 4, Part 2, Step 19 |
| 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. (See grade 4 Language standard 1 for specific expectations.) | All investigations provide students with situations in which they use either informal (small group discussions) or formal discourse structures and procedures (whole-group sharing). Protocols and sentence frames are provided for students who need support.  
Selected examples  
Inv 1, Part 2, Step 26  
Inv 2, Part 2, Step 26  
Inv 4, Part 2, Step 19 |
### Environments Module

- Inv 2, Part 3, Step 28; Inv 2, Part 4, Step 22
- Inv 3, Part 2, Step 13

### Soils, Rocks, and Landforms Module

- Inv 2, Part 1, Step 20; Inv 2, Part 4, Step 18

All investigations provide students with situations in which they use either informal (small group discussions) or formal discourse structures and procedures (whole-group sharing). Protocols and sentence frames are provided for students who need support.

Selected examples
- Inv 1, Part 2, Step 32
- Inv 2, Part 2, Step 20; Inv 2, Part 4, Steps 22, 24
- Inv 3, Part 2, Steps 13, 17

Selected examples
- Inv 1, Part 1, Steps 3, 4, 21; Inv 1, Part 2, Steps 14, 15
- Inv 2, Part 4, Step 18
## LANGUAGE STANDARDS

<table>
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<tr>
<th>Standard</th>
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| 1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.  
   a. Use relative pronouns *(who, whose, whom, which, that)* and relative adverbs *(where, when, why)*.  
   b. Form and use the progressive *(e.g., I was walking; I am walking; I will be walking)* verb tenses.  
   c. Use modal auxiliaries *(e.g., can, may, must)* to convey various conditions.  
   d. Order adjectives within sentences according to conventional patterns *(e.g., a small red bag rather than a red small bag)*.  
   e. Form and use prepositional phrases.  
   f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.  
   g. Correctly use frequently confused words *(e.g., to, too, two; there, their)*. | All investigations provide opportunities for students to apply the conventions of English grammar when writing and speaking.  
Selected examples  
Inv 1, Part 1, Step 16; Inv 1, Part 2, Step 22  
Inv 2, Part 3, Steps 7, 17  
Inv 3, Part 2, Step 10  
Inv 4, Part 2, Step 4; Inv 4, Part 3, Step 19 |
| 2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.  
   a. Use correct capitalization.  
   b. Use commas and quotation marks to mark direct speech and quotations from a text.  
   c. Use a comma before a coordinating conjunction in a compound sentence.  
   d. Spell grade-appropriate words correctly, consulting references as needed. | All investigations provide opportunities for students to demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing in their science notebooks, response sheets, and the I-Checks. |
| 3. Use knowledge of language and its conventions when writing, speaking, reading, or listening.  
   a. Choose words and phrases to convey ideas precisely.  
   b. Choose punctuation for effect.  
   c. Differentiate between contexts that call for formal English *(e.g., presenting ideas)* and situations where informal discourse is appropriate *(e.g., small-group discussion)*. | All investigations provide opportunities for students to use their knowledge of language and its conventions when writing in their science notebooks, discussing the investigation, and reading the articles in FOSS Science Resources.  
Selected examples  
Inv 1, Part 1, Steps 3, 23; Inv 1, Part 2, Step 22  
Inv 2, Part 1, Step 27; Inv 2, Part 2, Step 26  
Inv 2, Part 3, Step 17  
Inv 3, Part 1, Step 19  
Inv 4, Part 3, Step 25 |
### Language Standards

<table>
<thead>
<tr>
<th>Environments Module</th>
<th>Soils, Rocks, and Landforms Module</th>
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<tbody>
<tr>
<td>All investigations provide opportunities for students to apply the conventions of English grammar when writing and speaking.</td>
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<tr>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 2, Step 19, 32; Inv 1, Part 3, Step 10&lt;br&gt;Inv 2, Part 1, Step 14; Inv 2, Part 2, Steps 12, 23&lt;br&gt;Inv 2, Part 3, Steps 17, 19; Inv 2, Part 4, Step 18&lt;br&gt;Inv 3, Part 2, Steps 26, 30; Inv 3, Part 4, Step 18&lt;br&gt;Inv 4, Part 1, Steps 44, 48, 51; Inv 4, Part 2, Step 14</td>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 1, Step 17; Inv 1, Part 2, Steps 11, 13, 15&lt;br&gt;Inv 1, Part 3, Steps 19, 22&lt;br&gt;Inv 2, Part 1, Step 14; Inv 2, Part 2, Steps 7, 15, 20, 23, 24&lt;br&gt;Inv 2, Part 3, Step 10; Inv 2, Part 4, Steps 14, 18&lt;br&gt;Inv 4, Part 1, Step 8; Inv 4, Part 2, Step 14</td>
</tr>
<tr>
<td>All investigations provide opportunities for students to demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing in their science notebooks, response sheets, and the I-Checks.</td>
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</tr>
<tr>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 2, Step 23, 24, 26; Inv 1, Part 2, Step 16&lt;br&gt;Inv 2, Part 2, Step 23; Inv 2, Part 3, Steps 17, 19, 20&lt;br&gt;Inv 3, Part 4, Step 18&lt;br&gt;Inv 4, Part 1, Steps 49, 51</td>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 1, Steps 2-3; Inv 1, Part 2, Steps 14, 15&lt;br&gt;Inv 2, Part 2, Steps 6, 28; Inv 2, Part 4, Step 18</td>
</tr>
<tr>
<td>All investigations provide opportunities for students to use their knowledge of language and its conventions when writing in their science notebooks, discussing the investigation, and reading the articles in FOSS Science Resources.</td>
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</tr>
<tr>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 1, Steps 23, 24, 26; Inv 1, Part 2, Step 16&lt;br&gt;Inv 2, Part 2, Step 23; Inv 2, Part 3, Steps 17, 19, 20&lt;br&gt;Inv 3, Part 4, Step 18&lt;br&gt;Inv 4, Part 1, Steps 49, 51</td>
<td><strong>Selected examples</strong>&lt;br&gt;Inv 1, Part 1, Steps 2-3; Inv 1, Part 2, Steps 14, 15&lt;br&gt;Inv 2, Part 2, Steps 6, 28; Inv 2, Part 4, Step 18</td>
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### LANGUAGE STANDARDS (continued)

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</table>
| 4. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.  
  a. Use context (e.g., definitions, examples, or restatements in text) as a clue to the meaning of a word or phrase.  
  b. Use common, grade-appropriate Greek and Latin affixes and roots as clues to the meaning of a word (e.g., telegraph, photograph, autograph).  
  c. Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation and determine or clarify the precise meaning of key words and phrases. | All investigations provide opportunities for students to determine or clarify meaning of academic and science-specific words and phrases while reading and discussing articles in FOSS Science Resources.  
Selected examples  
Inv 1, Part 1, Steps 19, 21  
Inv 4, Part 3, Steps 21, 22, 25 |
| 5. Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.  
  a. Explain the meaning of simple similes and metaphors (e.g., as pretty as a picture) in context.  
  b. Recognize and explain the meaning of common idioms, adages, and proverbs.  
  c. Demonstrate understanding of words by relating them to their opposites (antonyms) and to words with similar but not identical meanings (synonyms). | Students learn the word relationships (e.g., concept maps) and nuances of certain words that have a specific meaning in science, such as battery, cell, circuit, component, conductor, contact, electricity, energy, source, heat, light, motion, open, closed, switch, system, terminal, transfer, attract, compass, force, gravity, interact, pole, repel, induced, permanent, code, coil, core, key, predict, rivet, collide, friction, kinetic, potential, stationary, transfer, absorb, color, frequency, mirror, peak, ray reflect, troughs, transmit, wave.  
Selected examples  
Inv 1, Part 2, Steps 24-25  
Inv 1, Language Extensions. Name that insulator/conductor  
Inv 4, Part 3, Step 25  
Inv 5, Part 2, Step 30 |
### Environments Module

All investigations provide opportunities for students to determine or clarify meaning of academic and science-specific words and phrases while reading and discussing articles in FOSS Science Resources.

**Selected examples**
- Inv 1, Part 1, Steps 17-19
- Inv 1, Part 2, Step 16
- Inv 2, Part 1, Step 6 EL Note, Step 17
- Inv 2, Part 2, Steps 1, 8, 18
- Inv 2, Part 4, Steps 20-24
- Inv 3, Part 1, Steps 14, 15
- Inv 4, Part 2, Step 17

Students learn the word relationships and nuances of certain words that have a specific meaning in science, such as adult, behavior, condition, environment, factor, function, inference, living, nonliving, observation, organism, preferred, stage, structure, carrying capacity, competition, consumer, decomposer, ecosystem, energy, food chain, food web, home range, interaction, population, producer, mimicry, brine, concentration, inherited, trait, optimum, range, tolerance, reproduce, thrive, variation, adaptation, dominant, drought, distribution.

**Selected examples**
- Inv 1, Part 2, Steps 24-25
- Inv 1, Language Extensions. Name that insulator/conductor
- Inv 4, Part 3, Step 25
- Inv 5, Part 2, Step 30

### Soils, Rocks, and Landforms Module

All investigations provide opportunities for students to determine or clarify meaning of academic and science-specific words and phrases while reading and discussing articles in FOSS Science Resources.

**Selected examples**
- Inv 1, Part 1, Step 20
- Inv 2, Part 1, Step 8
- Inv 4, Part 1, Step 12
- Inv 4, Part 2, Step 11

Students learn the word relationships (e.g., concept maps) and nuances of certain words that have a specific meaning in science, such as abrasion, acid, chemical reaction, weathering, conglomerate, expand, marble, system, soil, clay, humus, silt, sand, pebble, rock, basin, cast, delta, deposition, erosion, flood, fossil, imprint, meander, mold, slope, superposition, valley, contour, crust, elevation, lava, magma, mantle, profile, aggregate, cement, concrete, fuel, power, renewable, nonrenewable, resource, solar.

**Selected examples**
- Inv 1, Part 1, Step 20
- Inv 1, Part 2, Step 8
- Inv 1, Part 3, Steps 16, 21
- Inv 2, Part 2, Step 1
- Inv 4, Part 1, Step 2
- Inv 4, Part 2, Step 13
6. Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., **quizzed, whined, stammered**) and that are basic to a particular topic (e.g., **wildlife, conservation, and endangered** when discussing animal preservation).

All investigations provide opportunities for students to acquire and use conversational, academic, and science-specific words and phrases. Science vocabulary words are in bold when they are first introduced to students in FOSS Science Resources. Students also review the vocabulary in the Review vocabulary section for each part and the Wrap-up review vocabulary section of each investigation.

Selected examples
- Inv 1, Part 1, Steps 1-4, 8, 10, 11, 14, 16, 22
- Inv 1, Part 2, Steps 1, 3, 6, 11, 12, 19, 21, 22, 27
- Inv 1, Part 3, Steps 5, 12, 14, 19, 23, 25-27, 32
- Inv 2, Part 1, Steps 3, 12, 13, 16, 17
- Inv 2, Part 2, Steps 1, 3, 4, 6, 8, 12, 16, 17, 21-23
- Inv 2, Part 3, Steps 1, 10
- Inv 3, Part 1, Steps 4, 8, 10, 14, 15
- Inv 3, Part 3, Steps 2, 10
- Inv 4, Part 1, Steps 5, 16
- Inv 4, Part 2, Steps 11, 13, 14, 19
- Inv 4, Part 3, Steps 1, 2, 6, 13, 14
- Inv 5, Part 1, Steps 1, 5, 10, 11, 16
- Inv 5, Part 2, Steps 9, 15, 19
- Inv 5, Part 3, Steps 2, 8
### Language Standards

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