



EXPEDITIONARY  
LEARNING

# **Grade 4: Module 3A: Unit 2: Lesson 9**

## **Reading Scientific Text: Reading Closely about the Wheel and Axle**



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**Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)**

- I can determine the meaning of academic words or phrases in an informational text. (RI.4.4)
- I can determine the meaning of content words or phrases in an informational text. (RI.4.4)
- I can explain the main points in a scientific text, using specific details in the text. (RI.4.3)
- I can choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)

**Supporting Learning Targets**

- I can find the meaning of scientific and academic words related to the wheel and axle.
- I can determine important information about wheels and axles and how they help people do work.
- I can document what I learn about wheels and axles in my own words.

**Ongoing Assessment**

- Simple Machines Science journal
- Vocabulary note-catcher
- Diagram
- Constructed Response



Agenda	Teaching Notes
<ol style="list-style-type: none"><li>1. Opening<ol style="list-style-type: none"><li>A. Engaging Readers and Writers (10 minutes)</li><li>B. Reviewing Homework and Learning Targets (5 minutes)</li></ol></li><li>2. Work Time<ol style="list-style-type: none"><li>A. Partner Reading: Reading a Scientific Text Closely (20 minutes)</li><li>B. Connecting Key Vocabulary (10 minutes)</li></ol></li><li>3. Closing and Assessment<ol style="list-style-type: none"><li>A. Synthesizing Learning about the Wheel and Axle (5 minutes)</li><li>B. Debrief: Synthesizing about Simple Machines in Three Words (10 minutes)</li></ol></li><li>4. Homework<ol style="list-style-type: none"><li>A. Write a caption for the wheel and axle diagram that is on the front of your Science journal. Make sure to describe the importance of a wheel and axle in helping people do work.</li></ol></li></ol>	<ul style="list-style-type: none"><li>• The structure of this lesson is similar to Lessons 3 and 5. But in this lesson, students work more independently. Students learn about wheels and axles, focusing on how the wheel and axle are similar to and different from other simple machines.</li><li>• In the second half of this unit, students continue to read about simple machines and conduct experiments, but they will be doing this more independently. Therefore, in Lessons 8 and 9, they read closely first before doing the experiment to have a deeper understanding of the simple machine. They will conduct experiments on these simple machines in Lesson 10. This lesson will be slightly different from Lessons 2 and 4 because the two experiments will be happening simultaneously, but the note-catchers will be similar to ones they've used before.</li><li>• Work Time A and B in this lesson is primarily partner work and some students may need additional support. Consider pulling several partnerships together for additional support in processing content and/or defining the meanings of unfamiliar words.</li><li>• In advance: Write the names of simple machines on strips of paper—one for each student. You will need something to put the strips in so the students can randomly choose one to act out.</li><li>• Post: Learning targets.</li></ul>



Lesson Vocabulary	Materials
<p>Review: force, effort, work, lever, fulcrum, distance, increase, decrease New: wheel and axle, friction, faucet, shaft</p>	<ul style="list-style-type: none"><li>• Simple Machines strips of paper (one per student; see Teaching Notes)</li><li>• Sticky notes (2-3 per triad)</li><li>• Pulleys anchor chart (from Lesson 8)</li><li>• <i>Simple Machines: Forces in Action</i> pages 36 and 37 (book; one per student)</li><li>• Sticky notes (one per partnership)</li><li>• Vocabulary Strategies anchor chart (reviewed in Unit 1, Lesson 1)</li><li>• Simple Machines Science journals (one per student)</li><li>• Index cards (one per student)</li><li>• Blank paper (one per student)</li></ul>



Opening	Meeting Students' Needs
<p><b>A. Engaging Readers and Writers (10 minutes)</b></p> <ul style="list-style-type: none"> <li>• Invite students to stand and gather in groups of four, making sure there is enough room to move their arms and legs and not interfere with anyone else (it's fine to have groups of five if there is an uneven number of students in the class). Explain they have been reading a lot about simple machines and have learned about four of them: inclined plane, lever, screw, and pulley. Ask them to think about what it might look like if people used these simple machines to help them do work.</li> <li>• Explain that each person in the groups will choose a slip of paper that has the name of one of the simple machines they've learned about so far. Each person will have 10 seconds to use pantomime, which means no speaking or noise, to show how the simple machine works. The rest of the group has to guess what simple machine it is.</li> <li>• Circulate and have students choose a <b>Simple Machines strip of paper</b>. Remind them not to show anyone what's on their paper. Give them 1 minute to think about what they are going to do. Then invite them to begin.</li> </ul>	<ul style="list-style-type: none"> <li>• Acting out a complex concept supports the kinesthetic learning style. If some students are uncomfortable with this activity, have them be "the director" instead of "an actor."</li> </ul>
<p><b>B. Reviewing Homework and Learning Target (5 minutes)</b></p> <ul style="list-style-type: none"> <li>• Remind students of the homework from Lesson 8, "Look for pulleys around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the pulleys, make a sketch of what you saw, or use words to describe what you saw."</li> <li>• Invite students to get into triads to share and then record examples of pulleys they found—one per <b>sticky note</b>. Ask a representative from each triad to post their sticky notes on the bottom section of the <b>Pulleys anchor chart</b> (from Lesson 8).</li> <li>• Ask the class what they noticed about pulleys around them. Invite students to turn and talk to their triad groups. Listen for comments such as: "I didn't see as many pulleys as I have other simple machines, but I did see them on the blinds that are hung on our windows," or "I saw some men washing windows on a big building. The board they were standing on was controlled by pulleys."</li> <li>• Invite the students to read the learning targets. Ask them to show they understand what they will learn by touching their noses. If they are unsure of what the learning targets say, ask them to scratch their heads. Clarify as needed.</li> </ul>	



Work Time	Meeting Students' Needs
<p><b>A. Partner Reading: Reading a Scientific Text Closely (20 minutes)</b></p> <ul style="list-style-type: none"> <li>• Explain that today's lesson is going to be very similar to Lesson 8. They will read a text about the wheel and axle with their science partner. Distribute <b><i>Simple Machines: Forces in Action</i></b> and 1 sticky note per partnership and ask them to turn to pages 36, 37, and 39. Review the process of close text reading that they experienced during this unit.               <ol style="list-style-type: none"> <li>1. Read the text all the way through.</li> <li>2. Discuss what the gist of the text is and write it on a sticky note.</li> <li>3. Read the text again to identify key scientific vocabulary. Refer to the <b>Vocabulary Strategies anchor chart</b> for strategies to use in determining the meaning of unfamiliar words.</li> <li>4. Enter identified vocabulary in the Vocabulary section of the <b>Simple Machines Science journal</b>. Make sure to include: <i>wheel and axle, friction, work, force, and effort</i>.</li> <li>5. Read the text again, determining important information and using evidence from the text to support your thinking.</li> </ol> </li> <li>• Remind students of the process of deconstructing complex sentences and paragraphs to better understand challenging scientific content (Lessons 3, 5, and 8).</li> <li>• Explain that students have done this process several times before. As in Lesson 8, they will do it more independently. Explain that they will work together to complete the Wheel and Axle Research Notes on page 17 in their Simple Machines Science journal. Tell them that they'll work with the same science partner from Lesson 8. Also tell them you will be available for support.</li> <li>• Circulate and assist as needed. You can push their thinking by asking questions such as: "Where in the text does it say that?" or "Are you sure? How do you know?" These types of questions help push the students back to the text to cite evidence that supports their thinking.</li> </ul>	<ul style="list-style-type: none"> <li>• For students needing additional support, consider the following:           <ul style="list-style-type: none"> <li>– Pull small groups of students who have similar skills/needs.</li> <li>– Provide sentence stems for the gist statements to help students who struggle with language.</li> <li>– Students needing additional supports may benefit from partially filled-in graphic organizers. (See task cards in Module 2, Unit 2, Lesson 6.)</li> </ul> </li> <li>• Consider partnering an ELL with a student who speaks the same L1, when discussion of complex content is required. This lets students have more meaningful discussions and clarify points in their L1.</li> <li>• Students who struggle with language benefit from having their own individual dictionaries for reference throughout the module.</li> </ul>



Work Time (continued)	Meeting Students' Needs
<p><b>B. Connecting Key Vocabulary (10 minutes)</b></p> <ul style="list-style-type: none"><li>Review with the students what the term <i>interconnected</i> means (joined together). Remind them about the vocabulary analysis they did in Lesson 8 with the words <i>distance</i>, <i>increase</i>, <i>decrease</i>, and <i>effort</i>. Ask them to look in their Simple Machines Science journals for the definitions of these four words.</li><li>Ask each partnership to reread pages 36 and 37 in <i>Simple Machines</i> and find evidence to help answer the question: “How are distance and effort interconnected for your simple machine?”</li><li>Remind them that this is the same question they answered for four other simple machines in Lesson 8. Ask each partnership to write their answer on an <b>index card</b>.</li><li>Give students 5 to 7 minutes to reread pages 36 and 37 and answer the text-dependent question.</li><li>Gather students together and ask the partnerships to mingle and find another partnership. Invite them to share their answers. Ask them to share with two more partnerships. After each sharing, encourage the students to revise their answers if they feel they could improve based on what their peers shared.</li></ul>	<ul style="list-style-type: none"><li>Using sentence frames can help ELLs articulate their learning.</li></ul>



Closing and Assessment	Meeting Students' Needs
<p><b>A. Synthesizing Learning about the Wheel and Axle (5 minutes)</b></p> <ul style="list-style-type: none"> <li>• Distribute a piece of <b>blank paper</b> to each student. Ask them to reread the first paragraph on page 37 and draw a picture that represents how the wheel and axle works like the lever. Inform them they will need to be able to explain this scientific concept to another student.</li> <li>• Give the students 3 minutes to reread the text and create their visual representation. Ask them to find a partner to share their diagrams and how the wheel and axle works.</li> </ul>	
<p><b>B. Debrief: Synthesizing about Simple Machines in Three Words (10 minutes)</b></p> <ul style="list-style-type: none"> <li>• Ask students to think about all they have learned about simple machines in this unit. Invite them to skim the notes they took in their Science journals. Acknowledge that they've learned and experienced a lot. Explain that their challenge is to try to sum up the big idea of their learning about simple machines in three words. Explain it doesn't need to be a complete sentence. It just needs to convey an important idea about simple machines. (If your students participated in Module 2A, it may help to give them an example of this type of three-word synthesis for life in colonial America: "together they survived" or "constantly hard work" or "freedom to live.").</li> <li>• Invite them to get into small groups of four or five. Give them 1 to 2 minutes to think silently to themselves about their three words. Tell them to show a silent thumbs-up to their group when they are ready to share.</li> <li>• Give students a few minutes to share their three-word synthesis statements.</li> <li>• Then invite two or three students to share out a three-word synthesis they heard in their group.</li> </ul>	
Homework	Meeting Students' Needs
<ul style="list-style-type: none"> <li>• Look for wheels and axles around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the wheels and axles, make a sketch of what you saw, or use words to describe what you saw.</li> <li>• Write a caption for the wheel and axle diagram that is on the front of your Science journal. Make sure to describe the importance of a wheel and axle in helping people do work.</li> </ul> <p><i>Note: Lesson 10 includes two experiments. For details regarding preparations, see Notes at the end of Lesson 8 or the start of Lesson 10.</i></p>	

There are no new supporting materials for this lesson.