EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2:
Overview

Unit 2: Scientific Research: Researching Simple Machines: How Do They Help Do Work?

In Unit 2 students read the extended science text *Simple Machines: Forces in Action* by Buffy Silverman (870L) to learn about simple machines while also examining the structure and text features of scientific writing. Several sections of this science text are structured as close-reading experiences, and students continue to learn to use context clues to determine the meaning of new words. They write routinely in order to explain how various simple machines work. Students also experience the scientific method in several simple experiments. They develop hypotheses, document steps in experiments, and synthesize their learning about how simple machines work in scientific conclusions. In the mid-unit assessment, students are asked to read an on-demand text about a simple machine, the screw, and answer text-dependent and multiple-choice questions. The end of unit assessment also has the students read a scientific text about a simple machine, the wedge, and answer text-dependent and multiple-choice questions. In addition, the students read an experiment, answer text-dependent questions, and conduct the experiment. They are asked to explain in writing their observations and conclude about wedges and their impact on work from the experiment.

NOTE: The lessons in this unit are designed to meet ELA Reading Informational Text standards, specifically for reading scientific text. The unit is designed to complement, not replace, science instruction. In this unit, students do conduct several simple experiments, but in order to fully address key components of the state curriculum for K–4 science, students will need more experiences with simple machines. Students need additional science instruction and opportunities to be curious, explore the natural world, and have direct experience with common objects, materials, and living things in their environments.

Guiding Questions and Big Ideas

- **How do simple machines affect our lives?**
- **How can I use what I learn from research to form an opinion?**

Mid-Unit 2 Assessment	**Answering Questions about Screws** This assessment centers on standards NYSP12 ELA CCLS RI.4.2, RI.4.3, W.4.8, and W.4.9. In this assessment, students read a new text about the screw and answer a series of multiple-choice and short-answer questions that assess their ability to identify main points of the scientific text using explicit details from the text.
End of Unit 2 Assessment	**Part I: Reading and Answering Question about Wedges; and Part II: Reading and Answering Questions about Experiments** This two-part assessment centers on standards NYSP12 ELA CCLS RI.4.3, RI.4.4, W.4.2, W.4.8, and W.4.9. During Part I, students will read about a new simple machine, wedges, from pages 12 and 13 in *Simple Machines: Forces in Action*. They will take notes using a graphic organizer and then answer text-dependent multiple-choice and short-answer questions. In Part II, students will read an experiment, answer text-dependent questions, then conduct the experiment and write explaining what they observed and conclude about how wedges impact work from the experiment.

Content Connections

This module is designed to address English Language Arts standards. However, the module intentionally incorporates Science content that many teachers may be teaching during other parts of the day. These intentional connections are described below.

NYS Science Core Curriculum

- Science Learning Standard 4: The Physical Setting
  - Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.
- Key Idea 5
  - Energy and matter interact through forces that result in changes in motion.

Central Texts

1. Buffy Silverman, *Simple Machines: Forces in Action*, Do It Yourself series (New York: Heinemann, 2009), ISBN: 978-1-4329-2317-4.
2. Pamela Marx, *Take a Quick Bow!* (Culver City, CA: Good Year Books, 1997), ISBN: 978-1-59647-083-5. (NOTE: Only one copy required for teacher, then reproduced for students. The book explicitly states, "Only portions of this book intended for classroom use may be reproduced without permission in writing from the publisher.")

This unit is approximately 3 weeks or 13 sessions of instruction.

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 1	Setting Purpose for a Deeper Study of Simple Machines	• I can explain what a text says using specific details from the text. (RI.4.1) • I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) • I can recall information that is important to a topic. (W.4.8)	• I can self-assess my progress toward the learning targets. • I can identify what I already know about simple machines and what I want to learn. • I can ask questions about simple machines. • I can follow our class norms when I participate in a conversation.	• Tracking My Progress, End of Unit 1 recording form • Simple Machines KWL anchor chart - Page 10 of Simple Machines Science journal	• Simple Machines KWL • Concentric Circles protocol
Lesson 2*	Reading a Scientific Experiment: The Inclined Plane	• I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) • I can describe the organizational structure in an informational text (chronology). (RI.4.5) • I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) • I can use a variety of strategies to determine the meaning of words and phrases. (L.4.4)	• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment are a form of informational text that involves a procedure. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about inclined planes.	• Simple Machines Science journal: Science Experiment note-catcher (page 11)	• Simple Machines KWL • Vocabulary Strategies • Scientific Method

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 3	Reading Scientific Text: Learning More about the Inclined Plane	• 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)	• I can find the meaning of scientific and academic words as I read a text about the inclined plane. • I can determine important information about inclined planes and how they help people do work. • I can document what I learn about inclined planes in my own words.	• Students' Gist statements (homework from Lesson 2) • Simple Machines Science journal: ∗ Vocabulary note-catcher ∗ Diagram Constructed response captions	• Vocabulary Strategies • Scientific Method • Inclined Plane
Lesson 4*	Reading a Scientific Experiment: The Lever	• I can explain the main points in scientific text, using specific details in the text. (RI.4.3) • I can describe the organizational structure in an informational text (chronology). (RI.4.5) • I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) • I can use a variety of strategies to determine the meaning of words and phrases. (L.4.4)	• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment help me understand what a lever is and how it works. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about levers.	• Simple Machines Science journal: Science Experiment note-catcher (page 13)	• Inclined Planes • Vocabulary Strategies • Scientific Method

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 5	Reading Scientific Text: Reading Closely about the Lever	• 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)	• I can find the meaning of scientific and academic words as I read a text about levers. • I can determine important information about levers and how they help people do work. • I can document what I learn about levers in my own words.	• Simple Machines Science journal (page 14) • Vocabulary note-catcher • Diagram • Constructed response questions • Captions	• Levers

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 6	Science Talk: Synthesizing What We Know about the Inclined Plane and Lever	• I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) a. I can prepare myself to participate in discussions. a. I can draw on information to explore ideas in the discussion. b. I can follow our class norms when I participate in a conversation. c. I can ask questions that are on the topic being discussed. c. I can connect my questions and responses to what others say. • I can identify the reason a speaker provides to support a particular point. (SL.4.3) • I can identify evidence a speaker provides to support particular points. (SL.4.3)	• I can effectively participate in a Science Talk about simple machines. a. I can prepare for the Science Talk by using evidence from simple machines texts. b. I can ask questions so I am clear about what is being discussed. c. I can ask questions on the topic being discussed. d. I can follow our class norms when I participate in a conversation.	• Simple Machines Science journals (pages 9 and 15) • Science Talk Criteria checklist	• Science Talk Norms • Participating in a Science Talk • Quiz-Quiz-Trade protocol • Science Talk protocol

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 7	Making Connections to Vocabulary and Mid-Unit Assessment: Interactive Word Wall and Reading and Answering Question about Screws	• I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) • 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 choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)	• I can make connections between the meanings of vocabulary words related to simple machines. • I can document what I learn about a simple machine in my own words. • I can find the meaning of scientific and academic words related to a simple machine. • I can determine important information about a simple machine and how it helps people do work.	• Mid-Unit 2 Assessment: Reading and Answering Question about Screws • Tracking My Progress, Mid-Unit 2 recording form	• Interactive Word Wall directions • Interactive Word Wall protocol
Lesson 8	Reading Scientific Text: Reading Closely about the Pulley	• 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)	• I can find the meaning of scientific and academic words related to the pulley. • I can determine important information about pulleys and how they help people do work.	• Simple Machines Science journal (page 16) • Vocabulary note-catcher • Diagram • Constructed response questions	• Simple Machines KWL • Vocabulary Strategies • Pulleys

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 9	Reading Scientific Text: Reading Closely about the Wheel and Axle	• 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 write for a variety of reasons. (W.4.10) • I can choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)	• 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.	• Simple Machines Science journal (page 17) • Vocabulary note-catcher • Diagram • Constructed response questions	• Simple Machines KWL • Vocabulary Strategies • Wheels and Axles

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 10*	Reading a Scientific Experiment: The Pulley and Wheel and Axle	• I can explain the main points in scientific text, using specific details in the text. (RI.4.3) • I can describe the organizational structure in an informational text (chronology). (RI.4.5) • I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) • I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1)	• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment help me understand what a pulley and wheel and axle are and how they work. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about pulleys or wheels and axles. • I can follow our class norms when I participate in a conversation.	• Simple Machines Science journal: Science Experiment note-catcher (pages 18 or 19) • Four Corners Teacher observations	• Scientific Method • Conducting an Experiment

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 11	Science Talk: Synthesizing What We Know about Simple Machines	• I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) • I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) a. I can prepare myself to participate in discussions. a. I can draw on information to explore ideas in the discussion. b. I can follow our class norms when I participate in a conversation. c. I can ask questions that are on the topic being discussed. c. I can connect my questions and responses to what others say. • I can identify the reason a speaker provides to support a particular point. (SL.4.3) • I can identify evidence a speaker provides to support particular points. (SL.4.3)	• Learning targets: I can effectively participate in a Science Talk about simple machines. a. I can prepare for the Science Talk by using evidence from simple machines texts. b. I can ask questions so that I am clear about what is being discussed. c. I can ask questions on the topic being discussed. d. I can follow our class norms when I participate in a conversation.	• Simple Machines Science journals (page 20) • Science Talk Criteria checklist	• Science Talk Norms • Quiz-Quiz-Trade protocol • Science Talk protocol

Lesson	Lesson Title	Long-Term Targets	Supporting Targets	Ongoing Assessment	Anchor Charts & Protocols
Lesson 12	Connecting Key Vocabulary and End of Unit Assessment Part I: Reading and Answering Questions about Wedges	• I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) • 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 choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)	• I can make connections between the meaning of vocabulary words related to simple machines. • I can document what I learn about a simple machine in my own words. • I can find the meaning of scientific and academic words related to a simple machine. • I can answer questions about simple machines and how they work using details from a scientific text.	• End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges • Tracking My Progress, End of Unit 2, Part I recording form	• Interactive Word Wall Directions • Interactive Word Wall protocol
Lesson 13	Connecting Key Vocabulary and End of Unit Assessment Part II: Reading and Answering Questions about Experiments	• I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) • I can describe the organizational structure in an informational text (chronology). (RI.4.5) • 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 write informative/explanatory texts that convey ideas and information clearly. (W.4.2)	• I can explain what happens before, during, and after a scientific experiment. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about wedges.	• End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments • Tracking My Progress, End of Unit 2, Part II recording form	• Scientific Method • Conducting an Experiment • Concentric Circles protocol

* In these lessons, students conduct similar experiments that may need to be spread over two days. Time in the calendar reflects these additional days.

Optional: Experts, Fieldwork, and Service

Experts:
- Interview people in the community who use simple machines in their daily work.

Fieldwork:
- bike shop, physical therapy department of a local hospital

Service:
- N/A

Optional: Extensions

- Interview people in your community with disabilities to see how simple machines help improve their ability to move and travel.

Preparation and Materials

- This unit includes several scientific experiments. Review Lessons 2, 4, 8, and 9 in advance for necessary materials. Materials for each lesson can be found in the following pages of the text *Simple Machines: Forces in Action* by Buffy Silverman:
- For Lesson 2: Materials listed for inclined plane experiment on page 8.
- For Lesson 4: Materials listed for lever experiment on page 26.
- For Lesson 10: Materials listed for pulley experiments on page 32 and wheel experiment on page 38. (Note: See Lessons 8 or 10 for suggestions for alternate materials and logistics.)

EXPEDITIONARY
LEARNING

Grade 4: Module 3A: Unit 2:
Recommended Texts

Unit 2 focuses on simple machines and how those machines help people. The list below includes texts with a range of Lexile text measures on this topic, with an emphasis on six specific simple machines. This provides appropriate independent reading for each student to help build content knowledge.

It is imperative that students read a high volume of texts at their reading level in order to continue to build the academic vocabulary and fluency demanded by the CCLS.

Common Core Band Level Text Difficulty Ranges:
(As provided in the NYSED Passage Selection Guidelines for Assessing CCSS ELA)

- Grades 2–3: 420–820L
- Grades 4–5: 740–1010L
- Grades 6–8: 925–1185L

Where possible, texts in languages other than English are also provided. Texts are categorized into three Lexile measures that correspond to Common Core Bands: below-grade band, within band, and above-grade band. Note, however, that Lexile® measures are just one indicator of text complexity, and teachers must use their professional judgment and consider qualitative factors as well. For more information, see Appendix 1 of the Common Core State Standards.

Title	Author and Illustrator	Text Type	Lexile Measure
Lexile text measures below band level (below 740L)			
Ramps and Wedges	Sian Smith (author)	Informational	450
Los engranajes trabajan, las ruedas ruedan/Gears Go, Wheels Roll	Mark Weakland (author)	Informational	520*
Put Wheels and Axles to the Test	Sally M. Walker and Roseann Feldmann (authors)	Informational	520
Screws	Lyn Sirota (author), Reginald Butler (illustrator)	Informational	580
Inclined Planes	Katie Marsico (author), Reginald Butler (illustrator)	Informational	600

*Lexile based on a conversion from Accelerated Reading level;
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Title	Author and Illustrator	Text Type	Lexile Measure
Lexile text measures below band level (below 740L)			
From Washboards to Washing Machines: How Homes Have Changed	Jennifer Boothroyd (author)	Informational	620
Put Pulleys to the Test	Sally M. Walker and Roseann Feldmann (authors)	Informational	620
Get to Know Inclined Planes	Jennifer Christiansen (author)	Informational	720
Lexile text measures within band level (740-1010L)			
Twist, Dig, and Drill: A Book about Screws	Michael Dahl (author), Denise Shea (illustrator)	Informational	740
Get to Know Screws	Paul C. Challen (author)	Informational	750
Pulleys and Gears	David Glover (author)	Informational	750*
Screws	Michael De Medeiros (author)	Informational	790*
Wedges	Tatiana Tomljanovic (author)	Informational	790*
Inclined Planes	Jennifer Howse (author)	Informational	840*
Roll, Slope, and Slide: A Book about Ramps	Michael Dahl (author), Denise Shea (Illustrator)	Informational	860
Screws in Action	Gillian Gosman (author)	Informational	860*
Wheels and Axles in Action	Gillian Gosman (author)	Informational	980

*Lexile based on a conversion from Accelerated Reading level.

Title	Author and Illustrator	Text Type	Lexile Measure
Lexile text measures above band level (over 1010L)			
In the Renaissance	Richard Platt (author), David Lawrence (illustrator)	Informational	1030
Technology in the Ancient World	Paul C. Challen et al. (authors)	Informational	1070
The Inside & Out Guide to Mighty Machines	Clint Twist (author)	Informational	1130

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 1
Setting Purpose for a Deeper Study of Simple Machines

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can explain what a text says using specific details from the text. (RI.4.1) I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) I can recall information that is important to a topic. (W.4.8)	
Supporting Learning Targets	**Ongoing Assessment**
• I can self-assess my progress toward the learning targets. • I can identify what I already know about simple machines and what I want to learn. • I can ask questions about simple machines. • I can follow our class norms when I participate in a conversation.	• Tracking My Progress, End of Unit 1 recording form • Simple Machines KWL anchor chart • Page 10 of Simple Machines Science journal

Agenda	Teaching Notes
1. Opening A. Tracking My Progress Reflection (10 minutes) B. Engaging the Reader and Writer and Reviewing Learning Targets (5 minutes) 2. Work Time A. Building Background Knowledge: What We Already Know about Simple Machines (10 minutes) B. Building Background Knowledge: What We Want to Know about Simple Machines (10 minutes) C. Revisiting the Guiding Question: Concentric Circle Protocol (20 minutes) 3. Closing and Assessment A. Group Mingle (5 minutes) 4. Homework A. Continue your independent reading book for this module at home.	• The opening of this lesson serves as a bridge between Units 1 and 2; students reflect on their progress toward the Unit 1 targets. Then Unit 2 is launched in earnest. • In advance: Write the guiding question ("How do simple machines affect our lives?") on chart paper, leaving room for students to post sticky notes around or under it. • For the Concentric Circles protocol, identify an open space large enough for two circles and student movement. • Review: Concentric Circles protocol in (see Appendix). • Post: Learning targets.

Lesson Vocabulary	Materials
hypothesis, prove, disprove, accuracy	• Tracking My Progress, End of Unit 1 recording form (one per student) • Simple Machines Science journals—page 10: KWL chart (from Unit 1, Lesson 1) • Equity sticks • Simple Machines KWL anchor chart (new; co-created with students during Work Time A) • "The Machine" (pages 219–221 in *Take a Quick Bow!* by Pamela Marx) • *Simple Machines: Forces in Action* pages 4–5 (book; one per student) • Guiding Question chart • Writing paper

Opening	Meeting Students' Needs
A. Tracking My Progress Reflection (10 minutes) • Discuss the learning target: "I can self-assess my progress toward the learning targets." Have students talk to a partner; remind them what it means to "self-assess." Have students share their thinking and clarify as necessary. • Congratulate students on their hard work on Unit 1. Distribute the **Tracking My Progress, End of Unit 1**. Remind students that successful learners keep track and reflect on their own learning. Point out that students have been doing this informally all year, during debriefs when they consider how they are making progress toward the learning targets. • If necessary, review how to complete this reflection form. Remind students that in Step 1, they explain what the target means to them. For example, the first target is: "I can use literary terms to describe parts of a story or drama." They should write what the target means "in their own words" by explaining that the target means to describe parts of a story or play using the correct vocabulary terms. • Point out the second step, and explain that this is similar to the thumbs-up, thumbs-sideways, or thumbs-down that they have used in previous lessons. They should also explain why they think they "need more help," "understand some," or are "on the way," and give examples. Consider giving students an example such as: "I circled that I need more help because I can't remember what the word *literary* means." • Collect students' self-assessments to guide instructional decisions during the next unit.	• For students who struggle with language, consider giving a list of key academic and scientific words they might use in their reflections.
B. Engaging the Reader and Writer and Reviewing Learning Targets (5 minutes) • Tell students they will continue to increase their knowledge about simple machines in this unit by doing some research and will even get to conduct some science experiments. • Ask students to read the second learning target silently. Have them give a thumbs-up if they are clear on what they will be expected to do, a thumbs-sideways if they understand part but not all of what to do, and a thumbs-down if they are very unsure about what they should do.	

Work Time	Meeting Students' Needs
A. Building Background Knowledge: What We Already Know about Simple Machines (10 minutes) • Distribute the **Simple Machines Science journals—page 10: KWL chart**. Explain the KWL table to students if a KWL chart has not been used yet with your class (*K* = What we know or think we know: prior knowledge about the topic; *W* = What we want to know: our questions; and *L* = What we learned: answers to our questions or information that confirms/refutes our prior knowledge). Explain that for the next several days the class will record their knowledge, questions, and learning using this chart. Invite the students to take about 5 minutes to list all they already know about simple machines in the left K column. • Use **equity sticks** to cold call four to five students to share out whole group. Record students' comments (both accurate and inaccurate) in the K column on the **Simple Machines KWL anchor chart**. (For example, a student may share correct information such as: "A bicycle is a simple machine." Or they might inaccurately say: "A cell phone is a simple machine"). Tell students that during this unit, they will continue to learn about simple machines and will be looking for evidence from the text and their experiments to either confirm or revise their current knowledge. This chart will grow throughout this unit as a way to document the class's growth in scientific knowledge about simple machines. • Tell students that accuracy is important in scientific research. Scientists will make a guess, called a *hypothesis*, that is often based on what they think they know about a topic, but they always look for facts or data (either from reading or from their own research) to determine whether that guess is correct or not. They state a hypothesis before conducting an experiment. In other words, they make an educated guess about the results of the experiment based on what they know about a topic. • Explain that students now will work with a partner for about 5 minutes to determine whether the information they have listed in the K column is true or not by using "**The Machine" (pages 219–221 in *Take a Quick Bow!*)** as well as ***Simple Machines: Forces in Action* pages 4–5**. • Give directions: 1. Mark a Y if what you listed can be checked as correct. 2. Mark an N if what you listed is shown to be incorrect. 3. Put a ? if you did not find evidence in this text relating to a piece of information you listed. (You may need to read another text to find out.)	• For students needing additional support, consider allowing students to draw their ideas, or notes when appropriate. • Students needing additional support may need to share in a partnership or triad in order to help them articulate their thinking.

Work Time (continued)	Meeting Students' Needs
B. Building Background Knowledge: What We Want to Know about Simple Machines (10 minutes) • Tell students they will now think about their curiosity regarding simple machines. What do they want to learn about them? Explain that it is this process that scientists go through that guides their research and discovery of new things in the world of science. Without deep curiosity, scientists wouldn't have any motivation to conduct experiments or research a topic. Scientists often ask: "Why?" or "How come?" or "What if?" • Invite student partnerships to join another partnership to form a group of four. Each group of four will generate at least three questions that they *want* to know about simple machines. Each student will record the group's questions in their individual chart on page 10 of their Simple Machines Science journals. If students do not have much background knowledge about this topic, they may not have many questions at this time. This is okay, because the class will revisit and record more on this chart as they read other texts. Reiterate that they will be looking for the answers to these questions throughout the unit.	• Consider partnering an ELL student with a student who speaks the same L1 for discussion of complex content, or partner an ELL with a native speaker of English. Interacting with the content in English can facilitate language acquisition for ELLs.

Work Time (continued)	Meeting Students' Needs
C. Revisiting the Guiding Question: Concentric Circle Protocol (20 minutes) • Draw the students' attention to the **Guiding Question chart**. Distribute a piece of **writing paper** to each student. Ask them to take a few minutes to think and write about the guiding question: * "How do simple machines affect our lives?" • Encourage them to concentrate on their thinking and how to express that in writing without worrying about spelling or handwriting. They are the only ones who will be reading them. • Ask the students to find a partner and number off by 1s and 2s (if there is an uneven number of students, triads are fine). Tell them to bring their papers and a pencil with them as they form two circles. Direct all 1s to form an inner circle (shoulder-to-shoulder), facing out. Then direct the 2s to stand in front of their partners. • Remind them of the Concentric Circles protocol directions. Ask the students to talk with their partners about how they think simple machines affect people's lives. • Before rotating the outside circle two people to the left, encourage the students to jot down any new thinking or ideas they discussed with their partner. • Rotate the circle and repeat the process twice more. Each time, ask the students to talk with their partners about how they think simple machines affect people's lives. • As the students are discussing the topic, circulate and listen for comments such as: "Simple Machines help people do heavy work more easily," or "Simple machines help people move heavy things with less effort."	• Using sentence frames can help ELLs articulate their learning. Using the word "because" in the sentence frame helps all students support their thinking with evidence. • If there are an odd number of students in the Concentric Circles protocol, consider supporting students who struggle with verbalizing their thinking by creating triads.

Closing and Assessment	Meeting Students' Needs
A. Group Mingle (5 minutes) • Ask the students to review the learning target: * "I can identify what I already know about simple machines and what I want to learn." • Give directions: 1. Find a partner. 2. Share information from your KWL chart: one thing you know about simple machines (feel free to add anything your partner says to your list). 3. Share information from your KWL chart: one thing you want to know about simple machines (feel free to add anything your partner says to your list). 4. Repeat this with two more people.	• Posting sentence frames can assist ELLs and other students needing additional support in contributing to classroom discussions.
Homework	**Meeting Students' Needs**
• Continue your independent reading book for this module at home. *Note: In preparation for deeper learning about simple machines, add new scientific terms and academic vocabulary to your class Word Wall (in addition to the class anchor charts) at the end of each lesson. Students must be surrounded with key vocabulary to make them more apt to use it in conversation, not just in writing about science. Add the vocabulary words:* hypothesis, prove, disprove, accuracy. *In Lesson 2 the students will conduct a simple experiment on inclined planes. Make sure to read the experiment in* Simple Machines: Forces in Action *(pages 8–9) for the list of materials and how to prepare them.* *During the experiment in Lesson 2, students will be asked to write a hypothesis before they conduct the experiment and a conclusion at the end describing what they learned about inclined planes. To ensure that this is truly an inquiry experience, cover up the bottom of page 9 by either taping a half-sheet of paper or several large sticky notes over that part of the page.*	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 1
Supporting Materials

Tracking My Progress, End of Unit 1

Name:

Date:

Learning target: I can use literary terms to describe parts of a story or drama. (RL.4.5)

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this

I understand some of this

I am on my way!

3. The evidence to support my self-assessment is:

Tracking My Progress, End of Unit 1

Name:

Date:

Learning target: I can describe the differences in structure of drama and prose. (RL.4.5)

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this

I understand some of this

I am on my way!

3. The evidence to support my self-assessment is:

Tracking My Progress, End of Unit 1

Name:

Date:

Learning target: I can explain what a text says using specific details from the text. (RL.4.1)

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this

I understand some of this

I am on my way!

3. The evidence to support my self-assessment is:

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 2

Reading a Scientific Experiment: The Inclined Plane

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) I can describe the organizational structure in an informational text (chronology). (RI.4.5) I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) I can use a variety of strategies to determine the meaning of words and phrases. (L.4.4)	
Supporting Learning Targets	**Ongoing Assessment**
• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment are a form of informational text that involves a procedure. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about inclined planes.	• Simple Machines Science journal: Science Experiment note-catcher (page 11)

Agenda	Teaching Notes
1. Opening A. Engaging Readers and Writers (5 minutes) B. Reviewing Learning Targets (5 minutes) 2. Work Time A. Explaining Procedures: Reading a Science Experiment (20 minutes) B. Rereading Scientific Text while Conducting an Experiment (15 minutes) C. Writing a Conclusion (10 minutes) 3. Closing and Assessment A. Read-aloud of Pages 6 and 7 of *Simple Machines: Forces in Action*: Learning More about the Inclined Plane (5 minutes) 4. Homework A. On a sticky note, write a gist statement for pages 6–7 of your *Simple Machines: Forces in Action* text. Write legibly and put your name on it because you'll be sharing this with the class tomorrow, and it will be posted on the class Inclined Plane anchor chart. B. Continue reading in your independent reading book for this unit at home.	• This is an ELA lesson, not a science one. The purpose is to practice reading and applying understanding of scientific text. • This lesson is intended to align with science standards, but not to fully address them. Students will need more extensive experiences and instruction with simple machines, such as experiments and discovery, during other parts of the school day. • In Standard 4, Key Idea 5 of the NY State Science Standards, it's important for the students to know the role that gravity and friction play in the movement of objects. Each time the students conduct experiments in this unit, consider revisiting the scientific concepts of this standard. • For the first read, do NOT distribute the full text to students. Instead, use a document projector to show the text. This is important because the goal is for students to use inquiry to come to a conclusion of how an inclined plane works rather than simply reading about it. After conducting the experiment, students then write about their findings, and reread to verify their findings. • Before distributing the experiment to students, cover up the "How Does It Work?" on the bottom of page 9. • Create a chart to describe the steps of the Scientific Method described (see the supporting materials for examples). • Students will read *Simple Machines: Forces in Action* (pages 6–7) in depth in Lesson 3. • During this unit, students will often be working with a science partner. Consider assigning different partnerships for each simple machine so students experience working with different peers. Keep in mind the needs of your students, especially those who struggle with language and processing skills. • Post: Learning targets.

Lesson Vocabulary	Materials
experiment, observe, synthesize, findings, conclusion, procedure, hypothesis, corresponding	• Simple Machines Science journals (page 11: Inclined Plane Experiment Notes) • Sticky notes (one per student) • Simple Machines KWL anchor chart (from Lesson 1) • *Simple Machines: Forces in Action* pages 8–9 (cover up the text box "How Does It Work?" on the bottom of page 9; see Teaching Note above, and also at the end of Lesson 1) • Document camera • Equity sticks • Vocabulary Strategies anchor chart (reviewed in Unit 1, Lesson 1) • Scientific Method anchor chart

Opening	Meeting Students' Needs
A. Engaging Readers and Writers (5 minutes) • Remind students that in Lesson 1 they used a KWL chart to list what they already know about simple machines and what they want to learn about them. Explain that scientists ask questions about their field of study and conduct different kinds of research to find the answers to their questions. • Distribute the **Simple Machines Science journals** Ask students to choose one question about simple machines they most want to learn about and then write that question on a **sticky note**. Ask students to read their questions one at a time as they add them to the class **Simple Machines KWL anchor chart**. Categorize students' questions as you post them, so repeating or similar questions are clustered together.	
B. Reviewing Learning Targets (5 minutes) • Invite the students to read the learning targets. Ask them to turn and tell a partner what they think they'll learn today. Listen for things such as: "We're going to do an experiment," or "I think we're going to do a science experiment with simple machines." • Ask the students if there are any words or phrases that are confusing. Clarify as needed.	

Work Time	Meeting Students' Needs
A. Explaining Procedures: Reading a Science Experiment (20 minutes) • Project ***Simple Machines: Forces in Action*** **pages 8–9** with a **document camera**. Note: Be sure to cover up the text box "How Does It Work?" on the bottom of page 9; see Teaching Note above. Do not distribute the texts to the students at this point. • Ask students to notice the way this informational text is organized versus other informational texts they've read this year. Use **equity sticks** to cold call two to three students to share out whole group what they noticed. They may say things such as: "It's not written in paragraphs. It's written like a list that's numbered," or "It has different steps to follow like directions to a game." • Explain that they will conduct a scientific experiment today. Before they actually do the experiment, students need to read the directions to understand the *procedure*. Explain that a *procedure* is a series of steps someone takes to do something, such as a cook following a recipe. • Ask the students if any of them ever helped someone cook something new and had to follow a recipe. A cook has to read the recipe to know what she or he will need to cook with (the ingredients) and then go all the way through it to find out how to put it all together (steps) before beginning. Tell them they will do something similar: they will read about the scientific experiment and then do it. • Distribute *Simple Machines: Forces in Action* pages 8–9 to each student. Be sure that the bottom of page 9 is hidden. • Ask students to notice the yellow box on page 8. Explain this is a list of the materials they will need to conduct this experiment. Ask them to read this list with a partner and make sure they know what the materials are (they may not know "twist tie" and "gravel"). • If students don't understand the metric conversions, point out the standard units of measure also listed. • Tell students you'll read the text aloud as they follow along. Instruct them to try to visualize what is being described, asking them: "What is it going to look like when you conduct this experiment?" Tell them that visualizing the steps they'll take is a good way to understand the procedure and can explain what occurs in each step. • Read the first four steps aloud. Ask the students: "What are we supposed to do with the rubber band? Put your fingers on the step number(s) that tell us what to do."	• The experiment groups can be predetermined based on student readiness, learning styles, or groups can be heterogeneous. • For discussion of complex content, consider partnering an ELL student with a student who speaks the same L1. • Consider providing visual clues for the materials and steps in the experiment for ELLs and other students who struggle with language.

Work Time (continued)	Meeting Students' Needs
• Ask one or two students to share what step they're pointing to and why. Listen for: "Step 2. We need to cut the rubber band in half," and "Step 3. We need to tie one end to a paper clip," and "Step 4. We need to hang rubber band from the top of a ruler until the bottom of the paper clip reaches nine centimeters." • Ask students to continue the process of reading silently, visualizing, and explaining each step in the procedure in the next six steps of the experiment as you read aloud. Read Steps 5 through 10. • Focus on the word *corresponding* (Step 10). Ask: "What might the word *corresponding* mean?" Review the **Vocabulary Strategies anchor chart**. Encourage students to use the first strategy: "reading on in the text and infer" to figure out the meaning of *corresponding*. Ask one or two students to share their definitions. Listen for responses similar to: "next to." Acknowledge that is a great inference. Explain that the root word of corresponding is *correspond*, which means "be equivalent or parallel." Knowing this, the adjective *corresponding* describes something that is the "equivalent (the same) or parallel (similar) to another thing." In the context of Step 10, the word *corresponding* describes the location of the tip of the paper clip and numbers on the ruler. • Ask students to reread Step 10 to themselves, substituting the words "next to" for "corresponding" to see if they better understand what the text says. Encourage students to add this word to the Vocabulary section of their Simple Machines Science journal if it helps them remember it. (They can do this when they finish the experiment or for homework.) • Ask students to turn and tell a partner to discuss: * "How does the bag of gravel move? Where in the text are we given this information?" • Listen for answers such as: "Straight up and along an inclined plane." • Ask students to reread all 10 steps silently so that they have a solid understanding of the steps they will take during the experiment. • Ask the students to describe to a partner, in their own words, how the experiment will be conducted. The partner should listen for accuracy and clarity in the explanation. Note: This oral rehearsal will help them think through the process of the experiment and support them when they document what happens during the experiment.	

Work Time (continued)	Meeting Students' Needs
B. Rereading Scientific Text while Conducting an Experiment (15 minutes) • For the experiment, group students in groups of four to five. Ask them to turn to page 11 in their Science journal. Explain that scientists often use the Scientific Method to guide them through experiments. Draw students' attention to the **Scientific Method anchor chart**. Explain that the first thing they need to do as scientists is create a question that must be answered by conducting the experiment. Tell them that the question for this experiment is: "How can the inclined plane help make work easier?" • Explain that according to the Scientific Method, the next thing they need to do as scientists is form a *hypothesis* for what they think will happen. Remind them that a *hypothesis* is an educated guess about what will happen in an experiment based on research. Remind them they have already conducted some research about simple machines when they read pages 4 and 5 in *Simple Machines: Forces in Action*, in Unit 1. Encourage students to think about the reading they have already done that would help them form a hypothesis. Ask the small experiment groups to discuss what a possible hypothesis might be and to write it in their Science journal. • Invite the students to document the materials needed for the experiment in the Science journals and then begin the experiment. Tell them to make sure they record their observations after Steps 8 and 10. • Remind students to keep the bottom of page 9 covered. • Give students 10 minutes to conduct the experiment. • Circulate and assist as needed. When students have procedural questions, push them back into the text to see if they can answer their own question: * "Where might you look for that answer?" * "What does the text tell you?" • Listen for students talking about the amount of effort it takes to lift the bag of gravel. Give students specific positive feedback when you hear them using scientific vocabulary in their discussions, and encourage them to use this vocabulary as they write down their observations. They may make observations such as: "It takes less effort to lift a bag of gravel up an inclined plane because the rubber band didn't stretch very far," or "The rubber band stretched longer when I lifted the bad of gravel straight up. This showed me that it took a lot of effort to lift the bag that way." *Note: In Standard 4, Key Idea 5 of the NY State Science Standards, it's important for the students to know the role that gravity and friction play in the movement of objects. This point in the lesson may provide an opportunity to revisit those concepts.*	• Consider allowing students to draw their observations, ideas, or notes when appropriate. This allows all students to participate in a meaningful way.

Work Time (continued)	Meeting Students' Needs
C. Writing a Conclusion (10 minutes) • Explain that after scientists conduct an experiment, they *synthesize* their *findings* by writing a *conclusion* statement. Explain that *findings* are what they noticed happened as they conducted the experiment. This statement explains the main idea of what happened during the experiment and what they learned from it. • Help students connect to previous learning by explaining that a conclusion statement is similar to other types of synthesis statements they've written this year. In Module 2, they read texts about a trade and synthesized their learning in short gist statements. A conclusion statement in a science experiment asks the scientist to synthesize what they have learned about a topic through conducting a hands-on science experiment and discussions with their partners. • Point students to the last section of page 11 in their Science journals. Invite students to brainstorm with their experiment groups about a possible conclusion statement and to write it in their Science journal. • Next, ask students to unveil the bottom of page 9 in their texts. Ask them to read it as a group, checking to see if they reached the same conclusions as the author. If their findings were different from the author's, encourage them to NOT revise their hypothesis or their conclusion. Tell them that this happens to scientists. When different people do the same experiment and the results come out significantly different, this tells the scientists that the experiment needs to be conducted again to verify that the same materials were used and the same steps were followed. Instead of changing their conclusion, ask them to add to their conclusions by explaining how their conclusion is different from the author's.	• Using sentence frames can help ELLs articulate their learning. Using the word "because" in the sentence frame helps all students support their thinking with evidence. For example: "The rubber band stretched (more/less) when pulling the bag up the ramp. This means _____.""

Closing and Assessment	Meeting Students' Needs
A. Read-aloud of Pages 6 and 7 of *Simple Machines: Forces in Action*: Learning More about the Inclined Plane (5 minutes) • Tell students now they get to learn even more about inclined planes. Read pages 6 and 7 of *Simple Machines: Forces in Action* aloud as students read silently in their heads. • After the read-aloud, give students a few minutes to discuss the gist with a partner. • Tell students their homework is to write a gist statement on a sticky note.	
Homework	**Meeting Students' Needs**
• On a sticky note, write a gist statement for pages 6–7 of your *Simple Machines: Forces in Action* text. Write legibly and put your name on it because you'll be sharing this with the class tomorrow, and it will be posted on the class Inclined Plane anchor chart. • Continue reading in your independent reading book for this unit at home.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 2
Supporting Materials

The Scientific Method Anchor Chart

The Scientific Method
The Scientific Method is the process scientists go through as they ask and answer scientific questions. They do this by making observations and doing experiments.
Step 1: Ask a question
The first step is to form a question that can be answered. Good questions start with question words: *How*, *What*, *When*, *Who*, *Which*, *Why*, or *Where*? For example: "Which simple machine is the best one to help with this task?" "How many objects can be moved with a particular kind of simple machine?"
Step 2: Form a hypothesis
A hypothesis is an educated guess about the result of an experiment based on what you already know about a topic from reading and research. These can be worded like: "I think _____ will happen because _____."
Step 3: Test your hypothesis by conducting an experiment
Scientists need to be careful observers of what happens during the experiment. Think about/read the steps to the experiment. "First _____. Next _____. Then _____."
Step 4: Analyze the data and draw a conclusion
This is where scientists look at the results of the experiment. What happened in the experiment? Look to see if the question developed in Step 1 was answered.

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EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 3

Reading Scientific Text: Learning More about the Inclined Plane

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	**Ongoing Assessment**
• I can find the meaning of scientific and academic words related to the inclined plane. • I can determine important information about inclined planes and how they help people do work. • I can document what I learn about inclined planes in my own words.	• Students' gist statements (homework from Lesson 2) • Simple Machines Science journal (page 12: Inclined Plane Research Notes) – Vocabulary note-catcher – Diagram – Constructed response captions

Agenda	Teaching Notes
1. Opening A. Engaging the Reader and Writer and Checking on Homework (5 minutes) B. Reviewing Learning Targets (5 minutes) 2. Work Time A. Shared Reading for New Vocabulary (20 minutes) B. Rereading to Visualize Scientific Processes: Part I (10 minutes) C. Rereading to Visualize Scientific Processes: Part II (15 minutes) 3. Closing and Assessment A. Writing a Scientific Caption to Synthesize Learning (5 minutes) 4. Homework A. Look for inclined planes around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the inclined planes, make a sketch of what you saw, or use words to describe what you saw.	• In advance: Make a class Inclined Planes anchor chart with three sections (see supporting materials). • This lesson includes an activity that helps students visualize abstract scientific concepts. In advance, review Part B of Work Time carefully. • Post: Learning targets.

Lesson Vocabulary	Materials
academic, scientific, interconnected, diagram, caption; inclined plane, force, effort, resistance, reduce, distance, slanted, height	• Sticky notes—3 x 5 inches preferred (one per partnership) • Inclined Planes anchor chart (new; one for display) • Equity sticks • *Simple Machines: Forces in Action* pages 6–7 (book; one per student) • Simple Machines Science journal • Blank paper (one per pair of students)

Opening	Meeting Students' Needs
A. Engaging the Reader and Writer and Checking on Homework (5 minutes) • Ask the students to mingle and share their gist statements with at least two other students. After each has shared their statement, tell them to explain why theirs is a good one. After they've shared with at least two or three people, give the students 1 to 2 minutes to revise their statements if they think they can improve it based on the conversations they had as they shared. • Ask students to add any revisions to their gist statement on their homework **sticky note**, or give them a new sticky note if they want to start fresh. Post the gist statements in the top section of the **Inclined Planes anchor chart**. • Ask the students what they notice about scientific text: * "How is scientific text similar to or different from the social studies texts we have read about the Iroquois and Colonial America?" • Ask students to think then talk with a partner. Use **equity sticks** to cold call on two or three students. Some possible responses could be: "The social studies texts told a story about what happened in America. But this text just tells facts," or "This text doesn't take place anywhere special like New York or Williamsburg."	

Opening (continued)	Meeting Students' Needs
B. Reviewing Learning Targets (5 minutes) • Invite the students to read the first learning target: "I can find the meaning of scientific and academic words related to the inclined plane." Check to make sure they understand the difference between *scientific* and *academic* words. – *scientific*: words used specifically in science-related texts and conversations – *academic*: words often seen in other texts and content areas and that are important to understanding the main ideas of the texts • Tell students in this module they'll focus on two different types of words: *scientific* and *academic*. By knowing these types, students can determine vocabulary and understand the texts better. Remind them that informational text often has a glossary, a place that lists words and definitions. Explain to students they'll keep track of important academic and scientific vocabulary in their Simple Machines Science journals so they can become better readers and writers of scientific texts. • Invite them to read the next two learning targets: "I can determine important information about inclined planes and how they help people do work," and "I can document what I learn about inclined planes in my own words." Ask students to identify any words or phrases that seem confusing. Write a synonym or explanation above the unfamiliar words. Then read the learning targets again for understanding. Some possibly confusing words or phrases are: – *determine*: decide on; figure out – *in my own words*: not copied directly from the text; a summary of what I read • Ask the students to give a thumbs-up if they understand what they will be learning today, a thumbs-sideways if they are somewhat clear, and a thumbs-down if they are completely unsure. Clarify as needed.	• Using learning targets helps students understand the reading's purpose. • Providing visual cues or synonyms helps students understand the learning targets.

Work Time	Meeting Students' Needs
A. Shared Reading for New Vocabulary (20 minutes) • Tell students you will now read ***Simple Machines: Forces in Action*** **pages 6–7** aloud again. Ask them to follow along and underline any unfamiliar words. (Students may mark in the text, highlight, or use evidence flags/sticky notes.) • Read the first paragraph on page 6. Ask students to identify unfamiliar words. Point out the bolded words: *ramp, inclined plane, work, simple machines*. Explain these are scientific words that are important to know to understand what an inclined plane is and does. • Define the phrase *inclined plane*. – Explain the word *inclined* means to slope or slant and comes from a Latin word meaning "bend." – The word *plane*, in scientific terms, is not like an airplane. Instead, it means a flat surface and also comes from a Latin word meaning "flat surface." – Therefore the term *inclined plane* means a flat surface that is slanted or slopes. • Ask students to turn to the vocabulary section of their **Simple Machines Science journal** and find the term *inclined plane* in the left column. Write the definition in the second column. • Direct student's attention to the third column titled "This helps me know what this word means because ..." Explain when they entered words in their Vocabulary section in Unit 1, they ignored this column because they didn't have enough information at that time about the words and terms. Now that they're researching simple machines in more depth, this is an important resource. • For the third column, ask students to think about the following: – This is a space for them to describe the new words and terms so they'll remember what they mean. This can be in words or sketches (some things students might write could be: "a slanted board" or "a wheelchair ramp" or they could draw a quick sketch of a slanted line). – Each student may write or draw something different in this column. • Explain the last column identifies how some words they're learning are *interconnected*. Ask students to turn and tell a partner how *inclined plane* and *simple machine* are connected. All should say: "An inclined plane is one of the simple machines." Ask them to write this response in the fourth column.	• Students who struggle with language benefit from having individual dictionaries for reference throughout the module. • Deconstruction of complex vocabulary words or phrases in order to understand meaning helps all students with text comprehension. • Provide nonlinguistic symbols (e.g., two circles connected for *interconnected*) to assist ELLs and other struggling readers in making connections with vocabulary.

Work Time (continued)	Meeting Students' Needs
Note: In the context of the scientific topic of simple machines, the word work has a very specific scientific meaning that is distinct from its "everyday" meaning. • Acknowledge this was pretty obvious, but not all the words and phrases they're learning are connected to just one simple machine. For example, they read the word *work* in the play in Unit 1 and have already entered it in the Vocabulary section of their Science journal. Remind them that work is "the measure of energy or force that it takes to move something." Ask them if inclined planes help a person do work. If the answer is "yes," they should write "inclined plane" in the fourth column for the vocabulary word *work*. Also invite them to write or draw something in the third column that helps them remember what *work* is. • Tell students they will have 15 minutes to continue reading the text with a partner. Write the following words on the board and ask students to look for them along with others they may identify as unfamiliar when they read: – resistance – ramp • Make sure they include them in their Science journal. • Remind students that some science terms in this text have already been entered in their Science journal. They need to think about these words (*effort* and *force*) and how they relate to the inclined plane. • Ask them to repeat the process of identifying unfamiliar words and recording new scientific terms in their Simple Machines Science journal. Post the following directions: • Find the meaning of the following words (*effort*, *force*, *resistance*, *ramp*) along other words you read that are unfamiliar or are important in understanding what inclined planes are by using your glossary or a classroom dictionary. 1. As you read pages 6–7 in *Simple Machines*, determine the meaning of each word. 2. Look for the word in pages 2–6 of your Science journal and record the definition and fill in the rest of the columns. • Reread pages 6–7 with your partner. Identify other words you think are important in understanding what an inclined plane is, how it works, and how it helps people do work.	• Consider partnering an ELL with a student who speaks the same L1 when discussion of complex content is required. This allows students to have more meaningful discussions and clarify points in their L1. • Identifying the number of facts that need to be found gives support to struggling learners. (See task cards in Module 2, Unit 2, Lesson 6.)

Work Time (continued)	Meeting Students' Needs
• Give students 15 minutes to read. *Note: Some academic words students may identify are:* site, required, height, steep, *and* reduce. • Gather the class together. Ask partnerships to choose one word that's important for understanding inclined planes. Use the following steps to record new words in the middle section of the Inclined Planes anchor chart: 1. Call on one partnership at a time to share one word. 2. Tell other students to listen carefully. If they hear a word that is also on their own list, they can cross out that word. 3. Write the word on a sticky note. Add the note to the middle section of the anchor chart. • Repeat until all words are posted on the anchor chart.	
B. Rereading to Visualize Scientific Processes: Part I (10 minutes) • Remind students that good readers often read an unfamiliar and complex text several times to understand the content deeply. Tell students to read this text again, this time on their own, focusing specifically on text-dependent questions. • Explain to students that together you will answer to the first question by analyzing the sentence structure of the excerpt to better understand the scientific concepts being described: * "On page 7, the text says, 'If the distance along which you push a rock is twice as long, it takes half the force to do the same work and move the rock to the same height.' How does it help us understand the inclined plane?" • Explain to students that before we can understand the scientific concepts within a sentence, we need to look at the sentence more closely. Focus students on the picture on page 6 and the diagram on page 7 to help them make sense of the science concept being described. • Tell students to take a moment to deconstruct the sentence together. Distribute a piece of **blank paper** to each partnership. Ask students to fold it in half.	

Work Time (continued)	Meeting Students' Needs
• Ask students to read silently in their heads as you read aloud. Follow this sequence: 1. Read just the first half of the sentence: "If the distance along which you push a rock is twice as long ..." 2. Ask students to turn and talk with their partner about what that part of the sentence is saying. Listen for: "The length of space the thing is being pushed is two times longer." 3. Ask students to draw a picture on the left half of their paper that helps them understand this first part of the sentence. 4. Ask students to hold the paper up when they're finished so you can check for understanding. Look for pictures that are similar to a slanted line that is long with a rock-shaped object on it with arrows or other indications of upward movement. • Repeat the sentence deconstruction process with the second half of the sentence. 1. Read aloud as students read along silently: "... it takes half the force to do the same work and move the rock to the same height." 2. Ask students to turn and talk with their partner about what that second part of the sentence means. Listen for responses like: "A person is going to have to do half the work to move the same rock to the same place." 3. Ask students to draw a picture on the right half of their paper that helps them understand this second part of the sentence. 4. Ask students to hold the paper up when they're finished so you can check for understanding. Look for pictures that show a person with an object in their hands moving up a long slanted line with the fraction "1/2" near it. Students could also include pictures of a person moving the same-sized object up a shorter slanted line, indicating it takes more effort. 5. Ask students to share how the process of deconstructing a complex sentence helped them understand science concepts. Allow two to three students to share.	

Work Time (continued)	Meeting Students' Needs
C. Rereading to Visualize Scientific Processes: Part II (15 minutes) • Focus students whole group. Ask them to turn to page 12 (Inclined Plane Research Notes) in their Simple Machines Science journal. Explain that they will read pages 6–7 in Simple Machines: Forces in Action one last time. This time they will look for specific information about the inclined plane. • Ask them to talk with a partner about what information they need to look for as they reread the text. Some responses you might hear could be, "We need to draw a diagram." or "We need to describe what an inclined plane looks like and list some examples." Clarify what a diagram is vs. an illustration (A diagram is a sketch, outline, or a plan that demonstrates how something works. An illustration has more detail and often has color.) • Acknowledge that they may be familiar enough with the text after reading it several times that they could already fill in some of parts of this note-catcher without even looking at the material again. Reiterate that scientists strive to confirm facts, both by doing experiments and by reading carefully. Rereading will help students find more evidence from the text to answer the question about how inclined planes help people do work. • Give students 10 minutes to reread pages 6–7 in the text, and then record information in the note-catcher on page 12 of their Science journal. Encourage them to use the process of deconstructing complex sentences if they are unsure of what the text is describing. • Circulate to listen in and support as needed. Make sure that students are clear about the type of information they need to find and are using evidence directly from the text. Probe with questions such as "How do you know?" or "Where in the text did you learn that?" in order to ensure they are using evidence from the text (instead of just their own schema).	

Closing and Assessment	Meeting Students' Needs
A. Writing a Scientific Caption to Synthesize Learning (5 minutes) • Tell students that to synthesize their learning about inclined planes, they will write a caption for the graphic of an inclined plane on the cover of their Simple Machines Science journal. Remind them that they used captions when they read informational text about the Iroquois (in Module 1) and Colonial America (in Module 2). Captions are short (one to two sentences) texts that describe the importance of an image or graphic. • Give students 3 minutes to write their caption independently.	• Using sentence frames can help ELLs articulate their learning. (i.e., "An inclined plane is _____ [description of how it looks]. Inclined planes help people move things by _____.""

Homework	Meeting Students' Needs
• Look for inclined planes around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the inclined planes, make a sketch of what you saw, or use words to describe what you saw. *Note: After each lesson, add new scientific terms and academic vocabulary to the class Word Wall (as well as any new notes on anchor charts). In order for students to build knowledge about this topic, they need to be surrounded by key vocabulary so they will be more apt to use it in conversation, not just in science writing. Add the words:* inclined plane, effort, force, resistance, ramp, *and* interconnected. *Some of the academic words the students may identify are:* site, required, height, steep, *and* reduce. *In Lesson 4, the students will conduct another simple experiment, this time with levers. In advance, read the experiment on pages 26–27 of* Simple Machines: Forces in Action *for the list of materials and how to prepare them.* *During the experiment in Lesson 4, students will write a hypothesis before they conduct the experiment (just as they did in Lesson 2). They will also write a conclusion at the end to synthesize what they learned about inclined planes. To ensure that this is truly an inquiry experience, cover up the "How Does It Work?" box on page 27. Do this by taping a piece of paper or a large sticky note over that part of the page.*	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 3
Supporting Materials

Inclined Planes Anchor Chart
(For Teacher Reference)

(Example is not to scale—create this anchor chart in advance)

Inclined Planes
Gist Statements: (Student sticky notes)
Important Vocabulary to Know: (Student sticky notes)
Examples of Inclined Planes in Our Lives: (Student sticky notes)

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 4
Reading a Scientific Experiment: The Lever

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can explain the main points in scientific text, using specific details in the text. (RI.4.3) I can describe the organizational structure in an informational text (chronology). (RI.4.5) I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) I can use a variety of strategies to determine the meaning of words and phrases. (L.4.4)	
Supporting Learning Targets	**Ongoing Assessment**
• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment help me understand what a lever is and how it works. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about levers.	• Simple Machines Science Journal: Science Experiment note-catcher (page 13)

Agenda	Teaching Notes
1. **Opening** A. Checking Homework and Reviewing Learning Targets (5 minutes) 2. **Work Time** A. Explaining Procedures: Reading a Science Experiment (15 minutes) B. Guided Practice: Focusing on Key Vocabulary before Conducting an Experiment (10 minutes) C. Rereading Scientific Text while Conducting a Science Experiment (15 minutes) D. Writing a Conclusion (10 minutes) 3. **Closing and Assessment** A. Read-aloud of Pages 24–25 of *Simple Machines*: Learning More about the Lever (5 minutes) 4. **Homework** A. Write a gist statement for pages 24 and 25 in your *Simple Machines* text. You will be sharing this with the class tomorrow to post on the Levers anchor chart, which will also be introduced tomorrow.	• The structure of this lesson is similar to Lesson 2. The students read procedures and conduct a simple experiment about levers as an initial inquiry experience into what levers are and how they work. • This is an ELA lesson, not a science lesson. The purpose is to practice reading and applying understanding of scientific text. This lesson is intended to align with science standards, but not to fully address them. Students will need more extensive experiences and instruction with simple machines, such as experiments and discovery, during other parts of the school day. • As with Lesson 2, for the first read, do NOT distribute the full text to students. Rather, use a document projector to show the text. This is important, since the goal is for students to use inquiry to come to a conclusion of how a lever works rather than simply reading about it. After conducting the experiment, students will then write about their findings and reread to verify them. • Review the Scientific Method anchor chart (created in Lesson 2). • During Work Time B, some scientific vocabulary is defined for students since there is little context for these terms on pages 26–27. Students need a basic understanding of these terms to know how to conduct the experiment. • Then, in Lesson 5, students will read *Simple Machines: Forces in Action* (pages 24–25) in depth. They'll spend more time on detailed definitions and understanding how these terms relate to the concept of simple machines. • It was suggested in the Teaching Notes in Lesson 2 that science partners change for the study of each simple machine. Make sure students know who their new science partner is for Lessons 4 and 5. • Post: Learning targets.

Lesson Vocabulary	Materials
experiment, procedure, force, effort (review); lever, fulcrum, lever arm, balance, mid-point, arm, adjust, consider	• Sticky notes (three to five per triad) • Inclined Planes anchor chart (from Lesson 3) • *Simple Machines: Forces in Action* pages 26–27 (book; one per student) • Document camera • Equity sticks • Vocabulary Strategies anchor chart (reviewed in Unit 1, Lesson 1) • Simple Machines Science journal (page 13: Lever Experiment Notes) • Scientific Method anchor chart (from Lesson 2)

Opening	Meeting Students' Needs
A. Checking Homework and Reviewing Learning Targets (5 minutes) • Remind students of their homework: "Look for inclined planes around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the inclined planes, make a sketch of what you saw, or use words to describe what you saw." • Invite students to get into triads to share and then record examples of inclined planes they found—one per **sticky note**. Ask a representative from each triad to post their sticky notes on the bottom section of the **Inclined Planes anchor chart** (from Lesson 3). • Ask the class what they noticed about inclined planes around them. Invite students to turn and talk to their triad groups. Listen for comments such as: "They're everywhere, on sidewalks and doorways of buildings. I never knew the ramps were simple machines," or "Now that I know what an inclined plane is, I see them all over the place," or "Lots of people use inclined planes and probably don't even know it." • Invite the students to read the learning targets. Tell them these targets should be familiar to them from Lesson 2. Ask them to turn and tell a partner what they think they'll learn based on the learning targets. Listen for things such as: "I think we're going to do another science experiment, but this time it's going to be with levers," or "We're going to do another experiment and write about what we see happening and what we learn about levers." • Ask students if any words or phrases are confusing. Clarify as needed.	

Work Time	Meeting Students' Needs
A. Explaining Procedures: Reading a Science Experiment (15 minutes) *Note: Be sure to cover up the "How Does It Work?" text box on the top of page 27; see Teaching Notes. Do not distribute the texts to students at this point.* • Project the "Make a Dime Balance" spread from ***Simple Machines: Forces in Action*** **pages 26–27** with a **document camera**. Ask students to whisper into their hands the name of this kind of informational text. Tell students that on the count of three, they will "release" their answer to the rest of the class by whispering their "caught answer" as they turn their hands out. Count: "One, two, three!" You should hear: "It's an experiment." • Remind students this text is similar to the text they read in Lesson 2. Ask them to think, then turn and talk, about how this informational text is organized versus other informational texts they've read prior to this unit. Using **equity sticks**, cold call two or three students to share out. Listen for: "It's not written in paragraphs. It's written like a list that's numbered," or "It has different steps to follow, like directions in a game." • Tell students that they will conduct another science experiment today. Remind them that before they actually do the experiment, they need to read the directions to understand the procedure. Review that the procedure of an experiment consists of the steps a scientist takes to conduct the experiment. Explain that the term *steps* means a sequence of actions. • Ask the students to sit with their pre-assigned science partner for today's experiment. Distribute *Simple Machines: Forces in Action* to each student. Be sure that the "How Does It Work?" box on page 27 is covered up. • Ask them the following text-dependent questions: * "Do you know what the materials are for this experiment?" * "What do you notice about this list versus the list from the inclined plane experiment you conducted in Lesson 2?" • Listen for: "There are a lot fewer materials to use during this experiment." Tell students you'll read the steps aloud. Remind them to try to visualize what is being described so they can better explain what happens in each step. Tell students this text has new vocabulary. Remind students about all the experiences they've had this year with reading complex texts that have unfamiliar vocabulary words and phrases. Ask: * "What can you do to figure out the gist of what the experiment says, even though you may not know all the words?"	

Work Time (continued)	Meeting Students' Needs
• Use equity sticks to call on two or three students to share their thinking. Listen for: "Read around the word to figure out what is being described," or "Look at the pictures and diagrams to help figure out what the text is saying." Refer to the **Vocabulary Strategies anchor chart** to reinforce strategies students are learning. • Read the eight experiment steps aloud as students follow along in their texts. Ask partners to turn and talk: * "What is the gist of what we are going to do in this experiment?" • Tell them it's fine if they don't know what they're supposed to do. They will read the steps at least two more times before they conduct the experiment.	

Work Time (continued)	Meeting Students' Needs
B. Guided Practice: Focusing on Key Vocabulary before Conducting an Experiment (10 minutes) • Tell students they will now hear the experiment read aloud again. Ask students to read along silently and identify unfamiliar or important-sounding words to better understand what a lever is and how it works. • Read aloud. Listen for students to identify these words: *fulcrum*, *lever arm*, *balance*, *midpoint*, *adjust*. • Work with students to briefly define these words so they know how to conduct the experiment. (Note: In Lesson 5, students will spend more time on detailed definitions and on understanding how each of these terms relates to the concept of simple machines.) – *fulcrum*: The Step 1 text states: "The water bottle will be the fulcrum on which your lever rests." Focus students on the picture on page 26 to help them figure out that the fulcrum is the thing the ruler is balancing on and that it can move. Read the definition from the glossary to confirm this description. – *lever arm*: The Step 2 text says: "The ruler is the lever arm." Ask the students to talk with their partners to brainstorm a brief explanation of what this means based on the picture and the description in the text. Ask them to share their thinking with another partnership. Listen for: "It's the flat stick that is placed on top of the fulcrum." – *mid-point*: Explain that *mid* means "being in the middle," and *point* is a particular place on the lever. Ask students to tell their partners what *mid-point* means. Listen for: "The spot that is the middle of the lever." – *balance*: Tell the students this means to have equal weight on each side of something. Ask the students to show you with their bodies what balance means. Look for students to act out something like stretching their arms out to the sides evenly. – *adjust*: Tell them that this means to arrange or move something into a proper position. • Invite students to take 10 minutes and do the following steps (write these on the white board or chart paper). 1. Reread the experiment aloud, one step at a time. Either take turns reading each step or read it all together. 2. After each step, stop to describe what you are being asked to do. • Circulate and listen to partner talk. Probe for understanding by asking: "What do you think is going to happen in this step? Why do you think that?" This will get them thinking about a possible hypothesis.	• Consider giving ELLs and other students needing additional support visual clues for the key vocabulary words in this experiment. They may add these clues to the Vocabulary section in their Science journals.

Work Time (continued)	Meeting Students' Needs
C. Rereading Scientific Text while Conducting a Science Experiment (15 minutes) • Remind students to keep the top right section of page 27 covered. • Ask students to turn to page 13 in their **Simple Machines Science journal**. Remind students that scientists often use the Scientific Method to guide them through experiments. • Review the **Scientific Method anchor chart** from Lesson 2. Ask students to think then tell their partners what the first thing is they need to do as scientists before conducting the experiment. Listen for comments like: "We need to ask a question so we can find the answer by doing the experiment." Tell them the question for this experiment is: "How can the lever help make work easier?" • Now ask: "According to the Scientific Method, what is the next thing you need to do as scientists?" You should hear: "We need to write a hypothesis, or prediction, about what we think will happen." • Ask partners to discuss what a possible hypothesis might be. • Ask students to write their hypothesis in their Science journal. • Also ask them to list the materials needed for the experiment. Remind them that as they are doing the experiment, they will need to record their observations after Steps 6, 7, and 8. • Give students 10 minutes to conduct the experiment. • Circulate and assist as needed. When students have procedural questions, push them back into the text to see if they can answer their own question by saying: "Where might you look for that answer?" or "What does the text tell you?" • Listen for students talking about their need to adjust the distance between the stacks of coins and the fulcrum to balance the lever. Ask probing questions that push them to connect the terms *effort* and *force*. For example: "If force is the ability to push, pull, or twist, what is the force in this experiment?" (the coins). Or "How would you describe the effort that is being used?" • Reinforce vocabulary: Point out to students when you hear them using scientific vocabulary in their discussions. Encourage them to use this as they write their observations.	

Work Time (continued)	Meeting Students' Needs
*Note: Ideally, students will realize it takes less effort to balance the lever if the coins (force) are farther away from the center (fulcrum). It's fine if they don't reach this complex conclusion on their own. They are still building their knowledge about levers. In Lesson 5, they will deepen their knowledge about levers as they read an informational text (*Simple Machines *page 24–25). They may make connections to this experiment as they read the new text.*	
D. Writing a Conclusion (10 minutes) • Remind students after scientists conduct an experiment, they synthesize their findings by writing a *conclusion* statement. This statement explains the main idea of what happened during the experiment and what they learned because of it. • Point students to the last section of page 13 in their Science journals. Invite students to talk with their science partner about a possible conclusion statement, then write it in their Science journal. Inform them their statements most likely will be similar, but that they don't have to be if both people do not agree on the conclusion. • After students write their conclusion statements, ask them to unveil the "How Does It Work?" section of page 27 that has been covered. Invite students to read it aloud as partners, checking to see if they reached the same conclusions as the author did. Remind them if their findings were different from the author's to NOT revise their hypothesis or conclusion. Instead of changing the conclusion, ask them to add to their conclusions by explaining how their conclusion is different from the author's.	• Using sentence frames can help ELLs articulate their learning. Using the word "because" in the sentence frame helps all students support their thinking with evidence. For example: "By changing the distance between the coins and the bottle, _____."

Closing and Assessment	Meeting Students' Needs
A. Read-aloud of Pages 24–25 of *Simple Machines*: Learning More about the Lever (5 minutes) • Tell students that in the next lesson, they will continue learning about levers. For homework, they will read pages 24 and 25 of *Simple Machines: Forces in Action*. Now, they will hear that text read aloud once. • Read pages 24 and 25 of *Simple Machines: Forces in Action* aloud as the students follow along in their texts. • After the read-aloud, give students a few minutes to discuss the gist with a partner. • Tell students that their homework is to reread pages 24 and 25 and write a gist statement on a piece of paper. Remind them that they will be asked to share this gist statement at the beginning of Lesson 5, just like they did with their gist statements about the inclined plane in Lesson 3. *Note: This is a first read. Read the text aloud without stopping or discussing. The goal is to give the students exposure, promote fluency, and provide a scaffold for their rereading for homework and the learning in Lesson 5.*	
Homework	**Meeting Students' Needs**
• Write a gist statement for pages 24 and 25 in your *Simple Machines* text. You will be sharing this with the class tomorrow to post on the Levers anchor chart, which will also be introduced tomorrow.	

There are no new supporting materials for this lesson.

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 5

Reading Scientific Text: Reading Closely about the Lever

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	**Ongoing Assessment**
• I can find the meaning of scientific and academic words as I read a text about levers. • I can determine important information about levers and how they help people do work. • I can document what I learn about levers in my own words.	• Simple Machines Science journal (page 14) • Vocabulary note-catcher • Diagram • Constructed response questions • Captions

Agenda	Teaching Notes
1. Opening A. Engaging the Reader and Writer and Checking on Homework (5 minutes) B. Reviewing Learning Targets (5 minutes) 2. Work Time A. Shared Reading for New Vocabulary (20 minutes) B. Rereading to Visualize Scientific Processes (20 minutes) 3. Closing and Assessment A. Writing a Scientific Caption to Synthesize Learning (10 minutes) 4. Homework A. Look for levers around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the levers, make a sketch of what you saw, or use words to describe what you saw.	• The structure of this lesson is similar to Lesson 3. The students will reread pages 24–25 in *Simple Machines: Forces in Action* more deeply, analyzing new scientific vocabulary words and locating specific text-dependent information about levers. However, in this lesson, students first work independently of the teacher. They then discuss their thinking as a class with the teacher facilitating the analysis of the work. • In advance: Make a Levers anchor chart with three sections (see model in supporting materials). • Post: Learning targets.

Lesson Vocabulary	Materials
load Review: work, effort, force, lever, fulcrum	• Levers anchor chart (newly created) • Sticky notes (one per student) • *Simple Machines: Forces in Action* pages 24–25 (book; one per student) • Simple Machines Science journal (page 14: Lever Research Notes) • Equity sticks • Blank paper (one piece for each pair of students)

Opening	Meeting Students' Needs
A. Engaging the Reader and Writer and Checking on Homework (5 minutes) • Remind students that their homework was: "Write a gist statement for pages 24 and 25 in your *Simple Machines* text. You will be sharing this with the class tomorrow to post on the **Levers anchor chart**, which will also be introduced tomorrow.." Ask students to mingle and share their gist statements with at least two other students. After each has shared their statement, tell them to explain why they think theirs is a good one. After they've shared with at least two or three people, give the students 1 or 2 minutes to revise their statements if they think they can make it better based on their conversations. • Ask them to write their final gist statement and names on a **sticky note**. Post the gist statements in the top section of the Levers anchor chart.	
B. Reviewing Learning Target (5 minutes) • Invite students to read the first learning target: "I can find the meaning of scientific and academic words related to the lever." Review the difference between *scientific* and *academic* words. – *scientific*: words used specifically in science-related texts and conversations – *academic*: words often seen in other texts and content areas and that are important to understanding the main ideas of the texts. • Remind them that knowing the difference between these types of words will help them determine the importance of vocabulary and therefore they'll understand the text better. Remind students they will keep track of important academic and scientific vocabulary in their Simple Machines Science journals so they become better readers and writers of scientific texts. • Invite them to read the next two learning targets: "I can determine important information about levers and how they help people do work," and "I can document what I learn about levers in my own words." Ask students to give a thumbs-up if they understand the learning today, a thumbs-sideways if they are somewhat clear, and a thumbs-down if they are completely unsure. Clarify as needed.	• Using learning targets helps students understand the purpose for the reading. • Providing visual cues or synonyms helps students understand the learning targets.

Work Time	Meeting Students' Needs
A. Shared Reading for New Vocabulary (20 minutes) • Distribute ***Simple Machines: Forces in Action*** **pages 24–25** and the **Simple Machines Science journals**. Tell students they will reread pages 24–25. Ask students to join their science partners from the experiment in Lesson 4. Explain the partnerships will read the text together (taking turns or choral reading) and underline unfamiliar or difficult words. (Students may mark in the text, highlight, or use evidence flags/sticky notes.) Remind them that a word might be unfamiliar to someone if he or she can't sound it out or if he or she doesn't know what it means. Acknowledge that some of the words may be somewhat familiar from the experiment in Lesson 4. • Give the students 3 to 5 minutes to read pages 24–25 and annotate key vocabulary words. • Then draw their attention to the bolded words: *lever*, *fulcrum*, and *load*. Remind students that you discussed the basic definitions of these words in the last lesson, before they did the experiment. Explain that now they will record the definitions in their Science journals as well as personal clues for remembering what these words mean. • Explain that these are scientific words and it will be important to know what they mean and how they connect to simple machines to understand what a lever is and does. Ask students to find these key vocabulary words in the Vocabulary section of their Science journals. • Ask students to review the definitions for these three words based on the text and what they learned by conducting the experiment in Lesson 4. They need to write their definitions in the second column of the Vocabulary section of their Science journals. • Give the students 5 minutes to complete this task. • Gather students together and ask them to form groups of four (two partnerships) to share their definitions. Encourage them to explain why they think their definitions are accurate descriptions of the meaning of the words. Invite them to revise their definitions based on what they discuss with their peers if it improves their work. • Distribute three sticky notes to each group of four. Ask them to write one word on each sticky note along with the group's definition. Each group will have a representative share their definitions with the class. Use the following steps to record new words to the middle section of the Levers anchor chart:	• Students who struggle with language benefit from having their own individual dictionaries for reference throughout the module. • Deconstruction of complex vocabulary words or phrases to understand meaning helps all students with comprehension of text. • Provide nonlinguistic symbols (e.g., two circles connected for *interconnected*) to assist ELLs and other struggling readers in making connections with vocabulary.

Work Time (continued)	Meeting Students' Needs
1. Ask a representative from each group to share the same word and its definition. 2. As a class discuss the similarities of the different definitions of the same word. 3. Encourage students to revise the definitions in their Science journals if they think it would improve their understanding of the word. 4. Group all similar sticky notes in the middle section of the anchor chart together. 5. Repeat the process until all words are posted on the anchor chart. • Ask: "How are the words *force*, *effort*, and *work* each connected to levers? Make sure to use evidence from the text to support your thinking." • Invite them to look back into the text as they turn and talk with their science partners. • Use **equity sticks** to cold call two to three students to share. Listen for comments such as: "A lever helps move a load by applying force either by pushing or pulling," or "It takes less effort to move a load if you use a lever." • Give students 10 minutes to do the following: 1. Add their new understanding of how *work*, *effort*, and *force* are connected to levers in the Vocabulary section of their Science journals (fourth column). 2. Complete the last two columns for *lever*, *fulcrum*, and *load* so they remember what the words mean and how they connect to simple machines. 3. Add any other words they have identified as unfamiliar that they think will help them understand levers more clearly. These can be academic words (i.e., *apply*, *consists*, *trade-off*).	

Work Time (continued)	Meeting Students' Needs
B. Rereading to Visualize Scientific Processes (20 minutes) • Remind students that throughout this module, they are thinking about the big question: "How do simple machines affect our lives?" In order to answer this big question, they need to think about how each simple machine helps people do work. Tell students that in a moment, they will reread the text with this in mind. • Reorient students to page 14 in their Simple Machines Science journal. Tell students they will need to record the same type of information about the lever as they did about the inclined plane in Lesson 3. • Before students reread, review some key points: – Remind students that good readers often read an unfamiliar and complex text several times. – As with the inclined plane text, they may be familiar enough with the lever text after reading it two times that they could fill in some of the parts of this note-catcher without even looking at the text. – Reiterate that scientists strive to confirm facts. – Remind students that rereading will help them find more evidence from the text to answer the question about how inclined planes help people do work. • Ask the following question to focus students' rereading: * "How do levers help people do work? Use evidence from the text to support your answer." • Before the students begin reading, distribute a piece of **blank paper** to each partnership. Ask students to fold it in half. • Ask students to read silently to themselves as you read aloud. Draw their attention to the first paragraph on page 25, specifically where it states: "If the fulcrum is the same distance between both people on the seesaw, you will be stuck." Remind them of how a reader can deconstruct sentences to help them understand complex scientific content. Review the steps they learned in Lesson 3 and explain that the same process can be used in analyzing a complex paragraph.	

Work Time (continued)	Meeting Students' Needs
1. Ask them to reread just that first sentence: "If the fulcrum is the same distance between both people on the seesaw, you will be stuck." 2. Ask students to turn and talk with their partner about the sentence. Listen for: "If the fulcrum is in the middle between two loads, nothing will move," or "If one person is heavier than another on a seesaw, and the bar [fulcrum] is in the middle, the lighter person won't be able to go up." 3. Ask students to draw a picture on the left half of their paper that helps them understand this first part of the sentence. 4. Ask students to hold the paper up when they're finished so you can check for understanding. Look for pictures that are similar to a slanted line with a point (fulcrum) in the middle with an object at the bottom end and a larger object at the top end. • Repeat the paragraph deconstruction process with the next sentence. 1. Read aloud as students read silently in their heads: "But if the heavier person moves closer to the fulcrum and you move further from the fulcrum, you will be able to lift your load with less effort." 2. Ask students to turn and talk with their partner about that part of the sentence. Listen for responses similar to: "If the lighter load is further away from the fulcrum, then the heavy load can be lifted." 3. Ask students to draw a picture on the right half of their paper that helps them understand this first part of the sentence. 4. Ask students to hold the paper up when they're finished so you can check for understanding. Look for pictures that show the smaller load further away from the fulcrum than the heavier load. The line will be either straight or the heavier load will be at the top of a slanted line. • Give students 15 minutes to complete the task of rereading pages 24–25 in *Simple Machines: Forces in Action* and taking notes on page 14 in their Science journals. Encourage them to use the process of deconstructing complex sentences and paragraphs if they are unsure of what the text is describing. • Circulate to listen in and support as needed. To deepen students' analysis, ask questions such as: "What does the author want you to understand about levers?" or "How could the author have been more clear about explaining what levers are and how they work?" Make sure they connect their comments back to the text.	

Closing and Assessment	Meeting Students' Needs
A. Writing a Scientific Caption to Synthesize Learning (10 minutes) • As a way of synthesizing their learning about levers, ask students to write a *caption* for the graphic of a lever on the cover of their Simple Machines Science journal. Remind them that captions are short (one to two sentences) texts that describe the importance of an image or graphic.	• Using sentence frames can help ELLs articulate their learning. (e.g. "A lever is _____ [description of how it looks]. Inclined planes help people move _____ [description of "thing"] things by _____.")

Homework	Meeting Students' Needs
• Look for levers around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the levers, make a sketch of what you saw, or use words to describe what you saw. *Note: After each lesson, add new scientific terms and academic vocabulary to your class Word Wall in addition to the work you did with the class anchor charts. In order to help students build knowledge about this topic, students need to be surrounded by key vocabulary so that they will be more apt to use it in conversation, not just science writing. Add the words:* lever, fulcrum, load. *Some of the academic words the students may identify are:* apply, consists, trade-off.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 5
Supporting Materials

Levers Anchor Chart
(For Teacher Reference)

(Example is not to scale—create this anchor chart in advance)

Levers
Gist Statements: (Student sticky notes)
Important Vocabulary to Know: (Student sticky notes)
Examples of Levers in Our Lives: (Student sticky notes)

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 6

Science Talk: Synthesizing What We Know about the Inclined Plane and Lever

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) I can identify the reason a speaker provides to support a particular point. (SL.4.3) I can identify evidence a speaker provides to support particular points. (SL.4.3)	
Supporting Learning Targets	**Ongoing Assessment**
• I can effectively participate in a Science Talk about simple machines. a. I can prepare for the Science Talk by using evidence from the *Simple Machines* texts. b. I can build on others' ideas when responding to their statements and questions. c. I can ask questions on the topic being discussed. d. I can follow our class norms when I participate in a conversation.	• Simple Machines Science journals (pages 9 and 15) • Science Talk Criteria checklist

Agenda	Teaching Notes
1. Opening A. Engaging Readers and Writers and Checking Homework (5 minutes) B. Vocabulary Review: Quiz-Quiz-Trade (10 minutes) 2. Work Time A. Science Talk: Reviewing Learning Targets (5 minutes) B. Science Talk: Reflecting and Setting Goals (5 minutes) C. Preparing Evidence and Questions for the Science Talk (10 minutes) D. Conducting the Science Talk (20 minutes) 3. Closing and Assessment A. Debrief (5 minutes) 4. Homework A. Continue reading in your independent reading book for this unit at home.	• This lesson is similar to Unit 1, Lesson 3. In this lesson, students will participate in another Science Talk. This time, they will be asked to refer to more notes and texts in order to gather evidence to support their thinking during the talk than they did in Unit 1. • Students will need specific feedback from their previous Science Talk (Unit 1, Lesson 3). Write feedback on the bottom section of page 9 in students' Simple Machines Science journals. Focus the feedback on the learning target emphasized in that lesson: "I can prepare for the Science Talk by gathering evidence from scientific texts about simple machines." Also give suggestions to any students who may need more coaching to follow the class norms. Keep feedback focused, brief, and encouraging. For example, say: "I noticed that you recorded three pieces of evidence from the text on your form. Great! During the next science talk, be sure to mention the text during the class discussion," or "I noticed you were able to use evidence from the text when sharing your ideas during the Science Talk. Good work! One thing you should focus on for our next Science Talk is waiting for your turn to speak." • Review: Quiz-Quiz-Trade (in Vocabulary Strategies) and Science Talk protocol (see Appendix). • Post: Learning targets.

Lesson Vocabulary	Materials
force, effort, work, effectively, simple machine, inclined plane, lever, participate, evidence, norms	• Sticky notes • Levers anchor chart (created in Lesson 5) • Simple Machines Science journals (pages 9 and 15) • Vocabulary word cards (for teacher use; one card per student for Quiz-Quiz Trade) • Equity sticks • Science Talk Norms anchor chart (created in Unit 1, Lesson 3) • *Simple Machines: Forces in Action* pages 6–7 and 24–25 (book; one per student) • Participating in a Science Talk anchor chart (created in Unit 1, Lesson 3) • Science Talk Criteria checklist (for teacher reference)

Opening	Meeting Students' Needs
A. Engaging Readers and Writers and Checking Homework (5 minutes) • Remind students of their homework: "Look for levers around you (at school or at home). Record examples to share in our next lesson. Either take pictures of the levers, make a sketch of what you saw, or use words to describe what you saw." • Invite students to get into triads to share and record examples of levers they found—one per **sticky note**. Then ask a representative from each triad to post their sticky notes on the bottom section of the class **Levers anchor chart** (from Lesson 5). • Ask the class what they noticed about levers around them. Invite students to turn and talk to their triad groups. Listen for comments such as: "In our tool box at home I saw a lot of tools—a hammer, screw driver, wrench—that could be levers," or "Now that I know what a lever is, I see them all over the place," or "Lots of people use levers and probably don't even know it."	

Opening (continued)	Meeting Students' Needs
B. Vocabulary Review: Quiz-Quiz Trade (10 minutes) • Tell students today they will have another Science Talk about the question: "How do simple machines affect our lives?" Explain that now they have read and experimented with inclined planes and levers, they should have new thoughts or ideas related to this question. Explain that today they will prepare for their Science Talk by reviewing the vocabulary that they have collected related to simple machines. Remind students they have been recording vocabulary words into their **Simple Machine Science journals** and that the class has also been building a Word Wall with these terms. • Explain you would like them to do a short activity called Quiz-Quiz-Trade to help build their understanding of these words. Post the following directions for Quiz-Quiz-Trade: 1. Find a partner. 2. Read definition—read your word's definition to your partner. Allow him or her to guess the word or ask for a hint. 3. Give a hint—if your partner needs a hint, say one thing that helps you remember the meaning of this word. Allow your partner to guess and share your word. 4. Switch—have your partner read his or her definition and let you guess or receive a hint. 5. Trade cards and find a new partner. Repeat Steps 2 through 5. • Ask students to read directions and clarify or model process if necessary. Distribute **Vocabulary word cards**. • Give students 8 minutes to quiz and trade. • Collect the Vocabulary word cards (which will be used in a different way in Lesson 7).	• Consider supporting ELL students by providing individual copies of sentence frames for use during Science Talk.

Work Time	Meeting Students' Needs
A. Science Talk: Reviewing Learning Targets (5 minutes) • Share the general learning target for the Science Talk: "I can effectively participate in a Science Talk about simple machines." Remind students that they have discussed the meaning of this learning target the last time the class held a Science Talk (in Unit 1). Ask them to turn to a partner and explain this target in their own words. Use **equity sticks** to cold call a few students to share their explanations. Based on their previous experience with Science Talks, they should share information about the purpose, process, and norms the class discussed in Unit 1, Lesson 3. They may refer to the **Science Talk Norms anchor chart** (Unit 1, Lesson 3). • Tell students to help them "effectively participate," they will focus on the following specific learning targets: a. "I can prepare for the Science Talk by using evidence from the *Simple Machines* texts." b. "I can build on others' ideas when responding to their statements and questions." c. "I can ask questions on the topic being discussed." d. "I can follow our class norms when I participate in a conversation." • Remind students of the first target: "I can prepare for the Science Talk by using evidence from the *Simple Machines* texts." Tell students this target should be familiar to them. Briefly review with students why it is important for scientists to base their discussions on evidence. • Next, focus on the following learning targets: "I can build on others' ideas when responding to their statements and questions" and "I can ask questions about the topic being discussed." Have students Think-Pair-Share about what they think is important in these targets. • Explain to students that good discussions help you to think about topics in a new way. To help them expand their understanding about simple machines, they need to ask questions and build on one another's ideas about how simple machines affect peoples' lives. Next to these targets, write a few sentence stems to help students during the upcoming discussion. For example: – "I wonder if _____? I wonder why _____?" and "I agree and I also think _____." – "I disagree because _____," and "That's a good question. I think _____."	• To further support students with goal setting, consider giving them a sentence starter, such as: "My goal for today's Science Talk is to _____." • Consider printing out these sentence frames for ELL students to use in preparation for the discussion.

Work Time (continued)	Meeting Students' Needs
• Finally, point out the last learning target: "I can follow our class norms when I participate in a conversation." Remind students that a Science Talk is a discussion about big or important questions scientists have. While scientists discuss these big questions with one another, it is important for them to create a set of rules, or norms, that they will all follow so that everyone's ideas can be heard and considered. Tell students they will reflect on the norms they created during their last Science Talk, and set some goals for today.	
B. Science Talk: Reflecting and Setting Goals (5 minutes) • Post the Science Talk Norms anchor chart and review as a class. Ask each student to turn to a partner and point out one norm the class might need to focus on after their last Science Talk. Have pairs share and discuss or clarify norms as necessary. • Return students' Simple Machines Science journals (page 9 with teacher feedback from Unit 1, Lesson 3). Ask students to review the feedback and do their own reflection. Then ask students to write a goal for themselves (based on teacher feedback, the norms, or today's learning targets) in the last section on page 9 of their journals.	

Work Time (continued)	Meeting Students' Needs
C. Preparing Evidence and Questions for the Science Talk (10 minutes) • Post and ask the Science Talk question (same as from Unit 1, Lesson 3): "How do simple machines affect our lives?" • Have students look over the evidence they recorded during the last Science Talk on page 9 of their Simple Machines Science journal. Explain they have learned quite a bit more about simple machines. Ask students to Think-Pair-Share: "What is something new you now know about simple machines that you might want to mention in today's Science Talk?" • Tell students they will now have time to consider their new thinking on this question and what evidence they need to gather from the text and their notes. Be sure students have access to their text: ***Simple Machines: Forces in Action*** **pages 6–7 and 24–25**. Ask students to turn to page 15 in their Simple Machines Science journal to the Preparing for a Science Talk recording form. Tell students you would like them to now consider their new thinking on this question and what evidence they will need to gather from the text. Review the recording form briefly if needed. • Direct students to reread pages 6–7 and 24–25, and gather new evidence on page 15 in their journals. • Give students 8 minutes to reread and gather evidence for the Science Talk. Circulate to confer as necessary, and remind students to use specific evidence from text to support their thinking.	• Allow ELLs and other students to use pictures and symbols as necessary on their recording forms. • To further support students, consider allowing some students to talk with a partner or write down what they would like to share during the Science Talk in advance. • For students who need an extension, consider having them reread the experiments conducted on pages 8–9 and pages 26–27 and then gather evidence from these sections of the text.
D. Conducting the Science Talk (20 minutes) • Gather students whole group in a circle. Remind them to bring their journals. Display the Science Talk protocol for the class to see. Briefly review the **Participating in a Science Talk anchor chart** (from Unit 1, Lesson 3) with students, and answer any questions. • Direct students to begin the Science Talk. Use the **Science Talk Criteria checklist** (started in Unit 1, Lesson 3) or begin a new one with the new blank form in this lesson's supporting materials to monitor student progression toward the learning targets. Quickly redirect and support students as needed, but avoid leading the conversation. Remind students that their questions and comments should be directed to one another, not the teacher.	

Closing and Assessment	Meeting Students' Needs
A. Debrief (5 minutes) • Ask students to return to their seats. Invite them to reread the goals they wrote on the bottom of page 9 in their Simple Machines Science journals. Have them reflect on the following questions with a partner: "What progress did you make on your Science Talk goal today? What can you continue to work on?" Encourage students to base their discussion on their written goals and this lesson's learning targets. Listen for students to state their goals and reference the learning targets as they share. • Collect students' Simple Machines Science journals. Use page 15 and the Science Talk Criteria checklist to assess individual student progress towards SL.4.1. • Inform students they will get to demonstrate their knowledge about simple machines and their abilities to read and write like scientists on an assessment during the next two lessons. Tell them they will use their skills as scientific readers and writers in a similar way as they did when they researched inclined planes and levers, but this time, they will read about a simple machine the class hasn't talked much about. Build students up regarding this opportunity to "show what you know."	• Some students may need to reflect verbally with a partner before writing.
Homework	**Meeting Students' Needs**
• Continue reading in your independent reading book for this unit at home.	•

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 6
Supporting Materials

Vocabulary Word Cards (Front)

Directions for teacher: Type in six additional words and definitions that your class has recorded on the Word Wall or in the Vocabulary section of the Simple Machines Research journal into the following template and make enough copies so that each student will have a card (most likely two or more sets).

Words	
force	
effort	
work	
simple machine	
inclined plane	
lever	

Vocabulary Word Cards (Back)

Directions for teacher: Type in six additional words and definitions that your class has recorded on the Word Wall or in the Vocabulary section of the Simple Machines Research journal into the following template and make enough copies so that each student will have a card (most likely two sets).

Words	
force: physical quantity that denotes ability to push, pull, or twist	
effort: force needed to use a simple machine	
work: measure of energy used to move an object	
simple machine: machine with few or no moving parts that lets people use less effort to move something	
inclined plane: simple machine with a slanted surface used to raise or lower objects	
lever: simple machine that consists of a bar pivoting from a fulcrum	

Science Talk Criteria Checklist

Learning Targets:
I can effectively participate in a Science Talk about simple machines.
I can follow our class norms when I participate in a conversation.
I can prepare for the conversation by using evidence from simple machine texts.
I can ask questions so I am clear about what is being discussed.
I can ask questions on the topic being discussed.

Student name	Norms	Prepare with evidence	Ask questions to clarify understanding	Connect questions to what others say	Teacher comments

Science Talk Criteria Checklist

Student name	Norms	Prepare with evidence	Ask questions to clarify understanding	Connect questions to what others say	Teacher comments

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 7

Making Connections to Vocabulary and Mid-Unit Assessment: Interactive Word Wall and Reading and Answering Questions about Screws

GRADE 4: MODULE 3A: UNIT 2: LESSON 7

Making Connections to Vocabulary and Mid-Unit Assessment:

Interactive Word Wall and Reading and Answering Questions about Screws

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)
I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) 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 choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)

Supporting Learning Targets	Ongoing Assessment
• I can make connections between the meanings of vocabulary words related to simple machines. • I can document what I learn about a simple machine in my own words. • I can find the meaning of scientific and academic words related to a simple machine. • I can determine important information about a simple machine and how it helps people do work.	• Mid-Unit 2 Assessment: Reading and Answering Questions about Screws • Tracking My Progress, Mid-Unit 2 recording form

Agenda	Teaching Notes
1. Opening A. Reviewing Learning Targets (5 minutes) 2. Work Time A. Connecting Key Vocabulary: Interactive Word Wall (15 minutes) B. Mid-Unit Assessment: Answering Questions about Screws (30 minutes) 3. Closing and Assessment A. Tracking My Progress (10 minutes) 4. Homework A. Continue reading in your independent reading book for this unit at home.	• In advance: Students will be in groups of four to participate in the Interactive Word Wall portion of this lesson. Be sure to make enough complete sets of the Vocabulary word cards (from Lesson 6) so each group can have a complete set. • To prepare for the Interactive Word Wall activity, write the directions listed in the supporting materials of this lesson on a piece of chart paper or on the white board. • Review: Interactive Word Wall protocol (see Appendix). • Post: Learning targets.

Lesson Vocabulary	Materials
scientific, academic, screw, determine, effort, force, inclined plane, lever, work (all review from Lessons 1–6)	• Vocabulary word cards (from Lesson 6, one set per group of four) • Chart paper • Document camera • Interactive Word Wall Symbols (one set per group of four; see supporting materials) • Equity sticks • Mid-Unit 2 Assessment: Reading and Answering Questions about Screws (one per student) • *Simple Machines: Forces in Action* pages 18–19 (book; one per student) • Tracking My Progress, Mid-Unit 2 recording form (one per student) • Mid-Unit 2 Assessment: Reading and Answering Questions about Screws (answers, for teacher reference) • 2-Point Rubric: Writing from Sources/Short Response (for teacher reference)

Opening	Meeting Students' Needs
A. Reviewing Learning Targets (5 minutes) • Post the following learning target: "I can make connections between the meanings of vocabulary words related to simple machines." Read the target aloud to students, and ask them to turn to a partner to discuss what this target means. Have a few pairs share out. • Remind students they have been working on making connections to vocabulary words in their Simple Machines Science journals in the last column in the Vocabulary section. Tell them that today they will practice making similar connections using all of the multiple vocabulary words in an activity called Interactive Word Wall. This will help them develop a deeper understanding of the scientific concepts related to simple machines and help prepare them for their mid-unit assessment. • Post the remaining learning targets: "I can document what I learn about a simple machine in my own words," "I can find the meaning of scientific and academic words related to a simple machine," and "I can determine important information about a simple machine and how it helps people do work." • Tell students these targets should look familiar because they have used similar targets when reading about the inclined plane and lever. Tell them that in their assessment they will read about another simple machine and answer questions using evidence from the text. Have students give a quick thumbs-up, thumbs-sideways, or thumbs-down to show if they understand each target. Clarify as necessary.	• To review concepts and how they are interconnected, refer to the fourth column of Vocabulary section of students' Science journal.

Work Time	Meeting Students' Needs
A. Connecting Key Vocabulary: Interactive Word Wall (15 minutes) • Tell students they will use the **Vocabulary word cards** they used in the previous lesson for Quiz-Quiz-Trade (Lesson 6) to participate in an activity called Interactive Word Wall. Explain that the purpose of this activity is to help them make connections between the meanings of vocabulary words related to simple machines. 1. Place students in groups of four. Post the following directions for Interactive Word Wall on **chart paper** or the board: 2. Place Vocabulary word cards and arrows face up in the middle of your group space. 3. Take turns selecting one word to connect with another. 4. Explain your connection to the group each time you take a turn. 5. It is fine to move words or connect more than one word with another. 6. Continue taking turns until you have connected every word to some other word. • Briefly model for students how to make and explain a connection. Use the **document camera** (or magnets on the board) to model something like the following: "I am going to connect the word *inclined plane* to the word *work* because it makes the work of moving something heavy like a box up into a truck easier." Emphasize each step of the directions, and be sure that students understand that words can be connected in multiple ways. • Distribute a set of Vocabulary word cards with **Interactive Word Wall symbols** to each group. Give groups 10 minutes to make connections. If they finish early, encourage them to start again and try to make new connections with their words. • Ask each group to share one connection they made between words and why. Ask: "Why is it important for readers to make connections between words? How does it help us become better readers?" Have groups discuss briefly. Then use **equity sticks** to cold call a few students to share out. • Collect Vocabulary word cards and have students prepare their desk for the assessment.	• For ELLs and other students needing additional support, consider predetermining the words and giving students time to discuss with a partner what they will say during a protocol-based conversation.

Work Time (continued)	Meeting Students' Needs
B. Mid-Unit 2 Assessment: Answering Questions about Screws (30 minutes) • Distribute the **Mid-Unit 2 Assessment: Reading and Answering Questions about Screws** and the text ***Simple Machines: Forces in Action* pages 18–19**. Remind students of the importance of reading the text several times. Point out the directions at the top of the assessment: 1. Read pages 18–19 in the text *Simple Machines: Forces in Action* for the gist. 2. Reread the text, and take notes using the graphic organizer below. 3. Reread the text, and answer the questions below the graphic organizer. • Clarify directions as needed. • Give students 25 minutes to work. Circulate to observe test-taking strategies, and record observations for future instruction. For example, are students going back to the text to look for answers? Do they appear to be reading the text completely before beginning the assessment? Are they annotating the text for their assessment? This information can be helpful in preparing students for future assessments and standardized tests. • If students finish this assessment early, have them continue reading in their independent reading books for this unit.	• Allow ELLs additional time to complete their assessment. They will receive extra time on the New York State assessment.

Making Connections to Vocabulary and Mid-Unit Assessment:
Interactive Word Wall and Reading and Answering Questions about Screws

Closing and Assessment	Meeting Students' Needs
A. Tracking My Progress (10 minutes) • Ask students to reflect on the following learning targets and then record their progress using the **Tracking My Progress, Mid-Unit 2 recording form**. * "I can document what I learn about a simple machine in my own words." * "I can find the meaning of scientific and academic words related to a simple machine." * "I can determine important information about a simple machine and how it helps people do work." • Collect the Tracking My Progress recording form, and review before tomorrow's lesson. This will help you determine which students need further support as the class moves into the second half of the unit. Consider conferring with students in the coming days to check for understanding or elicit their opinions on how to best support them in their comprehension of scientific texts.	
Homework	**Meeting Students' Needs**
• Continue reading in your independent reading book for this unit at home.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 7
Supporting Materials

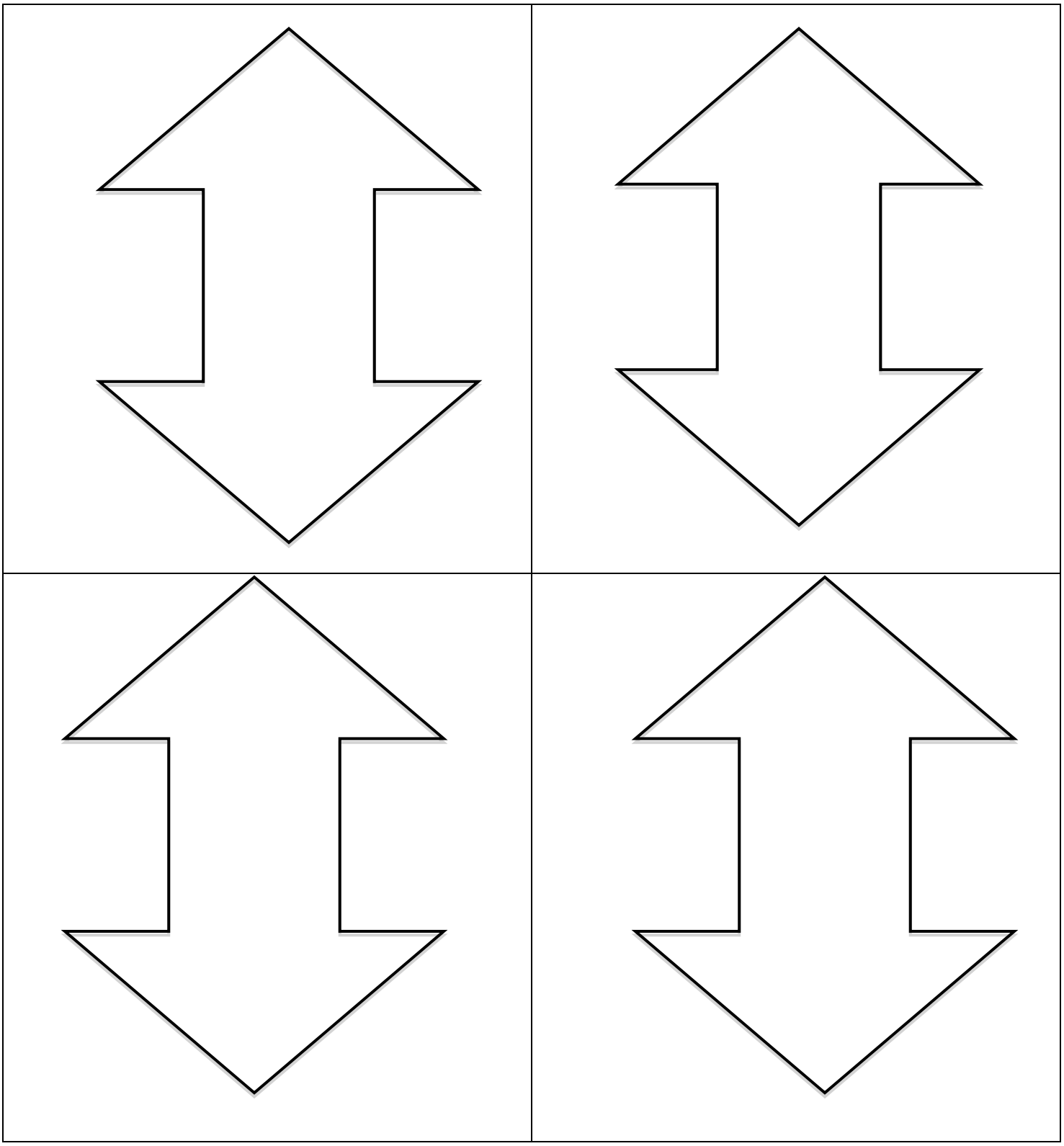
Interactive Word Wall

Teacher Directions: *Write these directions on a piece of chart paper or on the board before beginning this lesson with students.*

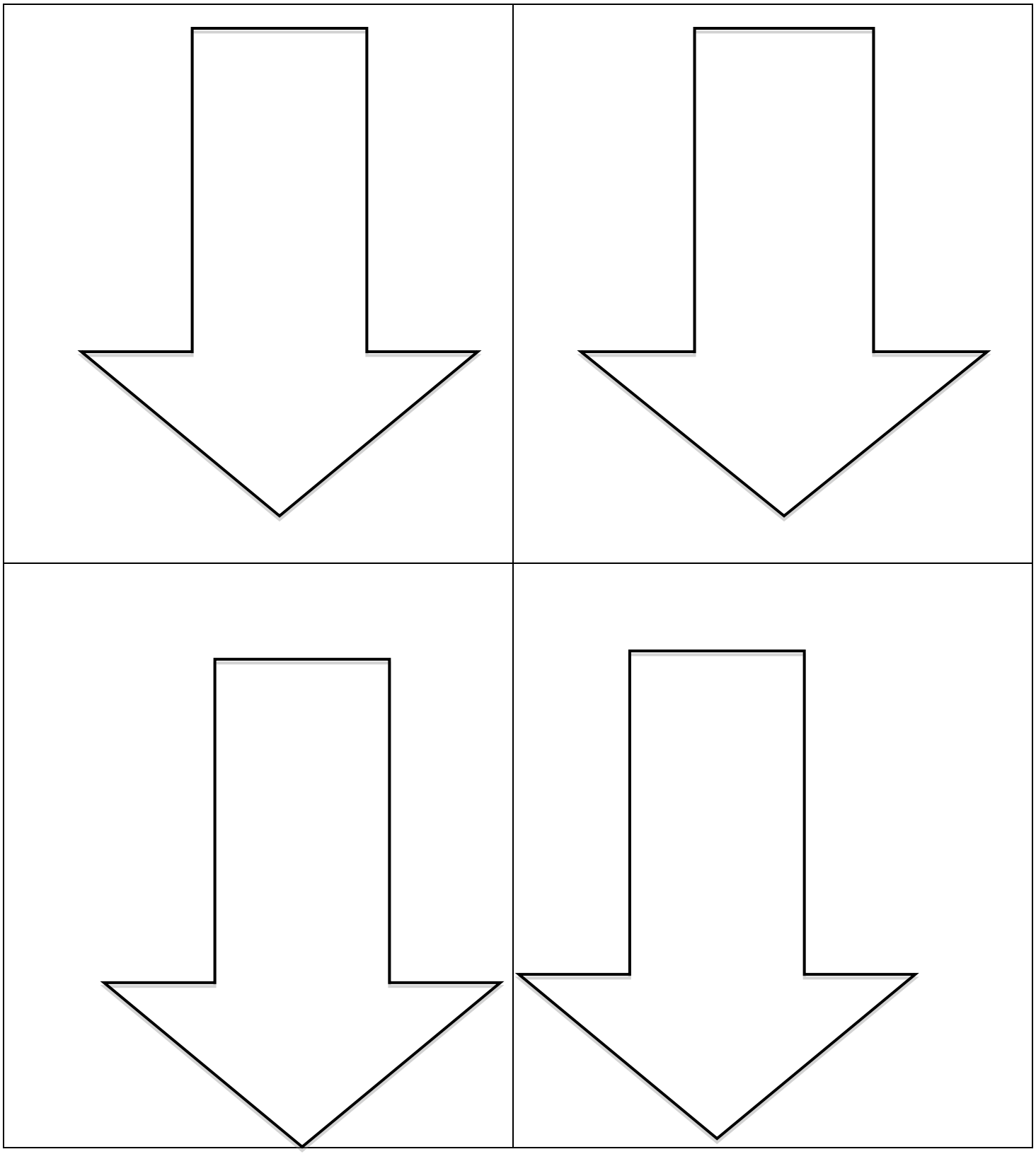
Interactive Word Wall directions:

1. Place Vocabulary word cards and arrows face up in the middle of your group space.
2. Take turns selecting one word to connect with another.
3. Explain your connection to the group each time you take a turn.
4. It is fine to move words or connect more than one word with another.
5. Continue taking turns until you have connected every word to some other word.

Interactive Word Wall Symbols



Interactive Word Wall Symbols



Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws

Name:

Date:

Directions:

1. Read pages 18–19 in the text *Simple Machines: Forces in Action* for the gist.
2. Reread the text and take notes using the graphic organizer below.
3. Reread the text and answer the questions below the graphic organizer.

Read and Record:

What a screw looks like:	Type of work it helps a person do:	Examples of a screw:

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws

Read and Answer:

1. According to the text, a screw is:
   A. a type of lever.
   B. made of an inclined plane wrapped around a cylinder.
   C. a complex machine.
   D. the most common simple machine in everyday life.

2. How does the diagram on **page 18** help the reader understand the screw?
   A. It gives the reader information on the different types of screws.
   B. It demonstrates how it affects force and effort.
   C. It shows the uses of a screw.
   D. It shows the parts of a screw.

3. What is the meaning of the word *threads* as it is used in this text on page 18?
   A. thin strands of cotton
   B. clothes
   C. long thin screws
   D. continuous ridges that spirals around a screw

4. Where in the text can you find the answer to Question 3?
   A. the glossary
   B. in a diagram
   C. in the paragraph on page 14
   D. it is not defined in this text

5. Which of the following words has a similar meaning to the word *increased* in this sentence on page 19: "Less effort is needed to cut into the wood because of the *increased* distance that the threads travel."

   A. longer

   B. upward

   C. downward

   D. shorter

6. Which of the following lines from **page 19** of the text best supports the answer to question 5?

   A. "Less effort is needed to cut into the wood ..."

   B. "You can demonstrate how turning a screw a long distance lessens the effort ..."

   C. "... the lid travels a short distance up or down"

   D. "... the threads of the screw cut down into a plank of wood"

Read the following paragraph from **page 19** the text and answer the questions below:

> "An inclined plane lessens the **effort** needed to lift or lower something by increasing the distance over which the **work** is done. A screw allows work to be done in the same way—with less effort. The threads of a screw turn around and around as they cut into wood or other materials. Less effort is needed to cut into the wood because of the increased distance that the threads travel." —p.19 *Simple Machines: Forces in Action* by Buffy Silverman

7. According to this paragraph above, a screw works in a similar way to which simple machine?

   A. lever

   B. pulley

   C. inclined plane

   D. wheel and axle

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws

8. How does a screw affect work? Use details from the text to support your explanation.

Tracking My Progress, Mid-Unit 2

Name:

Date:

Learning target: I can document what I learn about a simple machine in my own words.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this	I understand some of this	I am on my way!
		

3. The evidence to support my self-assessment is:

Tracking My Progress, Mid-Unit 2

Name:

Date:

Learning target: I can find the meaning of scientific and academic words related to a simple machine.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this

I understand some of this

I am on my way!

3. The evidence to support my self-assessment is:

Tracking My Progress, Mid-Unit 2

Name:

Date:

Learning target: I can determine important information about a simple machine and how it helps people do work.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this	I understand some of this	I am on my way!
		

3. The evidence to support my self-assessment is:

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws
(Answers, for Teacher Reference)

Standards Assessed:
Graphic Organizer (W.4.8); Questions 1, 3, 4, 5, and 6 (RI.4.4); Questions 2, 7, and 8 (RI.4.3); Question 8 (W.4.9)

Directions:
1. Read pages 18–19 in the text *Simple Machines: Forces in Action* for the gist.
2. Reread the text and take notes using the graphic organizer below.
3. Reread the text and answer the questions below the graphic organizer.

Read and Record: [possible responses]

What the screw looks like:	Type of work it helps a person do:	Examples of a screw:
• **An inclined plane wrapped around a cylinder** • **An inclined plane wrapped around a central shaft** • **An inclined plane wrapped like a spiral**	• **Holds things together by cutting into them** • **Drills holes** • **Pulls air in and pushes it out**	• **screw** • **lid of a jar** • **auger or drill** • **fan blades**

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws
(Answers, for Teacher Reference)

Read and Answer:

1. According to the text, a screw is:
   A. a type of lever.
   B. **made of an inclined plane wrapped around a cylinder.**
   C. a complex machine.
   D. the most common simple machine in everyday life.

2. How does the diagram on page 18 help the reader understand the screw?
   A. It gives the reader information on the different types of screws.
   B. It demonstrates how it impacts force and effort.
   C. It shows the uses of a screw.
   D. **It shows the parts of a screw.**

3. What is the meaning of the word *threads* as it is used in this text on page 18?
   A. thin strands of cotton
   B. clothes
   C. long thin screws
   D. **continuous ridges that spirals around a screw**

4. Where in the text can you find the answer to Question 3?
   A. **the glossary**
   B. in a diagram
   C. in the paragraph on page 14
   D. it is not defined in this text.

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws
(Answers, for Teacher Reference)

5. Which of the following words has a similar meaning to the word *increased* in this sentence on page 19: "Less effort is needed to cut into the wood because of the *increased* distance that the threads travel."

   A. **longer**

   B. upward

   C. downward

   D. shorter

6. Which of the following lines from **page 19** of the text best supports the answer to Question 5?

   A. "Less effort is needed to cut into the wood ..."

   B. **"You can demonstrate how turning a screw a long distance lessens the effort ..."**

   C. "... the lid travels a short distance up or down"

   D. "... the threads of the screw cut down into a plank of wood"

Read the following paragraph from **page 19** the text and answer the questions below:

> "An inclined plane lessens the **effort** needed to lift or lower something by increasing the distance over which the **work** is done. A screw allows work to be done in the same way—with less effort. The threads of a screw turn around and around as they cut into wood or other materials. Less effort is needed to cut into the wood because of the increased distance that the threads travel." —p.19 *Simple Machines: Forces in Action* by Buffy Silverman

7. According to this paragraph above, a screw works in a similar way to which simple machine?

   A. lever

   B. pulley

   C. **inclined plane**

   D. wheel and axle

Mid-Unit 2 Assessment:
Reading and Answering Questions about Screws
(Answers, for Teacher Reference)

8. How does a screw affect work? Use details from the text to support your explanation.

[Possible Answer] A screw makes work easier because it takes less effort to move something. If you need to take the lid off a jar of peanut butter, the screw on the lid makes it easier to get it off. You have to move the lid a longer distance as you turn it around, but it is a lot easier than trying to pull it straight off.
[Use the following rubric to score this question.]

2-Point Rubric: Writing from Sources/Short Response[1]

(For Teacher Reference)

Use the below rubric for determining scores on short answers in this assessment.

2-point Response	The features of a 2-point response are:
	• Valid inferences and/or claims from the text where required by the prompt • Evidence of analysis of the text where required by the prompt • Relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Sufficient number of facts, definitions, concrete details, and/or other information from the text as required by the prompt • Complete sentences where errors do not impact readability

1-point Response	The features of a 1-point response are:
	• A mostly literal recounting of events or details from the text as required by the prompt • Some relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Incomplete sentences or bullets

0-point Response	The features of a 0-point response are:
	• A response that does not address any of the requirements of the prompt or is totally inaccurate • No response (blank answer) • A response that is not written in English • A response that is unintelligible or indecipherable

[1]From New York State Department of Education, October 6, 2012.

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 8

Reading Scientific Text: Reading Closely about the Pulley

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	**Ongoing Assessment**
• I can find the meaning of scientific and academic words related to the pulley. • I can determine important information about pulleys and how they help people do work.	• Simple Machines Science journal (page 16: Pulley Research Notes) • Vocabulary note-catcher • Diagram • Constructed Response

Agenda	Teaching Notes
1. Opening A. Engaging Readers and Writers: Revisiting the KWL Chart (10 minutes) B. Reviewing Learning Targets (5 minutes) 2. Work Time A. Partner Reading: Reading a Scientific Text about the Pulley Closely (25 minutes) B. Connecting Key Vocabulary (15 minutes) 3. Closing and Assessment A. Share: Single versus Double Pulleys (5 minutes) 4. Homework A. Write a caption for the pulley diagram on the front of your Science journal. Make sure to describe how a pulley helps people do work.	• The structure of this lesson is similar to Lessons 3 and 5. Students learn about pulleys, focusing on how the pulley is similar to and different from other simple machines. • In the second half of this unit, students continue to read about simple machines and conduct experiments, but they do this more independently. Therefore, unlike in the first half of the unit, students read closely (in Lessons 8 and 9) BEFORE doing the experiment (in Lesson 10). This helps them see how they are developing as readers. They can learn a lot about simple machines before doing the experiment in Lesson 10. • Work Time A and B in this lesson is primarily partner work. Some students may need more support. Consider pulling partnerships together for additional support in processing content and/or defining the meanings of unfamiliar words. • In advance: Make a Pulleys anchor chart with three sections. (See model in supporting materials.) • Post: Learning targets.

Lesson Vocabulary	Materials
pulley, reduce, increase, decrease, antonyms; complicated, laborers, distance Review: force, load, effort	• KWL anchor chart (from Lesson 1) • Simple Machines Science journals (from Lesson 1) • *Simple Machines: Forces in Action* pages 30–31 (book, one per student) • Sticky note (one per partnership) • Vocabulary Strategies anchor chart (reviewed in Unit 1, Lesson 1) • Sticky notes (one per student) • Blank paper (one per student) • Pulleys anchor chart (newly created; for teacher reference)

Opening	Meeting Students' Needs
A. Engaging Readers and Writers: Revisiting the KWL Chart (10 minutes) • Post the **KWL anchor chart**. Remind students that in Lesson 1 of this unit, they used this chart to write down what they knew about simple machines and any questions they had. They've learned a lot since that lesson; it's time to revisit and revise the KWL chart. • Distribute the **Simple Machines Science journals** and ask the students to turn to page 10. • Ask students to do the following: 1. Review the information that they listed in the "I KNOW ..." column to check for accuracy. 2. Mark the information Y or N if they have learned that, yes (Y), it is accurate, or no (N), it is inaccurate, from all they have read and experienced so far in this unit. Tell them not to write any new information in this column. 3. List new learning in the last "I LEARNED ..." column. Point out they are asked to not only identify the information they have learned, but also where they learned it—the source. For example: – Information: A lever is made up of a bar that tilts on a special point called a fulcrum. – Source: *Simple Machines*, page 24 (Students could abbreviate the title of the book as *SM*.) • Give students 5 minutes to record as much new learning as they can. Tell them they will revisit this chart again after Lesson 9. • Cold call two or three students to share one piece of information they've learned and where they learned it. Add this information to the KWL anchor chart.	
B. Reviewing Learning Target (5 minutes) • Invite the students to read the learning targets. Ask them to show they understand what they will be learning by touching their noses. If they are unsure of what the learning targets say, ask them to scratch their heads. Clarify as needed.	

Work Time	Meeting Students' Needs
A. Partner Reading: Reading a Scientific Text about the Pulley Closely (25 minutes) • Explain students will read a text about pulleys with their science partner from Lesson 4. Distribute ***Simple Machines: Forces in Action*** **pages 30–31** and one **sticky note** per partnership and ask students to turn to page 30. Review the process of closely reading a text that they have experienced during this unit. 1. Read the entire text. 2. Discuss what the gist of the text is and write it on a sticky note. 3. Read the text again to identify key scientific vocabulary. Refer to the **Vocabulary Strategies anchor chart** for strategies to use in determining the meaning of unfamiliar words. 4. Identify vocabulary in the Vocabulary section of the Simple Machines Science journal. Make sure to locate*: pulley*, *reduce*, *decreased*, *increased*, *force*, *load*, *effort*, *distance*. 5. Read the text again, determining important information and using evidence from the text to support your thinking. Remind students of the process of deconstructing complex sentences and paragraphs to better understand challenging scientific content (Lessons 3 and 5). Encourage them to use the diagrams on page 30 to help them understand the difference between single and double pulleys as they read. • Explain that they will work together to complete the first two sections of the Pulley Research Notes on page 16 in their Simple Machines Science journal. Remind students they've done this process twice before, so today they are going to do it more on their own. Tell them that they will work with a new science partner. Also tell them you are available for support. • As pairs work, circulate and assist as needed. Ask questions to help push the students back to the text to cite evidence that supports their thinking. For example: "Where in the text does it say that?" or "Are you sure? How do you know?" Give students specific praise when they cite textual evidence.	• For students needing additional support, consider the following: – Pull small groups of students who have similar skills/needs. – Provide sentence stems for the gist statements to help students who struggle with language. – Students needing additional supports may benefit from partially filled-in graphic organizers. (See task cards in Module 2, Unit 2, Lesson 6.) • 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. • Students who struggle with language benefit from having their own individual dictionaries for reference throughout the module.

Work Time (continued)	Meeting Students' Needs
B. Connecting Key Vocabulary (15 minutes) • Ask students what the word *interconnected* means. Remind them that they learned about that word in Lesson 3 when they read about the inclined plane. Ask them to turn and talk with a partner. Once they have a definition in mind, they should put a thumbs-up sign in front of their chest. When all students have indicated they have a definition ready to share, ask them to lift their faces to the ceiling and on the count of three, whisper their definition "to the universe." Count: "One, two, three!" You should hear: "Joined together." • Write the following words on the white board or chart paper: *distance, increase, decrease, effort*. Ask students to look back in their Science journals to review what these words mean. – distance: the measure of space between two points – increase: make greater – decrease: make less – effort: the force needed to use a simple machine • Ask students to pair up, and assign each pair one of the three passages. Each partnership will do the following: 1. Review a page in *Simple Machines: Forces in Action* together by choral reading. – inclined plane ("Historic Planes" and "Distance versus Effort"), page 7 – lever ("Effort and Load"), page 25 – pulley ("Easy Lifting" and "Powerful Pulleys"), page 31 2. Work together to answer the question: "How are distance and effort interconnected for your simple machine? Use evidence from the text to support your answer." 3. Write your answer on a large **sticky note**. • Model this process using the screw. Ask students to turn to page 19 in *Simple Machines: Forces in Action*. Read the first paragraph aloud as the students read silently. Focus on the last sentence: "Less effort is needed to cut into the wood because of the increased distance that the threads travel." Think aloud how the terms distance and effort are used. For example: "The text is saying that the threads of a screw turn over and over—a longer distance, but with little more effort than trying to force the lid to close by pushing down on it with great force."	• Using sentence frames can help ELLs articulate their learning.

Work Time (continued)	Meeting Students' Needs
• Give the students 15 minutes to read the identified pages in *Simple Machines: Forces in Action* and answer the text-dependent question. • Circulate and offer support as needed.	

Closing and Assessment	Meeting Students' Needs
A. Share: Single versus Double Pulleys (5 minutes) • Distribute a piece of **blank paper** to each student. Ask them to reread the first paragraph on page 31 and draw a picture that represents the difference between a single pulley and a double pulley. Encourage them to look at the diagrams on page 30 for help. Inform them they will need to be able to explain this scientific concept to another student. • 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 pulleys are different.	• Providing word banks for students who struggle with language will give them additional support in answering complex questions.

Homework	Meeting Students' Needs
• 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. • Write a caption for the pulley diagram on the front of your Simple Machines Science journal. Make sure to describe how a pulley helps people do work. *Note: Lesson 10 (two lessons from now) includes two experiments. Half of the class will do an experiment about pulleys; the other half will do an experiment about the wheel and axle. They then share what they learned with peers who performed the other experiment. In advance, review procedures and prepare materials: see pages 32 to 33 of* Simple Machines: Forces in Action *for the pulley experiment and pages 38 to 39 for the wheel and axle one. If it's not possible to gather all of the experiment materials, consider these alternatives:* *Pulley:* – If empty thread spools are not available, try either empty toilet paper rolls or cut a wooden dowel, such as a closet rod, into two-inch sections. Wrap rubber bands around each end of the dowel/roll to keep the string of the pulley from slipping off. – If small buckets are not available, try plastic cups with string handles. – For a fixed point on which to hang the pulleys, use the leg of a desk chair on its side on a flat surface (i.e., table or desk). To be sure that the chair does not fall off the flat surface, use some kind of anchor weight (i.e., heavy books, one of the students holding it with their hands, or tie the chair down) holding it securely on the surface. *Wheel and Axle:* – If roller skates are not available, try any smaller toy on wheels (i.e., cars, trucks). Make sure the toys weigh enough to cause friction when on their sides. Consider securing a small bag of gravel to the wheeled object.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 8
Supporting Materials

Pulleys Anchor Chart
(For Teacher Reference)

(Example is not to scale—create this anchor chart in advance)

Pulleys
Gist Statements: (Student sticky notes)
Important Vocabulary to Know: (Student sticky notes)
Examples of Pulleys in Our Lives: (Student sticky notes)

EXPEDITIONARY LEARNING

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

Reading Scientific Text: Reading Closely about the Wheel and Axle

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	**Ongoing Assessment**
• 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.	• Simple Machines Science journal • Vocabulary note-catcher • Diagram • Constructed Response

Agenda	Teaching Notes
1. Opening A. Engaging Readers and Writers (10 minutes) B. Reviewing Homework and Learning Targets (5 minutes) 2. Work Time A. Partner Reading: Reading a Scientific Text Closely (20 minutes) B. Connecting Key Vocabulary (10 minutes) 3. Closing and Assessment A. Synthesizing Learning about the Wheel and Axle (5 minutes) B. Debrief: Synthesizing about Simple Machines in Three Words (10 minutes) 4. Homework 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.	• 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. • 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. • 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. • 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. • Post: Learning targets.

Lesson Vocabulary	Materials
Review: force, effort, work, lever, fulcrum, distance, increase, decrease New: wheel and axle, friction, faucet, shaft	• Simple Machines strips of paper (one per student; see Teaching Notes) • Sticky notes (2-3 per triad) • Pulleys anchor chart (from Lesson 8) • *Simple Machines: Forces in Action* pages 36 and 37 (book; one per student) • Sticky notes (one per partnership) • Vocabulary Strategies anchor chart (reviewed in Unit 1, Lesson 1) • Simple Machines Science journals (one per student) • Index cards (one per student) • Blank paper (one per student)

Opening	Meeting Students' Needs
A. Engaging Readers and Writers (10 minutes) • 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. • 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. • Circulate and have students choose a **Simple Machines strip of paper**. 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.	• 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."
B. Reviewing Homework and Learning Target (5 minutes) • 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." • Invite students to get into triads to share and then record examples of pulleys they found—one per **sticky note**. Ask a representative from each triad to post their sticky notes on the bottom section of the **Pulleys anchor chart** (from Lesson 8). • 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." • 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.	

Work Time	Meeting Students' Needs
A. Partner Reading: Reading a Scientific Text Closely (20 minutes) • 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 ***Simple Machines: Forces in Action*** 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. 1. Read the text all the way through. 2. Discuss what the gist of the text is and write it on a sticky note. 3. Read the text again to identify key scientific vocabulary. Refer to the **Vocabulary Strategies anchor chart** for strategies to use in determining the meaning of unfamiliar words. 4. Enter identified vocabulary in the Vocabulary section of the **Simple Machines Science journal**. Make sure to include: *wheel and axle*, *friction*, *work*, *force*, and *effort*. 5. Read the text again, determining important information and using evidence from the text to support your thinking. • Remind students of the process of deconstructing complex sentences and paragraphs to better understand challenging scientific content (Lessons 3, 5, and 8). • 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. • 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.	• For students needing additional support, consider the following: – Pull small groups of students who have similar skills/needs. – Provide sentence stems for the gist statements to help students who struggle with language. – Students needing additional supports may benefit from partially filled-in graphic organizers. (See task cards in Module 2, Unit 2, Lesson 6.) • 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. • Students who struggle with language benefit from having their own individual dictionaries for reference throughout the module.

Work Time (continued)	Meeting Students' Needs
B. Connecting Key Vocabulary (10 minutes) • Review with the students what the term *interconnected* means (joined together). Remind them about the vocabulary analysis they did in Lesson 8 with the words *distance*, *increase*, *decrease*, and *effort*. Ask them to look in their Simple Machines Science journals for the definitions of these four words. • Ask each partnership to reread pages 36 and 37 in *Simple Machines* and find evidence to help answer the question: "How are distance and effort interconnected for your simple machine?" • 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 **index card**. • Give students 5 to 7 minutes to reread pages 36 and 37 and answer the text-dependent question. • 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.	• Using sentence frames can help ELLs articulate their learning.

Closing and Assessment	Meeting Students' Needs
A. Synthesizing Learning about the Wheel and Axle (5 minutes) • Distribute a piece of **blank paper** 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. • 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.	
B. Debrief: Synthesizing about Simple Machines in Three Words (10 minutes) • 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."). • 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. • Give students a few minutes to share their three-word synthesis statements. • Then invite two or three students to share out a three-word synthesis they heard in their group.	
Homework	**Meeting Students' Needs**
• 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. • 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. *Note: Lesson 10 includes two experiments. For details regarding preparations, see Notes at the end of Lesson 8 or the start of Lesson 10.*	

There are no new supporting materials for this lesson.

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 10

Reading a Scientific Experiment: The Pulley and Wheel and Axle

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can explain the main points in scientific text, using specific details in the text. (RI.4.3) I can describe the organizational structure in an informational text (chronology). (RI.4.5) I can write informative/explanatory texts that convey ideas and information clearly. (W.4.2) I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1)	
Supporting Learning Targets	**Ongoing Assessment**
• I can explain what happens before, during, and after a scientific experiment. • I can explain how the directions in a scientific experiment help me understand what a pulley and wheel and axle are and how they work. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about pulleys or wheels and axles. • I can follow our class norms when I participate in a conversation.	• Simple Machines Science journal: Science Experiment note-catcher (pages 18 or 19) • Four Corners Teacher observations

Agenda	Teaching Notes
1. Opening A. Engaging the Reader and Writer: Mix and Mingle and Reviewing Learning Targets (5 minutes) 2. Work Time A. Reviewing Procedures: Reading a Science Experiment (15 minutes) B. Rereading Scientific Text while Conducting a Science Experiment (15 minutes) C. Writing a Conclusion (10 minutes) 3. Closing and Assessment A. Forming an Opinion: Four Corners strategy (15 minutes) 4. Homework A. Continue reading in your independent reading book for this unit at home.	• In this lesson, the class divides into two experiment groups. Each group conducts a different experiment—one on the pulley and one on the wheel and axle. These groups can either be strategically or randomly chosen, depending on the needs of your students. • Further divide students into smaller groups of three or four students within each experiment. This is because experiments are best conducted with smaller groups of students so everyone can participate. Plan these smaller groups in advance. • In advance: Prepare materials for both experiments. See pages 32–33 for the pulley experiment and pages 38–39 for the wheel and axle experiment in *Simple Machines: Forces in Action*. Some suggestions for alternate materials and logistics: • Pulley: – If empty thread spools are not available, try either empty toilet paper rolls or cutting a wooden dowel, such as a closet rod, into two-inch sections. Wrap rubber bands around each end of the dowel/roll to keep the string of the pulley from slipping off. – If small buckets are not available, try plastic cups with string handles. – A possible fixed point on which to hang the pulleys could be the leg of a desk chair on its side on a flat surface (i.e., table or desk). To ensure that the chair does not fall off the flat surface, there would need to be some kind of anchor weight (i.e., heavy books, one of the students holding it, or tie the chair down) holding it securely on the surface. • Wheel and Axle: – If roller skates are not available, try any smaller toy on wheels (i.e., cars, trucks). Make sure that the toys weigh enough to cause friction when on their sides. Consider securing a small bag of gravel to the wheeled object. • As in Lessons 2 and 4, for the first read, be sure to cover up the "How Does It Work?" box on pages 33 and 38 before students conduct the experiments.

Agenda	Teaching Notes (continued)
	• To prepare for the debrief, create four signs, one for each of the simple machines the students have learned about in depth (inclined plane, lever, pulley, wheel and axle). In advance, post one sign in each corner of the room. • Review the steps of the Scientific Method (first described in Lesson 2). • Review Mix and Mingle (Unit 1, Lesson 4). • Post: Learning targets.

Lesson Vocabulary	Materials
Review: force, effort, work, load New: spool	• Simple Machines Science journal (one per student) • Conducting an Experiment anchor chart • *Simple Machines: Forces in Action* pages 32–33 and 38 (book; one per student) • Scientific Method anchor chart (from Lesson 2) • Document camera • Four Corners (for teacher reference; see supporting materials) • Equity sticks

Opening	Meeting Students' Needs
A. Engaging the Reader and Writer: Mix and Mingle and Reviewing Learning Targets (5 minutes) • Tell students that in a moment they will share the captions they wrote on the cover of their **Simple Machines Science journal** for the pulley and wheel and axle, as well as any examples of a wheel and axle they found around them. • Remind students that they used Mix and Mingle discussion (in Unit 1, Lesson 4) to practice sharing their opinions about whether fiction is a good teacher of facts. Say that Mix and Mingle is similar to Think-Pair-Share, but instead of sharing with a single partner they get to move around and share their thinking with several peers. • Review the following directions for the Mix and Mingle: 1. Stand up and find a partner. 2. Share your captions for the pulley and wheel and axle with each other. Be sure to explain why your captions clearly describe how these simple machines are important in helping people do work. Be respectful speakers and listeners. 3. Thank your partner and find another partner. 4. Share any examples of a wheel and axle you found around you. • Address any clarifying questions about Mix and Mingle. • Give students 4 minutes to participate in the Mix and Mingle. Listen to students' conversations for scientifically accurate facts about the pulley and wheel and axle. (For example, some students may say that the pulley helps people lift very heavy loads—the heavier the load, the more pulleys need to be used. Or they may say that the wheel and axle help people move heavy loads from one place to the next easily by not causing friction.) • Tell students that today the class will conduct two experiments: one on the pulley and one on the wheel and axle. Each student will conduct just one of the two experiments. • Tell students the process they follow today are similar to how they conducted the experiments on the inclined plane and lever in Lessons 2 and 4. Invite them to read the learning targets. Remind them these are the same learning targets they've had for each of the experiments they conducted in this unit. Ask if they have any questions about the learning targets. Clarify as needed. • Tell students they are getting really good at reading about and conducting science experiments, so today they'll work with less teacher support. They should rely on their group. Reassure them that you will still circulate and support as needed, but encourage them to "step up" to more independence today.	

Work Time	Meeting Students' Needs
A. Reviewing Procedures: Reading a Science Experiment (15 minutes) • Tell students they will do an experiment either on the pulley or on the wheel and axle. The class will be divided into two groups. Each large group will be broken into smaller "experiment groups" of three to four students. • Ask students to move to their predetermined experiment groups. Review the process of preparing to conduct an experiment. Post the **Conducting an Experiment anchor chart**. • Invite the students to silently read to themselves the four steps they need to follow to prepare to conduct the experiment. Then ask each experiment group to read the steps aloud together. 1. Read the list of materials needed for the experiment. 2. Read through the entire procedure for conducting the experiment. Try to visualize what is being described in each step. 3. Reread the steps, pausing after each step to discuss with your partners what you are being asked to do. 4. If there are vocabulary words that are unfamiliar, refer to the Vocabulary Strategies anchor chart, focusing on the first strategy "reading on in the text and infer" to figure out the meaning of the word(s). • Address any clarifying questions. • Distribute the Simple Machines Science journals and ***Simple Machines: Forces in Action***. – Ask the pulley groups to turn to pages 32–33 in the text. – Ask the wheel and axle groups to turn to page 38 in the text. • Give students 5 minutes to complete the four steps listed on the Conducting an Experiment anchor chart.	• The smaller experiment groups can be predetermined based on student readiness or learning styles, or they could be heterogeneous. Alternatively, they could be randomly grouped. It will depend on what is best for your students' needs. • Consider partnering an ELL student with a student who speaks the same L1 for discussion of complex content. • The experiment on the wheel and axle is not as complex as the experiment on the pulley. Consider assigning students who struggle with language or complex concepts to the wheel and axle experiment.

Work Time (continued)	Meeting Students' Needs
B. Rereading Scientific Text while Conducting a Science Experiment (15 minutes) • Remind students to keep the "How Does It Work?" box on the bottom half of page 33 and the bottom left section of page 38 covered. • Ask students to turn to page 18 in their Science journals for the pulley experiment and page 19 for the wheel and axle experiment. Remind students that scientists often use the Scientific Method to guide them through experiments. Review the **Scientific Method anchor chart** from Lesson 2. Remind them that the question for each of the experiments they have conducted in this unit is: "How can this simple machine make work easier?" • Ask students to tell their experiment group the next thing they need to do before conducting the experiment. You should hear: "We need to write a hypothesis, or prediction about what we think is going to happen." • Ask the experiment groups to discuss: * "What might be a possible hypothesis?" • Ask students to write their hypothesis in their Science journals. • Also ask them to list the materials needed for the experiment. • Give students 10 minutes to conduct the experiment. • Circulate and assist as needed. When students have procedural questions, push them back into the text to see if they can answer their own question: "Where might you look for that answer?" or "What does the text tell you?" • ***Pulley Experiment***: Ask probing questions that push them to connect the terms *effort* and *force*. For example: * "If force is the ability to push, pull, or twist, what is the force in this experiment?" (Answer: It's pulling down on the string in order to lift the pail up.) * "How would you describe the effort that is being used?" (Answer: It takes less effort to lift a heavy pail up if you use force to pull down in a pulley.)	• To further support students add visual cues to your anchor chart or provide copies of the chart for certain students to use at their desk. • Consider allowing students to draw their observations, ideas, or notes when appropriate. This allows all students to participate in a meaningful way.

Work Time (continued)	Meeting Students' Needs
• ***Wheel and Axle Experiment***: Ask probing questions that push them to connect the terms *effort* and *force*. For example: * "If force is the ability to push, pull, or twist, what is the force in this experiment?" (Answer: It's pulling on the rubber band). * "How would you describe the effort that is being used?" (Answer: If a load is pulled on wheels, it reduces the friction, which makes the effort easier. The less friction, the easier it is to move a load.) • Reinforce vocabulary: Point out to students when you hear them using scientific vocabulary in their discussions. Encourage them to use it as they write their observations.	
C. Writing a Conclusion (10 minutes) • Remind students that the last step in the Scientific Method is to analyze the data and draw a conclusion. This means that they need to synthesize their findings by writing a *conclusion* statement. This statement explains the main idea of what happened during the experiment and what they learned from it. Tell them in the next lesson they will share their conclusions with students from the other experiment as a way of teaching them what they learned. Reinforce that writing is one way scientists share their new learning with the scientific community. • After students have written their conclusion, ask them to unveil the "How Does It Work?" box on pages 33 and 38 that has been covered. Invite students to read it, checking to see if they reached the same conclusions as the author did. If their findings were different from the author's, tell them to NOT change their hypothesis or their conclusion. Ask them to add to their conclusions by explaining how their conclusion is different from the author's. • Remind them to hold on to their writing; they will share these conclusions at the start of Lesson 11.	

Closing and Assessment	Meeting Students' Needs
A. Forming an Opinion: Four Corners (15 minutes) • Ask the students to gather in the middle of the room with their Science journals. • Use a **document camera** to show students the directions for the **Four Corners**. Read the protocol description aloud as the students follow along silently. To check for understanding, ask two or three students to explain the protocol in their own words. • Conduct the protocol. • Debrief the protocol by using **equity sticks** to cold call students. Ask questions such as: * "Was it easy or hard for you to choose one simple machine? Why?" * "If you moved corners, what made you change your mind?" * "Did you find it easy or challenging to form an opinion and articulate why you chose the simple machine that you did? Why?"	• Using sentence frames can help ELLs articulate their learning. Using the word "because" in the sentence frame helps all students support their thinking with evidence. For example: "I chose _____ simple machine because I think it benefits people by _____."
Homework	**Meeting Students' Needs**
• Continue reading in your independent reading book for this unit at home. *Note: For Lesson 11, students will need specific feedback from their last Science Talk (Lesson 6). Write feedback on the bottom section of page 15 in students' Simple Machines Science journals. Focus the feedback on the learning targets that were emphasized in that lesson: "I can prepare for the Science Talk by using evidence from scientific texts," "I can ask questions about the topic being discussed," and "I can build on others' ideas when responding to their statements and questions." Also give suggestions to any students who may need more coaching in order to follow the class norms. Keep feedback focused, brief, and encouraging.*	•

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 10
Supporting Materials

Conducting an Experiment Anchor Chart

1. Read the list of materials needed for the experiment.
2. Read through the entire procedure for conducting the experiment. Try to visualize what is being described in each step.
3. Reread the steps, pausing after each step to discuss with your partners what you are being asked to do.
4. If there are vocabulary words you don't know, refer to the Vocabulary Strategies anchor chart. Focus on the first strategy "reading on in the text and infer" to figure out the meaning of the word(s).

Four Corners
(For Teacher Reference)

Purpose: Four Corners provides students with a structure to engage in conversation with their peers about a topic. They are asked to form opinions and state their reasoning to support their opinion.

Procedure:

1. Post a sign in each corner of the room with the name of one simple machine (inclined plane, lever, pulley, and wheel and axle).
2. Ask the students to choose which simple machine they think is the most beneficial to people in their everyday lives. They must choose one corner.
3. Once they have decided on their simple machine, instruct them to move to that corner.
4. Give the students 2 to 3 minutes to talk as a "corner group" about why they chose that particular simple machine. Encourage them to use the notes in their Science journals to support their opinions.
5. They need to choose a spokesperson to report to the whole group the top two reasons why they think that simple machine is the most beneficial based on the texts they've read and the experiments they have conducted (1 minute per corner).
6. Each "corner group" shares their two reasons.
7. After each group has shared, give the students an opportunity to change if they wish. Make sure to ask them what made them change their minds.

Option: The Caucus

- If students can't choose one corner, give them the option of standing in the middle of the room.
- As the corners are discussing why they chose that particular simple machine, the students in the middle are discussing why they couldn't choose one.
- After each corner has shared the reasons their simple machine is the most beneficial, the students in the middle can move to a corner if they have made a decision.
- If there are any students left in the middle, each corner group has 1 minute to use evidence from the texts and experiments to convince the "undecided" to join their corner.

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 11

Science Talk: Synthesizing What We Know about Simple Machines

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can effectively engage in discussions with diverse partners about fourth-grade topics and texts. (SL.4.1) I can identify the reason a speaker provides to support a particular point. (SL.4.3) I can identify evidence a speaker provides to support particular points. (SL.4.3)	
Supporting Learning Targets	**Ongoing Assessment**
• I can effectively participate in a Science Talk about simple machines. a. I can prepare for the Science Talk by using evidence from the *Simple Machines* texts. b. I can build on others' ideas when responding to their statements and questions. c. I can ask questions on the topic being discussed. d. I can follow our class norms when I participate in a conversation.	• Simple Machines Science journals (page 20: Preparing for a Science Talk) • Science Talk Criteria checklist

Agenda	Teaching Notes
1. Opening A. Vocabulary Review: Quiz-Quiz-Trade (10 minutes) B. Science Talks: Reviewing Learning Targets (5 minutes) 2. Work Time A. Science Talks: Reflecting and Setting Goals (10 minutes) B. Preparing Evidence and Questions for the Science Talk (10 minutes) C. Conducting the Science Talk (20 minutes) 3. Closing and Assessment A. Debrief (5 minutes) 4. Homework A. Share with someone at home what you are learning about simple machines and how they help us in our everyday lives.	• This lesson follows the same structure as Lesson 6. Students have now built significant background knowledge about simple machines and how they affect force, effort, and work. • Since their last Science Talk in Lesson 6, students have researched the pulley and wheel and axle. In this Science Talk, students should be pushed to synthesize their learning about simple machines and support their thinking with additional evidence from pages 30–31 and 38–39 of the text *Simple Machines: Forces in Action* by Buffy Silverman. • Students will need specific feedback from their previous Science Talk (Lesson 6). Write feedback on the bottom section of page 15 in students' Simple Machines Science journals. Focus the feedback on the learning targets that were emphasized in that lesson: "I can prepare for the Science Talk by using evidence from scientific texts," "I can ask questions about the topic being discussed," and "I can build on other's ideas when responding to their statements and questions." • Review: Quiz-Quiz-Trade (in Vocabulary Strategies) and Science Talk protocols (see Appendix). • Post: Learning targets.

Lesson Vocabulary	Materials
increase, decrease, distance, pulley, wheel and axle, screw, participate, evidence, norms (review from previous lessons)	• Vocabulary word cards (for teacher use; one car per student for Quiz-Quiz Trade) • Equity sticks • Science Talk Norms anchor chart (created in Unit 1, Lesson 3) • Simple Machines Science journals (one per student) • *Simple Machines: Forces in Action* pages 6–7 and 24–25 (book; one per student) • Preparing for a Science Talk recording form (in Simple Machines Science journals) • Participating in a Science Talk anchor chart (from Unit 1, Lesson 3) • Science Talk Criteria checklist

Opening	Meeting Students' Needs
A. Vocabulary Review: Quiz-Quiz-Trade (10 minutes) • Tell students that to prepare for their Science Talk they will review vocabulary related to simple machines in another round of Quiz-Quiz-Trade. Explain to students that you have added words to the Vocabulary word cards based on the words they collected since studying the pulley and wheel and axle. • Post and review the following directions for Quiz-Quiz-Trade: 1. Find a partner. 2. Read definition—read your word's definition to your partner. Allow him or her to guess the word or ask for a hint. 3. Give a hint—if your partner needs a hint, say one thing that helps you remember the meaning of this word. Allow your partner to guess and share your word. 4. Switch—have your partner read his or her definition and let you guess or receive a hint. 5. Trade cards, and find a new partner. Repeat Steps 2 through 5. • Ask students to read directions and clarify or model process if necessary. Distribute **Vocabulary word cards**. • Give students 10 minutes to quiz and trade. • Collect the Vocabulary word cards (which will be used again in Lesson 12 for another round of Interactive Word Wall).	

Opening (continued)	Meeting Students' Needs
B. Science Talks: Reviewing Learning Targets (5 minutes) • Begin by sharing just the general learning target for the Science Talk: "I can effectively participate in a Science Talk about simple machines." Remind students that they have discussed this learning target at the last Science Talk (in Lesson 6). Ask them to turn to a partner and explain this target in their own words. • Use **equity sticks** to cold call a few students to share their explanations. Listen for students to share information preparing for the Science Talk by gathering evidence, asking questions, building on other's ideas, and following the norms. As students mention each of these, post the corresponding learning targets and discuss and clarify: a. I can follow our class norms when I participate in a conversation. b. I can prepare for the conversation by using evidence from simple machine texts. c. I can ask questions so I am clear about what is being discussed. d. I can ask questions on the topic being discussed. • Tell students that in today's Science Talk they should strive to meet each of these learning targets. Tell them they will get to see feedback on these targets from their last Science Talk, which will help them figure out what to focus on today.	• Consider supporting ELL students by providing individual copies of sentence frames for use during the Science Talk. • To provide further support to students during the Science Talk, consider posting or printing out sentence stems to help students during the discussion. For example: "I wonder if _____? I wonder why _____?" and "I agree and I also think _____. I disagree because _____" and "That's a good question. I think _____."

Work Time	Meeting Students' Needs
A. Science Talks: Reflecting and Setting Goals (10 minutes) • Post the **Science Talk Norms anchor chart** and review as a class. Ask students to turn to a partner and point out one norm they think the class will need to focus on after their last Science Talk. Have pairs share and discuss or clarify norms as necessary. • Return students' **Simple Machines Science journals** and have them turn to page 15 with teacher feedback from Lesson 6. Ask students to review the goals they set during the last Science Talk. Post the following directions for students to reflect and set goals: 1. Review your previous goal (and the feedback). 2. Reflect on whether or not you met your goal. Base this on the feedback you received. 3. Turn to a partner and share your goal and if you think you met the goal or are still making progress. 4. Write a revised goal for this Science Talk on page 20 in your Simple Machines Science journal. • Give students 5 minutes to discuss and revise their goals. Confer with pairs who may need extra support reflecting and setting goals.	

Work Time (continued)	Meeting Students' Needs
B. Preparing Evidence and Questions for the Science Talk (10 minutes) • Post the Science Talk question (same as from Unit 1, Lesson 3, and Unit 2, Lesson 6): "How do simple machines affect our lives?" • Explain that students have learned quite a bit more about simple machines. Have students look over the evidence they recorded during the last Science Talk. Ask students to Think-Pair-Share: "What is something new you now know about simple machines that you might want to mention in today's Science Talk?" • Tell students they will now have time to consider their new thinking on this question and what evidence they need to gather from the text and their notes. Be sure students have access to their text: ***Simple Machines: Forces in Action*** **pages 6–7 and 24–25** and have them turn to page 20 in their Simple Machines Science journal to the next **Preparing for a Science Talk recording form**. • Give students 10 minutes to prepare their evidence. Circulate to confer as needed. Commend students who are using specific evidence; remind students how important it is to have evidence to support their thinking.	• Allow ELLs and other students to use pictures and symbols as necessary on their recording forms. • Consider supporting students to extend their thinking by also rereading the experiments conducted on pages 8–9 and 26–27.
C. Conducting the Science Talk (20 minutes) • Gather students whole group in a circle. Remind them to bring their Simple Machines Science journal. Display the Science Talk protocol for students to see. Briefly review the **Participating in a Science Talk anchor chart** with students, and answer any clarifying questions. • Direct students to begin the Science Talk. Use the **Science Talk Criteria checklist** to monitor student progression toward the learning targets. Quickly redirect and support students as needed, but avoid leading the conversation. Remind students their questions and comments should be directed to one another, not the teacher.	• Consider allowing some students to talk with a partner or write what they would like to share during the Science Talk in advance.

Closing and Assessment	Meeting Students' Needs
A. Debrief (5 minutes) • Ask students to return to their seats. Invite them to reread the goal they wrote on the back of their recording form. Have them reflect on their goal and write their thoughts on the reflection section of page 20 in their Simple Machines Science journal. • Inform students they can demonstrate their knowledge about simple machines and their abilities to read and write like scientists in an assessment during the next two lessons. Tell them that they will use their skills as scientific readers and writers like when they researched inclined planes, levers, pulleys, and wheels and axles, but this time, they will read about another simple machine the class hasn't talked much about. Build students up regarding this opportunity to "show what you know."	• Some students may need to reflect verbally with a partner before writing.
Homework	**Meeting Students' Needs**
• Share with someone at home what you are learning about simple machines and how they help us in our everyday lives. *Note: In Lessons 12 and 13, students will complete an on-demand assessment based on reading about wedges in pages 12–15 from* Simple Machines: Forces in Action. *This is a two-part assessment. In Part 1, students will read and answer questions about wedges and how they help do work. In Part 2, students will read, conduct an experiment, and write about their findings.* *To prepare for Part 2 of the assessment (which takes place in Lesson 13), gather the experiment materials listed on page 14 of* Simple Machines: Forces in Action.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 11
Supporting Materials

Vocabulary Word Cards (Front)

Directions for teacher: These word cards should be added to the word cards from Lesson 6 of this unit. Be sure to type in any additional words your class may have added to the Word Wall or their vocabulary lists.

Words	
increase	
decrease	
distance	
pulley	
wheel and axle	
screw	

Vocabulary Word Cards (Back)

Directions for teacher: These word cards should be added to the word cards from Lesson 6 of this unit. Be sure to type in any additional words your class may have added to the Word Wall or their vocabulary lists.

Definitions	
increase: make greater	
decrease: make less	
distance: the measure of space between two points	
pulley: simple machine made of a wheel with a rope or chain wrapped around it and used to lift objects	
wheel and axle: simple machine with a large wheel connected to a central shaft that moves together	
screw: simple machine made of an inclined plane wrapped around a shaft	

Science Talk Criteria Checklist

Learning Targets:
I can effectively participate in a Science Talk about simple machines.
I can follow our class norms when I participate in a conversation.
I can prepare for the conversation by using evidence from simple machine texts.
I can ask questions so I am clear about what is being discussed.
I can ask questions on the topic being discussed.

Student name	Norms	Prepare with evidence	Ask questions to clarify understanding	Connect questions to what others say	Teacher comments

Science Talk Criteria Checklist

Student name	Norms	Prepare with evidence	Ask questions to clarify understanding	Connect questions to what others say	Teacher comments

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 12

Connecting Key Vocabulary and End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges

GRADE 4: MODULE 3A: UNIT 2: LESSON 12
Connecting Key Vocabulary and End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)
I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) 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 choose evidence from informational texts to support analysis, reflection, and research. (W.4.9)

Supporting Learning Targets	Ongoing Assessment
• I can make connections between the meaning of vocabulary words related to simple machines. • I can document what I learn about a simple machine in my own words. • I can find the meaning of scientific and academic words related to a simple machine. • I can answer questions about simple machines and how they work using details from a scientific text.	• End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges • Tracking My Progress, End of Unit 2, Part 1 recording form

Connecting Key Vocabulary and End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges

Agenda	Teaching Notes
1. Opening A. Reviewing Learning Targets (5 minutes) 2. Work Time A. Connecting Key Vocabulary: Interactive Word Wall (15 minutes) B. End of Unit 2 Assessment: Answering Questions about Wedges (35 minutes) 3. Closing and Assessment A. Tracking My Progress, End of Unit 2 Assessment, Part I (5 minutes) 4. Homework A. Continue reading in your independent reading book for this unit at home.	• This end of unit assessment has two parts. In this lesson, Part I, students will read and answer questions about the wedge. Then in Lesson 13, Part II, they will read, conduct, and write about an experiment with wedges. • Also in this lesson, students participate in another round of Interactive Word Wall (similar to Lesson 7) using the Vocabulary word cards from Lesson 11. • Before distributing the text *Simple Machines: Forces in Action* to students, use a large sticky note or small strip of paper to cover up the "How Does It Work?" box on the top half of page 15. • Review: Interactive Word Wall protocol (see Appendix). • Post: Learning targets.

Lesson Vocabulary	Materials
decrease, distance, effort, force, inclined plane, increase, lever, pulley, wheel and axle, work (review from previous lessons) Do not pre-teach specific vocabulary in the assessment text.	• Interactive Word Wall directions (from Lesson 7) • Document camera • Vocabulary word cards (from Lesson 11; one complete set per group of four) • Interactive Word Wall symbols (from Lesson 7; one set per group) • End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges (one per student) • *Simple Machines: Forces in Action* pages 12–13 (book; one per student) • Tracking My Progress, End of Unit 2, Part I recording form (one per student) • End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges (answers, for teacher reference) • 2-Point Rubric: Writing from Sources/Short Response (for teacher reference)

Opening	Meeting Students' Needs
A. Reviewing Learning Targets (5 minutes) • Post the first learning target: "I can make connections between the meaning of vocabulary words related to simple machines." Read the target aloud to students and ask them to turn to a partner to discuss its meaning. Have a few pairs share out. Tell students that this target should be familiar to them since it was used the last time they participated in an Interactive Word Wall activity. If necessary, remind students that when they "make connections between the meaning of vocabulary," they explain the meanings of words are related to one another. • Explain that also in today's lesson, they will complete Part I of a two-part assessment. They will read more about the sixth simple machine (the wedge). Then, in the next lesson, for Part II, they will read, conduct, and write about an experiment with wedges. Post the remaining learning targets: "I can document what I learn about a simple machine in my own words," "I can find the meaning of scientific and academic words related to a simple machine," and "I can answer questions about simple machines and how they work using details from a scientific text." Tell students that these targets should look familiar from previous lessons. Have students give a quick thumbs-up, thumbs-sideways, or thumbs-down to show that they understand each target. Clarify as necessary.	

Work Time	Meeting Students' Needs
A. Connecting Key Vocabulary: Interactive Word Wall (15 minutes) • Tell students they will use the cards from the previous lesson for Quiz-Quiz-Trade (Lesson 11) to participate in another round of Interactive Word Wall. Remind students they have done this before (Lesson 7). Review the purpose of this activity: to help them develop a deeper understanding of the scientific concepts related to simple machines and help to prepare them for their end of unit assessment. • Post the **Interactive Word Wall directions** and review with students. Using the **document camera** (or with magnets on the board), briefly review with students how to make a connection between words using the **Vocabulary word cards** and the **Interactive Word Wall symbols**. • Divide students into groups of four (it's fine to have groups of three or five if there is an uneven number of students). Distribute a set of Vocabulary word cards (with additional words from Lesson 11) and Interactive Word Wall arrows to each group. • Give groups 10 minutes to make connections. If they finish early, encourage them to start again and try to make new connections with their words. • Ask each group to share a connection they made and why. Listen for students to explain the trade-off of using simple machines: Effort is decreased but distance is increased. Listen for: "We connected the word *pulley* with the words *effort* and *decrease*, because the pulley decreases the amount of effort needed to lift something up." Collect Vocabulary word cards and have students prepare their desk for the assessment.	• Consider allowing students to draw a diagram or picture to explain their connections.

Work Time (continued)	Meeting Students' Needs
B. End of Unit 2 Assessment: Answering Questions about Wedges (35 minutes) • Distribute the **End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges** and the text ***Simple Machines: Forces in Action***. Remind students it's important to read the text several times. • Point out the directions at the top of the assessment: 1. Read pages 12–13 in the text *Simple Machines: Forces in Action* for the gist. 2. Reread the text and take notes using the graphic organizer below. 3. Reread the text and answer the questions following the graphic organizer. • Clarify if needed. • Invite students to begin. Circulate to observe test-taking strategies and record observations for future instruction. For example, are students going back to the text to look for answers? Do they appear to be reading the text completely before beginning the assessment? Are they annotating the text or their assessment? This information helps when preparing students for future assessments and standardized tests.	

Closing and Assessment	Meeting Students' Needs
A. Tracking My Progress, End of Unit 2 Assessment, Part I (5 minutes) • Ask students to reflect on the following learning target and then record their progress using the **Tracking My Progress, End of Unit 2, Part I recording form**: "I can answer questions about simple machines and how they work using details from a scientific text." • Collect Tracking My Progress sheets for additional assessment. Congratulate students on their research about all six simple machines. Remind students that tomorrow they will complete Part II of the assessment, during which they will read, conduct, and write about an experiment with wedges. This will be similar to the experiments they have conducted on inclined planes, levers, pulleys, and the wheel and axle.	

Homework	Meeting Students' Needs
• Continue reading in your independent reading book for this unit at home. *Note: For Part II of this assessment, students will read and answer questions about an experiment using wedges (pages 14 and 15 of* Simple Machines: Forces in Action*). As with the experiments in Lessons 2, 4, and 10, be sure to use a large sticky note or small strip of paper cover up the "How Does It Work?" box on the top half of page 15.* *Before Lesson 13, prepare the necessary materials for the experiment. If materials are limited, consider having students conduct the experiment with a partner or in small groups and then asking them to answer questions individually.*	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 12
Supporting Materials

End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges

Name:

Date:

Directions:

1. Read pages 12–13 in the text *Simple Machines: Forces in Action* for the gist.
2. Reread the text and take notes using the graphic organizer below.
3. Reread the text and answer the questions below the graphic organizer.

Read and Record:

What a wedge looks like:	Type of work it helps a person do:	Examples of a wedge:

End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges

Read and Answer:

1. According to the text, the main function of a wedge is to:
   A. lift heavy loads
   B. push things apart
   C. pull things together
   D. raise something higher

2. Which of the following lines from the text describes HOW a wedge works?
   A. "A doorstop is a wedge used to hold things."
   B. "You can push a thin wedge a longer distance than a thick wedge ..."
   C. "When the axe hits the log, the force is pushed from above to the sides and splits the log apart."
   D. "You have a wedge inside you—your teeth!"

3. Which is an example of a wedge doing work?
   A. teeth biting into something
   B. your mouth opening and closing
   C. a closed door
   D. a knife sitting in the sink

4. What evidence from the text best supports the answer to Question 3 above?
   A. "A doorstop is a wedge ..."
   B. "The wedge is a simple machine that is used to push things apart."
   C. "You can split an apple using your jaw muscles."
   D. "You can push a thin wedge a longer distance than a thick wedge ..."

End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges

5. Which of the following words has a similar meaning to the word *narrower* as it is used in the text: "The sharper the point or *narrower* the edge of the wedge, the less effort it takes to push an object apart."

   A. thinner

   B. limited

   C. taller

   D. stricter

6. Using the scientific meaning of the word *work*, which of the following describes work being done?

   A. a baby crawling

   B. reading a book

   C. a knife in the sink

   D. hammering a nail into wood

7. How is the wedge related to the inclined plane? Use evidence from the text to support your explanation.

End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges

8. How does a screw affect work? Use details from the text to support your explanation.

Tracking My Progress, End of Unit 2 Assessment, Part I

Name:

Date:

Learning target: I can answer questions about simple machines and how they work using details from a scientific text.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this	I understand some of this	I am on my way!
		

3. The evidence to support my self-assessment is:

End of Unit 2 Assessment, Part I: Reading and Answering Questions about Wedges (Answers, for Teacher Reference)

Standards Assessed:
Graphic Organizer (W.4.8); Questions 1, 2, 3, and 4 (RI.4.3); Questions 5 and 6 (RI.4.4); Questions 7 and 8 (W.4.9); and (RI.4.3)

Directions:

1. Read pages 12–13 in the text *Simple Machines: Forces in Action* for the gist.
2. Reread the text and take notes using the graphic organizer below.
3. Reread the text and answer the questions below the graphic organizer.

Read and Record: [possible responses]

What a wedge looks like:	Type of work it helps a person do:	Examples of a wedge:
• **Two inclined planes joined back to back** • **A triangle that is narrow at one end and wider at the other** • **Wide on one end, thin on the other**	• **Helps push things apart** • **Chopping wood** • **Cutting food** • **Biting into something** • **Holding a door open**	• **axe** • **nail** • **knife** • **teeth** • **doorstop**

End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges
(Answers, for Teacher Reference)

Read and Answer:

1. According to the text, the main function of a wedge is to:
   A. lift heavy loads
   B. **push things apart**
   C. pull things together
   D. raise something higher

2. Which of the following lines from the text describes HOW a wedge works?
   A. "A doorstop is a wedge used to hold things."
   B. "You can push a thin wedge a longer distance than a thick wedge ..."
   C. **"When the axe hits the log, the force is pushed from above to the sides and splits the log apart."**
   D. "You have a wedge inside you—your teeth!"

3. Which is an example of a wedge doing work?
   A. **teeth biting into something**
   B. your mouth opening and closing
   C. a closed door
   D. a knife sitting in the sink

4. What evidence from the text best supports the answer to Question 3 above?
   A. "A doorstop is a wedge ..."
   B. **"The wedge is a simple machine that is used to push things apart."**
   C. "You can split an apple using your jaw muscles."
   D. "You can push a thin wedge a longer distance than a thick wedge ..."

End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges
(Answers, for Teacher Reference)

5. Which of the following words has a similar meaning to the word *narrower* as it is used in the text: "The sharper the point or *narrower* the edge of the wedge, the less effort it takes to push an object apart."

   A. **thinner**

   B. limited

   C. taller

   D. stricter

6. Using the scientific meaning of the word *work*, which of the following describes work being done?

   A. a baby crawling

   B. reading a book

   C. a knife in the sink

   D. **hammering a nail into wood**

End of Unit 2 Assessment, Part I:
Reading and Answering Questions about Wedges
(Answers, for Teacher Reference)

Use the rubric below to score the answers to the following. Be sure students' explanations are scientifically accurate and based on the text.

7. How is the wedge related to the inclined plane? Use evidence from the text to support your explanation.

[Possible Answer] The wedge is made of two inclined planes joined back-to-back. The wedge is made to move and the inclined plane is not. They both make work easier by making it take less effort.

8. How does a screw affect work? Use details from the text to support your explanation.

[Possible Answer] The wedge is used to push things apart. When you push on a wedge you can cut into something easier, like teeth cutting into an apple. If you have to take a bite of an apple, you can use your teeth to do the work. It takes less effort than trying to pull off a chunk with your fingers.

2-Point Rubric: Writing from Sources/Short Response[1]

(For Teacher Reference)

Use the below rubric for determining scores on short answers in this assessment.

2-point Response	The features of a 2-point response are:
	• Valid inferences and/or claims from the text where required by the prompt • Evidence of analysis of the text where required by the prompt • Relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Sufficient number of facts, definitions, concrete details, and/or other information from the text as required by the prompt • Complete sentences where errors do not impact readability

1-point Response	The features of a 1-point response are:
	• A mostly literal recounting of events or details from the text as required by the prompt • Some relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Incomplete sentences or bullets

0-point Response	The features of a 0-point response are:
	• A response that does not address any of the requirements of the prompt or is totally inaccurate • No response (blank answer) • A response that is not written in English • A response that is unintelligible or indecipherable

[1]From New York State Department of Education, October 6, 2012.

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 13

Connecting Key Vocabulary and End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

Connecting Key Vocabulary and End of Unit 2 Assessment, Part II:
Reading and Answering Questions about Experiments

Long-Term Targets Addressed (Based on NYSP12 ELA CCLS)	
I can explain the main points in a scientific text, using specific details in the text. (RI.4.3) I can describe the organizational structure in an informational text (chronology). (RI.4.5) 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 write informative/explanatory texts that convey ideas and information clearly. (W.4.2)	
Supporting Learning Targets	**Ongoing Assessment**
• I can explain what happens before, during, and after a scientific experiment. • I can document what I observe during a scientific experiment. • I can construct a conclusion statement that describes what I learned about wedges.	• End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

Agenda	Teaching Notes
1. Opening A. Reviewing Learning Targets (5 minutes) 2. Work Time A. Reviewing the Scientific Method: Concentric Circles (10 minutes) B. End of Unit Assessment, Part II: Answering Questions about Experiments (35 minutes) 3. Closing and Assessment A. Tracking My Progress (10 minutes) 4. Homework A. Make some observations and record a list of types of work that you see on your way home or at home that you think could be made easier with a simple machine. B. Continue reading in your independent reading book for this unit at home.	• In Part II of the End of Unit 2 Assessment, students read and answer questions about an experiment, then conduct and write about the results of an experiment. • In advance: Prepare materials for students to conduct the experiment (*Simple Machines: Forces in Action*, page 14). If materials are limited, consider having students conduct the experiment with a partner or in small groups and then asking them to answer questions individually. • Consider what your classroom expectations are for conducting this experiment during the assessment, as many students will likely be reading or writing while others conduct the experiment. • Before distributing the text *Simple Machines: Forces in Action* to students, use a large sticky note or strip of paper to cover up the "How Does It Work?" box on the top half of page 15. • Post: Learning targets.

Lesson Vocabulary	Materials
scientific process, hypothesis, observations, conclusion (review from previous lessons)	• Equity sticks • Scientific Method anchor chart (from Lesson 2) • End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments (one per student) • *Simple Machines: Forces in Action* pages 14–15 (with top of page 15 covered) (book; one per student) • Tracking My Progress, End of Unit 2, Part II recording form (one per student) • End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments (answers, for teacher reference) • 2-Point Rubric: Writing from Sources/Short Response (for teacher reference)

Opening	Meeting Students' Needs
A. Reviewing Learning Targets (5 minutes) • Post and review the following learning targets: "I can explain what happens before, during, and after a scientific experiment," "I can document what I observe during a scientific experiment," and "I can construct a conclusion statement that describes what I learned about wedges using scientific vocabulary." Tell students today they get to show what they know about reading, conducting, and writing about experiments and they will do this with the wedge. • Have students Think-Pair-Share on the following prompt: * Based on your experience reading, conducting, and writing about experiments, what do these targets mean? Give evidence from the experiments we have conducted on simple machines so far. • Ask pairs to share their specific examples with the class. Listen for students to say things like: "When we experimented with the inclined plane, we observed _____ and wrote this in our notes," or "In our experiment with the pulley, we read _____."	

Work Time	Meeting Students' Needs
A. Reviewing the Scientific Method: Concentric Circles (10 minutes) • Tell students they are going to review the scientific method by discussing questions in Concentric Circles, much like they did with the guiding question in Lesson 1. • Ask the students to find a partner and number off 1 and 2 (if there is an odd number of students, triads are fine). Direct all 1s to form an inner circle (shoulder-to-shoulder) facing out. Then direct the 2s to stand in front of their partners. • Remind them of the Concentric Circles protocol directions from Lesson 1. Ask the students to discuss the following question: "Why do scientists conduct experiments?" • Give students 2 minutes to share. Then use **equity sticks** to cold call a few pairs and have them share their thinking. • Have the outside circle move two people to the left to discuss the remaining questions. Have students move as you present them with each new question. * "What is a hypothesis?" * "Why is careful observation and recording important in an experiment?" * "What makes a good experiment conclusion?" • As the students are discussing the topic, circulate and listen for students to reference information on the Scientific Method anchor chart. • Have students gather together as a whole group. Post the **Scientific Method anchor chart**. Review the steps with students. Ask them to think about these steps as they complete their assessment.	• Using sentence frames can help ELLs articulate their learning. Using the word "because" in the sentence frame helps all students support their thinking with evidence. • When using the Concentric Circles protocol in a class with an odd number of students, consider creating triads to support students who struggle with verbalizing their thinking.

Work Time (continued)	Meeting Students' Needs
B. End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments (35 minutes) *Note: Students need to keep the top of page 15 in* Simple Machines: Forces in Action *covered while they are answering Questions 1 through 9 of this assessment.* • Have students prepare to take the assessment by clearing their table/desk. Distribute the **End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments**. Review the directions at the top of the assessment and point out where students should stop and conduct the experiment. • Explain to students where to perform the experiment when they are ready. Be sure to share the expectations for this portion of the assessment, as some students will likely still be reading and answering questions when others begin the experiment. If students are to share or take turns with materials, let them know expectations for this as well. • Once students are clear on the directions for the assessment distribute the text ***Simple Machines: Forces in Action* pages 14 and 15**. Remind students to keep the top of page 15 covered until they have answered Questions 1 through 9. • Let students begin. Circulate to support them as they transition to conducting the experiment and writing about the results.	• Allow ELLs additional time to complete their assessment. They will receive extra time on the New York State assessment.

Closing and Assessment	Meeting Students' Needs
A. Tracking My Progress (10 minutes) • Ask students to complete the **Tracking My Progress, End of Unit 2, Part II recording form**. Collect students' assessments and Tracking My Progress sheets. Compare students' reflections on the learning targets to their performance on this assessment to inform future instruction. • If students finish early, have them continue their independent reading from this module. • Congratulate students for working so hard to learn to read scientific text independently. Note their growing knowledge about simple machines; they will get to apply this as writers during Unit 3.	• For students who struggle with language, consider giving them a list of key academic and scientific words they might use in their reflections.
Homework	**Meeting Students' Needs**
• Make some observations and record a list of types of work that you see on your way home or at home that you think could be made easier with a simple machine. • Continue reading in your independent reading book for this unit at home.	

EXPEDITIONARY LEARNING

Grade 4: Module 3A: Unit 2: Lesson 13
Supporting Materials

End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

Name:

Date:

Directions:

1. Read page 14 in *Simple Machines: Forces in Action*.
2. Answer Questions 1 through 7 about the text. Then stop.
3. Conduct the experiment and record your observations for Question 8.
4. Write your conclusion for Question 9.
5. Uncover the "How Does It Work?" box of the text and answer Questions 10 and 11.

1. What is the best description of this text?
   A. It compares and contrasts different wedges.
   B. It presents a problem that can be solved using a wedge.
   C. It explains how a wedge affects work.
   D. It gives ordered steps for a procedure using different wedges.

2. Which of the following is NOT a characteristic of this text?
   A. diagrams
   B. dialogue
   C. numbered steps
   D. bulleted list

3. What is the purpose of the yellow box at the top of page 14?

End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

4. The diagram at the bottom of page 14 helps the reader to visualize which step in the experiment?

5. How many times is the reader asked to record measurements?
   A. twice
   B. five times
   C. three times
   D. once

6. In Step 4, the reader is asked to:
   A. Record the distance.
   B. Use the skinny wedge.
   C. Use the fat wedge.
   D. Use a ruler.

7. Reread the text and write your **hypothesis**: What do you think is going to happen? Use evidence from the text to support your prediction.

STOP HERE: Conduct the experiment now. Then answer the remaining questions.

End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

Use vocabulary from this word bank to help you answer the questions below.

effort	force
experiment	wedge
simple machine	work

8. **Observations:** As you conduct this experiment, what do you see happening?

9. **Conclusion:** Describe what you have learned about the wedge and how it works.

End of Unit 2 Assessment, Part II: Reading and Answering Questions about Experiments

***Uncover the top of page 15 in the text and read the "How Does It Work?" section. Then answer the following questions.**

10. Which explanation of how a wedge affects a force is supported by the text?

    A. Pushing down on a wedge increases the force.

    B. Pushing down on a wedge does not affect the force.

    C. Pushing down on a wedge changes the direction of the force to sideways.

    D. Pushing down on a wedge changes the direction of the force upwards.

11. According to the text, how is the distance between the blocks affected by using the thin versus the thick wedges?

    A. Thick wedges take more effort than thin wedges, but move the blocks a greater distance.

    B. Thin and thick wedges both move the blocks an equal distance.

    C. Thick wedges do not move the blocks.

    D. Thick wedges don't work as well as thin wedges.

Tracking My Progress, End of Unit 2, Part II

Name:

Date:

Learning target: I can explain what happens before, during, and after a scientific experiment.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this	I understand some of this	I am on my way!
		

3. The evidence to support my self-assessment is:

Tracking My Progress, End of Unit 2, Part II

Name:

Date:

Learning target: I can document what I observe during a scientific experiment.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this	I understand some of this	I am on my way!
		

3. The evidence to support my self-assessment is:

Tracking My Progress, End of Unit 2 Assessment, Part II

Name:

Date:

Learning target: I can construct a conclusion statement that describes what I learned about wedges.

1. The target in my own words is:

2. How am I doing? Circle one.

I need more help to learn this

I understand some of this

I am on my way!

3. The evidence to support my self-assessment is:

End of Unit 2 Assessment, Part II:
Reading and Answering Questions about Experiments
(Answers, for Teacher Reference)

Standards assessed:
Questions 1, 2, 3, and 4 (RI.4.5); Questions 5, 6, 10, and 11 (RI.4.3); Questions 7, 8, and 9 (W.4.2).

Directions:
1. Read page 14 in *Simple Machines: Forces in Action*.
2. Answer Questions 1 through 7 about the text. Then stop.
3. Conduct the experiment and record your observations for Question 8.
4. Write your conclusion for Question 9.
5. Uncover the "How Does It Work?" box of the text and answer the remaining Questions 10 and 11.

1. What is the best description of this text?
   A. It compares and contrasts different wedges.
   B. It presents a problem that can be solved using a wedge.
   C. It explains how a wedge affects work.
   D. **It gives ordered steps for a procedure using different wedges.**

2. Which of the following is NOT a characteristic of this text?
   A. diagrams
   B. **dialogue**
   C. numbered steps
   D. bulleted list

3. What is the purpose of the yellow box at the top of page 14?

[Possible Answer] It tells the materials needed for the experiment.

End of Unit 2 Assessment, Part II:
Reading and Answering Questions about Experiments
(Answers, for Teacher Reference)

4. The diagram at the bottom of page 14 helps the reader to visualize which step in the experiment?

[Possible Answers] Step 2, Step 4, or Steps 2 and 4

5. How many times is the reader asked to record measurements?
   A. **twice**
   B. five times
   C. three times
   D. once

6. In Step 4, the reader is asked to:
   A. Record the distance.
   B. Use the skinny wedge.
   C. **Use the fat wedge.**
   D. Use a ruler.

End of Unit 2 Assessment, Part II:
Reading and Answering Questions about Experiments
(Answers, for Teacher Reference)

Use the attached rubric to score the following questions.

7. Reread the text and write your **hypothesis**: What do you think is going to happen? Use evidence from the text to support your prediction.

[Possible Responses]
- **Both wedges will push the blocks apart.**
- **The thick wedge will push the blocks farther apart than the thin wedge.**
- **It will be harder to push the blocks apart with the thick wedge.**

8. **Observations:** As you conduct this experiment, what do you see happening?

[Possible Answer] When I used put a force down on the blocks using the skinny wedge the blocks moved _____ inches apart. When I put a force down using the fat wedge the blocks moved _____ inches apart.

9. **Conclusion:** Describe what you have learned about the wedge and how it works.

[Possible Answer] In this experiment I learned that the wedge is a simple machine that pushes things apart. I found that fat wedges move things more than skinny wedges, but I had to push harder. I think this means you need to use more effort with fat wedges and less with skinny wedges, but they can both help you do work.

End of Unit 2 Assessment, Part II:
Reading and Answering Questions about Experiments
(Answers, for Teacher Reference)

***Uncover the top of page 15 in the text and read the "How Does It Work?" section. Then answer the following questions.**

10. Which explanation of how a wedge affects a force is supported by the text?

    A. Pushing down on a wedge increases the force.

    B. Pushing down on a wedge does not affect the force.

    C. **Pushing down on a wedge changes the direction of the force to sideways.**

    D. Pushing down on a wedge changes the direction of the force upwards.

11. According to the text, how is the distance between the blocks affected by using the thin versus the thick wedges?

    A. **Thick wedges take more effort than thin wedges, but move the blocks a greater distance.**

    B. Thin and thick wedges both move the blocks an equal distance.

    C. Thick wedges do not move the blocks.

    D. Thick wedges don't work as well as thin wedges.

2-Point Rubric: Writing from Sources/Short Response[1]

(For Teacher Reference)

Use the below rubric for determining scores on short answers in this assessment.

2-point Response	The features of a 2-point response are:
	• Valid inferences and/or claims from the text where required by the prompt • Evidence of analysis of the text where required by the prompt • Relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Sufficient number of facts, definitions, concrete details, and/or other information from the text as required by the prompt • Complete sentences where errors do not impact readability

1-point Response	The features of a 1-point response are:
	• A mostly literal recounting of events or details from the text as required by the prompt • Some relevant facts, definitions, concrete details, and/or other information from the text to develop response according to the requirements of the prompt • Incomplete sentences or bullets

0-point Response	The features of a 0-point response are:
	• A response that does not address any of the requirements of the prompt or is totally inaccurate • No response (blank answer) • A response that is not written in English • A response that is unintelligible or indecipherable

[1]From New York State Department of Education, October 6, 2012.