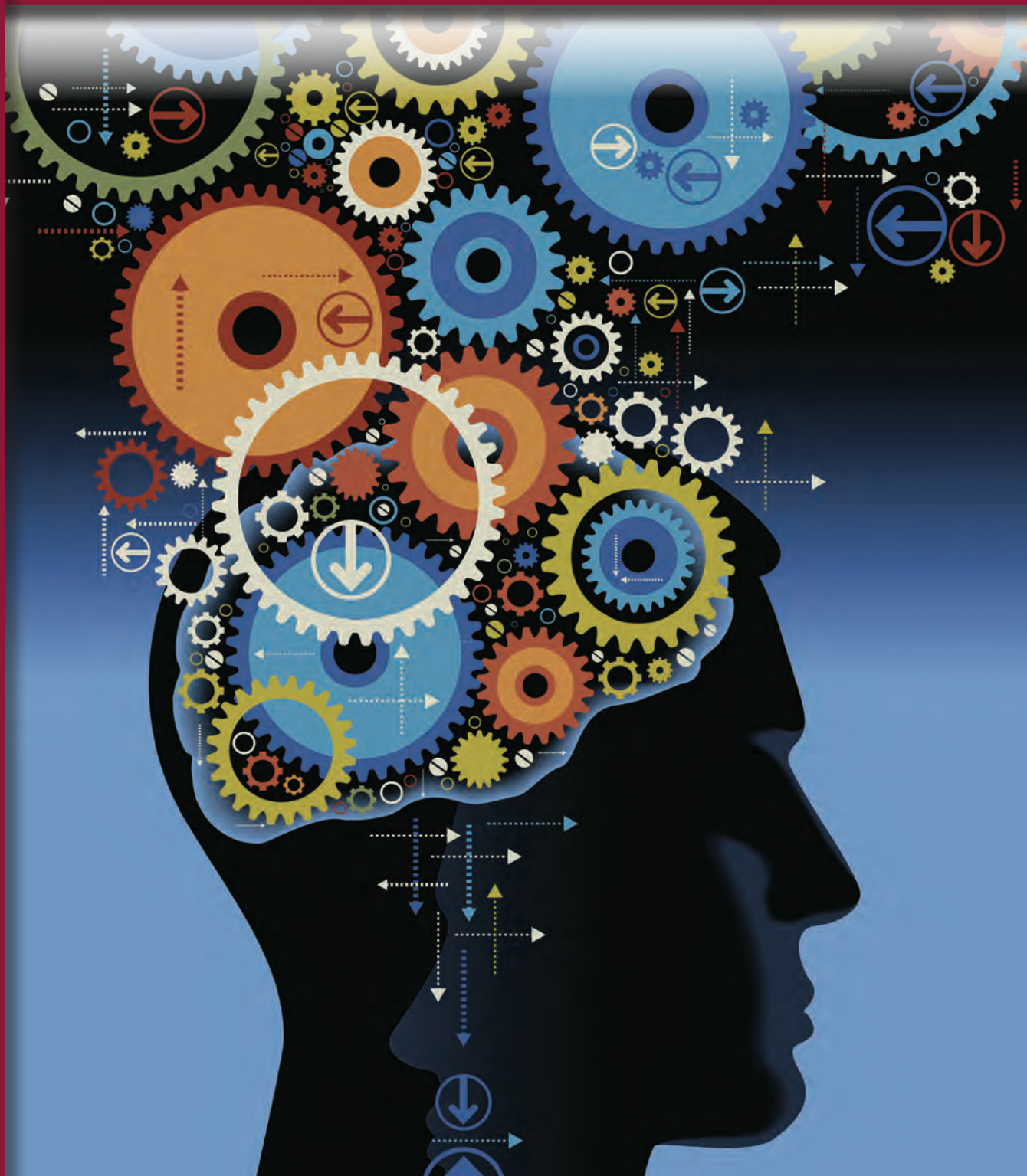
Unit 2

Calling All Minds: How to Think and Create Like an Inventor

By Temple Grandin

Teacher Guide



GRADE 6 Core Knowledge Language Arts®

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Unit 2

Calling All Minds: How to Think and Create Like an Inventor

Teacher Guide

GRADE 6

Core Knowledge Language Arts®

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Alignment to the Common Core State Standards

The following chart indicates which lessons in the *Calling All Minds: How to Think and Create Like an Inventor* unit address content from the Common Core State Standards (CCSS).

Unit 2: Calling All Minds: How to Think and Create Like an Inventor		Lessons									
		1	2	3	4	5	6	7	8	9	10
Reading Standards for Literature											
Key Ideas and Details											
STD RL.6.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.										
STD RL.6.2	Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.										
STD RL.6.3	Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.										
STD RL.6.4	Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of a specific word choice on meaning and tone.										
STD RL.6.5	Analyze how a particular sentence, chapter, scene, or stanza fits into the overall structure of a text and contributes to the development of the theme, setting, or plot.										
STD RL.6.6	Explain how an author develops the point of view of the narrator or speaker in a text.										
STD RL.6.7	Compare and contrast the experience of reading a story, drama, or poem to listening to or viewing an audio, video, or live version of the text, including contrasting what they "see" and "hear" when reading the text to what they perceive when they listen or watch.										
STD RL.6.8	(Not applicable to literature)										
STD RL.6.9	Compare and contrast texts in different forms or genres (e.g., stories and poems; historical novels and fantasy stories) in terms of their approaches to similar themes and topics.										
Range of Reading and Level of Text Complexity											
STD RL.6.10	By the end of the year, read and comprehend literature, including stories, dramas, and poems, in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.										
Reading Standards for Informational Text											
STD RI.6.1	Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD RI.6.2	Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	✓	✓	✓						✓	✓

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		1	2	3	4	5	6	7	8	9	10
STD RI.6.3	Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	✓	✓	✓	✓	✓	✓	✓	✓	✓	
STD RI.6.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD RI.6.5	Analyze how a particular sentence, paragraph, chapter, or section fits into the overall structure of a text and contributes to the development of the ideas.	✓	✓	✓	✓	✓	✓	✓		✓	✓
STD RI.6.6	Determine an author's point of view or purpose in a text and explain how it is conveyed in the text.		✓	✓		✓	✓	✓	✓	✓	✓
STD RI.6.7	Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.		✓	✓			✓	✓		✓	
STD RI.6.8	Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.										
STD RI.6.9	Compare and contrast one author's presentation of events with that of another (e.g., a memoir written by and a biography on the same person).							✓			
STD RI.6.10	By the end of the year, read and comprehend literary nonfiction in the grades 6–8 text complexity band proficiently, with scaffolding as needed at the high end of the range.										
Writing Standards											
Text Types and Purposes: Argument											
STD W.6.1	Write arguments to support claims with clear reasons and relevant evidence.										
STD W.6.1.a	Introduce claim(s) and organize the reasons and evidence clearly.										
STD W.6.1.b	Support claim(s) with clear reasons and relevant evidence, using credible sources and demonstrating an understanding of the topic or text.										
STD W.6.1.c	Use words, phrases, and clauses to clarify the relationships among claim(s) and reasons.										
STD W.6.1.d	Establish and maintain a formal style.										
STD W.6.1.e	Provide a concluding statement or section related to the opinion presented.										
Text Types and Purposes: Informative/Explanatory											
STD W.6.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.		✓	✓	✓	✓	✓	✓	✓	✓	✓
STD W.6.2.a	Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.		✓	✓	✓						
STD W.6.2.b	Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.					✓	✓	✓			

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		1	2	3	4	5	6	7	8	9	10
STD W.6.2.c	Use appropriate transitions to clarify the relationships among ideas and concepts.			✓	✓						
STD W.6.2.d	Use precise language and domain-specific vocabulary to inform about or explain the topic.					✓					
STD W.6.2.e	Establish and maintain a formal style.						✓				
STD W.6.2.f	Provide a concluding statement or section that follows from the information or explanation presented.							✓			
Text Types and Purposes: Narrative											
STD W.6.3	Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.										
STD W.6.3.a	Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.										
STD W.6.3.b	Use narrative techniques, such as dialogue, pacing, and description, to develop experiences, events, and/or characters.										
STD W.6.3.c	Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.										
STD W.6.3.d	Use precise words and phrases, relevant descriptive details, and sensory language to convey experiences and events.										
STD W.6.3.e	Provide a conclusion that follows from the narrated experiences or events.										
Production and Distribution of Writing											
STD W.6.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)		✓	✓	✓	✓	✓	✓	✓	✓	✓
STD W.6.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach. (Editing for conventions should demonstrate command of Language standards 1–3 up to and including grade 6 on page 53.)		✓	✓	✓	✓	✓	✓	✓	✓	
STD W.6.6	Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.									✓	✓
Research to Build and Present Knowledge											
STD W.6.7	Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.										
STD W.6.8	Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.										

Unit 2: Calling All Minds: How to Think and Create Like an Inventor		Lessons									
		1	2	3	4	5	6	7	8	9	10
STD W.6.9	Draw evidence from literary or informational texts to support analysis, reflection, and research.										
STD W.6.9.a	Apply grade 6 Reading standards to literature (e.g., "Compare and contrast texts in different forms or genres [e.g., stories and poems; historical novels and fantasy stories] in terms of their approaches to similar themes and topics").										
STD W.6.9.b	Apply grade 6 Reading standards to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not").										
Range of Writing											
STD W.6.10	Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.										
Speaking and Listening Standards											
Comprehension and Collaboration											
STD SL.6.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD SL.6.1.a	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD SL.6.1.b	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD SL.6.1.c	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD SL.6.1.d	Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD SL.6.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.	✓	✓	✓				✓	✓		
STD SL.6.3	Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.										
Presentation of Knowledge and Ideas											
STD SL.6.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.										
STD SL.6.5	Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.										

Unit 2: Calling All Minds: How to Think and Create Like an Inventor		Lessons									
		1	2	3	4	5	6	7	8	9	10
STD SL.6.6	Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate. (See grade 6 Language standards 1 and 3 on page 53 for specific expectations.)										
Language Standards											
Conventions of Standard English											
STD L.6.1	Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.		✓	✓	✓		✓	✓	✓	✓	✓
STD L.6.1.a	Ensure that pronouns are in the proper case (subjective, objective, possessive).										
STD L.6.1.b	Use intensive pronouns (e.g., myself, ourselves).										
STD L.6.1.c	Recognize and correct inappropriate shifts in pronoun number and person.*										
STD L.6.1.d	Recognize and correct vague pronouns (i.e., ones with unclear or ambiguous antecedents).*										
STD L.6.1.e	Recognize variations from standard English in their own and others' writing and speaking, and identify and use strategies to improve expression in conventional language.*								✓		
STD L.6.2	Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.									✓	
STD L.6.2.a	Use punctuation (commas, parentheses, dashes) to set off nonrestrictive/parenthetical elements.*										
STD L.6.2.b	Spell correctly.						✓	✓	✓		✓
Knowledge of Language											
STD L.6.3	Use knowledge of language and its conventions when writing, speaking, reading, or listening.		✓		✓		✓			✓	
STD L.6.3.a	Vary sentence patterns for meaning, reader/listener interest, and style.*		✓		✓						
STD L.6.3.b	Maintain consistency in style and tone.*										
Vocabulary Acquisition and Use											
STD L.6.4	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on *grade 6 reading and content*, choosing flexibly from a range of strategies.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD L.6.4.a	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.	✓	✓		✓	✓	✓	✓	✓	✓	✓
STD L.6.4.b	Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word (e.g., *audience, auditory, audible*).		✓	✓		✓		✓	✓	✓	
STD L.6.4.c	Consult reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.	✓	✓		✓	✓	✓	✓	✓	✓	✓
STD L.6.4.d	Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).	✓	✓		✓	✓	✓	✓	✓	✓	✓

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		1	2	3	4	5	6	7	8	9	10
STD L.6.5	Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.										
STD L.6.5.a	Interpret figures of speech (e.g., personification) in context.										
STD L.6.5.b	Use the relationship between particular words (e.g., cause/effect, part/whole, item/category) to better understand each of the words.										
STD L.6.5.c	Distinguish among the connotations (associations) of words with similar denotations (definitions) (e.g., *stingy, scrimping, economical, unwasteful, thrifty*).										
STD L.6.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Reading Standards for Literacy in History/Social Studies											
Key Ideas and Details											
STD RH.6-8.1	Cite specific textual evidence to support analysis of primary and secondary sources.	✓									
STD RH.6-8.2	Determine the central ideas or information of a primary or secondary source; provide an accurate summary of the source distinct from prior knowledge or opinions.	✓									
STD RH.6-8.3	Identify key steps in a text's description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered).	✓									
Craft and Structure											
STD RH.6-8.4	Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies.	✓									
STD RH.6-8.5	Describe how a text presents information (e.g., sequentially, comparatively, causally).	✓									
STD RH.6-8.6	Identify aspects of a text that reveal an author's point of view or purpose (e.g., loaded language, inclusion or avoidance of particular facts).	✓									
STD RH.6-8.7	Integrate visual information (e.g., in charts, graphs, photographs, videos, or maps) with other information in print and digital texts.	✓									
STD RH.6-8.8	Distinguish among fact, opinion, and reasoned judgment in a text.										
STD RH.6-8.9	Analyze the relationship between a primary and secondary source on the same topic.										
Range of Reading and Level of Text Complexity											
STD RH.6-8.10	By the end of grade 8, read and comprehend history/social studies texts in the grades 6–8 text complexity band independently and proficiently.										

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		1	2	3	4	5	6	7	8	9	10
Reading Standards for Literacy in Science and Technical Subjects											
STD RST.6-8.1	Cite specific textual evidence to support analysis of science and technical texts.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD RST.6-8.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	✓								✓	✓
STD RST.6-8.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.				✓			✓			
STD RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 6–8 texts and topics*.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
STD RST.6-8.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.		✓		✓		✓	✓		✓	✓
STD RST.6-8.6	Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.		✓				✓	✓	✓	✓	✓
Integration of Knowledge and Ideas											
STD RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).			✓				✓		✓	
STD RST.6-8.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.								✓	✓	
STD RST.6-8.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.						✓	✓			
STD RST.6-8.10	By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.										
Writing Standards for Literacy in History/Social Studies, Science, and Technical Subjects											
STD WHST.6-8.1	Write arguments focused on discipline-specific content.										
STD WHST.6-8.1.a	Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.										
STD WHST.6-8.1.b	Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources.										
STD WHST.6-8.1.c	Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.										
STD WHST.6-8.1.d	Establish and maintain a formal style.										

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		1	2	3	4	5	6	7	8	9	10
STD WHST.6-8.1.e	Provide a concluding statement or section that follows from and supports the argument presented.										
STD WHST.6-8.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.		✓	✓	✓	✓	✓	✓	✓	✓	✓
STD WHST.6-8.2.a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.		✓	✓	✓						
STD WHST.6-8.2.b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.					✓	✓	✓			
STD WHST.6-8.2.c	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.			✓	✓						
STD WHST.6-8.2.d	Use precise language and domain-specific vocabulary to inform about or explain the topic.					✓					
STD WHST.6-8.2.e	Establish and maintain a formal style and objective tone.						✓				
STD WHST.6-8.2.f	Provide a concluding statement or section that follows from and supports the information or explanation presented.							✓			
STD WHST.6-8.3	(See note; not applicable as a separate requirement) Note: Students' narrative skills continue to grow in these grades. The Standards require that students be able to incorporate narrative elements effectively into arguments and informative/explanatory texts. In history/social studies, students must be able to incorporate narrative accounts into their analyses of individuals or events of historical import. In science and technical subjects, students must be able to write precise enough descriptions of the step-by-step procedures they use in their investigations or technical work that others can replicate them and (possibly) reach the same results.										
Production and Distribution of Writing											
STD WHST.6-8.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.		✓	✓	✓	✓	✓	✓	✓	✓	✓
STD WHST.6-8.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.		✓	✓	✓	✓	✓	✓	✓	✓	
STD WHST.6-8.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.									✓	✓

Unit 2: Calling All Minds: How to Think and Create Like an Inventor		Lessons									
		1	2	3	4	5	6	7	8	9	10
Research to Build and Present Knowledge											
STD WHST.6-8.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.										
STD WHST.6-8.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.										
STD WHST.6-8.9	Draw evidence from informational texts to support analysis reflection, and research.										
Range of Writing											
STD WHST.6-8.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.										

Introduction

Unit 2: *Calling All Minds: How to Think and Create Like an Inventor*

WELCOME

This introduction includes the necessary background information to teach the *Calling All Minds: How to Think and Create Like an Inventor* unit in the Core Knowledge Language Arts® (CKLA) program. **For detailed information about the CKLA approach to instruction, including reading, writing, grammar, morphology, spelling, fluency, speaking and listening, differentiation of instruction, and resources available in Grade 6 CKLA, see the Introduction to CKLA on pages 10–23 of the Unit 1 Teacher Guide.**

Lessons and activities address various aspects of a comprehensive language arts curriculum aligned to the Common Core State Standards–English Language Arts (CCSS–ELA): reading, writing, spelling, grammar, and morphology. When applicable, Grade 6 also covers Reading Standards for Literacy in History/Social Studies, Science, and Technical Subjects (CCSS–RH and CCSS–RST). CCSS and many state guidelines require students to learn how to read informational texts as part of their language arts and/or English programs. For this reason, *Calling All Minds: How to Think and Create Like an Inventor,* which includes science information, is included in this middle-school English curriculum. Lesson 8 contains a Unit Assessment that assesses all of the skills taught in this unit. **Unit 2 contains eleven daily lessons, each of which will require a total of 90 minutes**, **i.e., in schools in which 45 minutes daily is allocated for English instruction, teachers will typically need to allocate two instructional days for each lesson**.

This unit contains two Pausing Points that may be used for differentiated instruction and have been included on the Pacing Guide on page 14. We have included an optional Mid-Unit Comprehension Check, which can be given at the end of Lesson 4 (PP.1), and an optional End-of-Unit Comprehension Check (PP.2), which could be included at the end of the unit as part of the Pausing Point Activities. These assessments allow you to assess students' general comprehension of the reading and help to inform your decisions about grouping and support. If you decide to administer these assessments, be sure to allocate an additional 45 minutes for each of these assessments. Following the completion of the lessons in this unit, several culminating activities are suggested from which teachers may choose.

It is recommended that you spend no more than eighteen instructional days total on this unit. Please refer to the Pacing Guide on page 14 for guidance.

Why *Calling All Minds: How to Think and Create Like an Inventor* Is Important

This unit addresses science topics in an informational text read as part of the language arts program. Students will learn about inventors and their inventions. Students will also learn more about how the processes of invention happen as a result of problem-solving using logic. In terms of literary skills, students will focus on different kinds of text structure (including problem and solution, cause and effect, sequential, and procedural text structures). Students will be exposed to content-area vocabulary and technical language related to science and math. Students will also learn more about frequently confused words, sentence types, Greek and Latin root words that indicate numbers, and prefixes and suffixes.

Students will read selections from *Calling All Minds: How to Think and Create Like an Inventor* by inventor and animal scientist Temple Grandin. It details the author's failures as well as her successes. It is a good opportunity to show students that it is okay to fail. In fact, failure is often a valuable learning experience on the road to success. Students will learn that Grandin is on the autism spectrum and speaks openly about her challenges and advantages growing up as an autistic person. The "All Minds" in the title of the book refers to the author's assertion that different kinds of minds and thinkers are valuable and important contributors to society, each in their own way. This is an opportunity for students to think about their own differences and similarities with others and how this impacts how they learn and what interests them.

Unit 2 is also an opportunity to continue the discussion of identity—what makes us who we are—that students began in Unit 1 *Flying Lessons & Other Stories* and will continue in Unit 6 *90 Miles to Havana*. Students who had CKLA in earlier grades will also have discussed identity in Grade 4, Unit 1 *Brown Girl Dreaming* and Grade 5, Unit 1 *They Call Me Güero*.

Teaching and Discussing Sensitive Topics

Calling All Minds: How to Think and Create Like an Inventor includes the potentially sensitive topic of autism. You may wish to educate yourself about autism before addressing the issue with the class at the beginning the unit. Some students may fall on the autism spectrum or may know others who do. It is important to dissuade stereotypical thinking about people with autism and other kinds of neuroatypical differences.

Some students in the classroom who are on the autism spectrum, who are neuroatypical, or who have particular intellectual disabilities or gifts may enjoy the opportunity this unit provides to relate and share their own experiences with the class, while others may not. Use your best judgment. You may wish to speak ahead of time with these students to find out how they feel about the unit and sharing their own experiences in class.

If you believe your students' families would benefit from an introduction to this unit, there is a sample letter included in the Activity Book that can be sent to families (AP 1.1). Along with this sample letter, you may choose to let families know about the following additional resources that they may explore on their own.

We strongly encourage you to consult the following additional resources in advance and during your teaching of this unit.

Temple Grandin

This 2010 feature-length film on the life of Temple Grandin is available to rent or purchase from video streaming sources.

Temple Grandin: Autism - Calling All Minds

In this 2018 presentation, Temple Grandin shares her insights on living with autism based on her personal experiences. It is available for rent or purchase from video streaming sources.

Links to the following websites can be found at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Temple Grandin

Author and inventor Temple Grandin has her own website, where she discusses the gifts and challenges of autism, autism facts, and advice for educating students with different kinds of minds.

U.S. Department of Health and Human Services

This website provides links to various nonprofit organizations that educate the public about autism and the autism spectrum. The links offer various types of resources, including video clips, blog posts, and advice for talking with students about what autism is and how to communicate with and learn from people who are autistic. Visit each site, and determine which would best fit the needs of your classroom, your teaching style, and your students' manner of learning.

Advance Preparation for Unit 2

Some of the previously mentioned sources about the autism spectrum will help prepare you to teach the unit. In particular, students may have questions about how people on the autism spectrum learn. Be prepared to answer their questions and concerns.

There are a number of science experiments and projects in *Calling All Minds: How to Think and Create Like an Inventor*. You may want to have students do some of these projects during the unit's Pausing Points. If so, preview the projects and have materials and work spaces available in the classroom. You may also want to consult with the science teacher(s) at your school.

Note that not all experiments are appropriate for every classroom. Please consult the "Classroom Safety for Hands-On Activities" section on page 159 of this Teacher Guide, and use your best judgment to determine which projects are most appropriate for your students. Note that during Lesson 7, students will be assigned the paper plane activities on pages 143–145 of the book, so do not cover these during other lessons or assign them as homework assignments.

As students read about Temple Grandin and the other inventors in her book, they may become interested in learning more about inventors and inventions. Consider creating a classroom library of science biographies and books or articles from print or online resources about inventions and inventing to make available for students throughout the unit.

- *All in a Drop: How Antony van Leeuwenhoek Discovered an Invisible World* by Lori Alexander and Vivien Mildenberger (HMH Books for Young Readers, 2019); ISBN 978-1328884206
- *Dreaming in Code: Ada Byron Lovelace, Computer Pioneer* by Emily Arnold McCully (Candlewick, 2019); ISBN 978-0763693565
- *The Girl Who Thought in Pictures: The Story of Temple Grandin* by Julia Mosca (The Innovation Press, 2019); ISBN 978-1943147618
- *Great Black Heroes: Five Notable Inventors* by Wade Hudson and Ron Garrett (Cartwheel, 1995); ISBN 978-0590480338
- *Hawking* by Jim Ottavani (First Second, 2019); ISBN 978-1626720251
- *Hidden Figures Young Readers' Edition* by Margot Lee Shetterly (HarperCollins, 2016); ISBN 978-0062662378
- *Mistakes That Worked: 40 Familiar Inventions & How They Came to Be*, by Charlotte Foltz Jones and John O'Brien (Delacorte Books for Young Readers, 1994); ISBN 978-0385320436
- *The Reason I Jump: The Inner Voice of a Thirteen-Year-Old Boy with Autism* by Naoki Higashida (Random House, 2016); ISBN 978-0812985153
- *So You Want to Be an Inventor?* by Judith St. George and David Small (Puffin Books, 2005); ISBN 978-0142404607
- *Wonder* by R.J. Palacio (Knopf, 1212); ISBN 978-0375869020

You may find the following websites useful. Links to these websites are included in the Digital Components at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Smithsonian Education Spotlight Biographies is a website that includes inventor biographies and extensive source links.

Thinkgrowth.org contains biographies of Black inventors.

A Mighty Girl contains biographies of women inventors.

Free Inventors Help has a website created by inventors to help other inventors, including information such as how to obtain a patent as well as a page of links for kids who want to find out more about young inventors and inventing.

National Inventors Hall of Fame includes resources to help educators connect students with invention-related resources.

Famous Scientists: The Art of Genius contains a collection of science biographies.

Core Content Objectives Addressed in Core Knowledge Language Arts During Previous Grades

Students who have participated in Core Knowledge Language Arts™ (CKLA) instruction in Grades 3–5 will have had prior experience reading about science as highlighted below. For students who have not received this instruction, the Core Connections section of Lesson 1 and the review sections of subsequent lessons provide background for the content.

Classification of Animals (Grade 3)

- Explain that scientists classify animals by common or shared characteristics.

The Human Body: Systems and Senses (Grade 3)

- Explain that the human body is made up of systems.
- Explain that the five senses work with the brain to process information about our surroundings.

Light and Sound (Grade 3)

- Define the properties of light and sound.
- Describe the life and inventions of Alexander Graham Bell.

Astronomy: Our Solar System and Beyond (Grade 3)

- Identify planets and celestial objects.
- Describe the role of Copernicus and Mae Jemison in the exploration of space.

Ecology (Grade 3)

- Describe the relationship between interdependent species and ecosystems.

Geology (Grade 4)

- Identify the relationships between different geological processes.

Pacing Guide

The following is an overview and pacing guide to teaching the eleven lessons of this unit. If possible, we encourage teachers to allocate additional time to administer the optional Mid-Unit and End-of-Unit Comprehension Checks.

Please Note: *Calling All Minds: How to Think and Create Like an Inventor* contains three strands of writing intermixed throughout:

1. An episodic first-person narrative;
2. Lengthy sidebar biographies/informational text about different inventors/inventions;
3. Instructions for how-to activities.

This provided an opportunity to better align reading selections to focused writing skills.

Keeping that in mind, please be aware in Lesson 5, Day 9 students will be engaging with text from Chapter 4, in Lesson 6, Day 11, with Chapter 3 and then back to Chapter 4 for Lesson 7, Day 13 and Lesson 8, Day 15.

Lesson 1		Lesson 2		Lesson 3
Day 1	**Day 2**	**Day 3**	**Day 4**	**Day 5**
Core Connections 45 min Inventors and Inventions	**Reading** 45 min Read-Aloud: Introduction, pages 1–8 Word Work: *Innovation*	**Reading** 45 min Whole Group: Chapter 1, pages 9–18 Word Work: *Stereotype*	**Grammar** 15 min Introduce Sentence Types **Writing** 30 min Write an Explanatory Text: Plan	**Reading** 45 min Whole Group: Chapter 2, pages 39–42 and pages 50–51 Word Work: *Engineer*

Lesson 3	Lesson 4		Lesson 5	
Day 6	**Day 7**	**Day 8**	**Day 9**	**Day 10**
Morphology 15 min Introduce Greek and Latin Roots in Number Words **Writing** 30 min Write an Explanatory Text: Plan	**Reading** 45 min Partner: Chapter 2, pages 79–83 Word Work: *Properties*	**Grammar** 15 min Practice Using Different Sentence Types **Writing** 30 min Write an Explanatory Text: Plan	**Reading** 45 min Close Reading: Chapter 4, pages 123–132 Word Work: *Aerodynamic*	**Morphology** 15 min Practice Greek and Latin Roots in Number Words **Writing** 30 min Write an Explanatory Text: Draft **Optional: Mid-Unit Comprehension Check**

Lesson 6		Lesson 7		Lesson 8
Day 11	**Day 12**	**Day 13**	**Day 14**	**Day 15**
Reading 45 min Independent: Chapter 3, 89–93, 119–122 Word Work: *Modification*	**Spelling** 15 min Introduce Spelling Words **Writing** 30 min Write an Explanatory Text: Draft	**Reading** 45 min Whole Group: Chapter 4, pages 142–150 Word Work: *Transatlantic*	**Morphology** 15 min Introduce Prefixes *uni–, di–*; Suffixes *–er, –or* **Spelling** 5 min Practice Spelling Words **Writing** 25 min Write an Explanatory Text: Draft	**Reading** 45 min Small Groups: Chapter 4, pages 152–157 Word Work: *Aviators*

Lesson 8	Lesson 9		Lesson 10	
Day 16	**Day 17**	**Day 18**	**Day 19**	**Day 20**
Grammar 15 min Introduce Frequently Confused Words: *fewer/less; affect/effect* **Spelling** 5 min Practice Spelling Words **Writing** 25 min Write an Explanatory Text: Share, Evaluate, Revise	**Reading** 45 min Close Reading: Chapter 5, pages 207–212 Word Work: *Colleague*	**Grammar** 15 min Practice Frequently Confused Words: *fewer/less; affect/effect* **Morphology** 15 min Practice Prefixes *uni–, di–*; suffixes *–er, –or* **Writing** 15 min Write an Explanatory Text: Edit	**Reading** 40 min Read-Aloud: Epilogue, pages 213–217 Word Work: *Components*	**Spelling** 15 min Assessment **Writing** 15 min Write an Explanatory Text: Publish

Lesson 11
Day 21
Unit Assessment 35 min
Unit Feedback Survey 10 min

Pausing Points	
Day 1	**Day 2**
Culminating Activity 45 min	**Culminating Activity** 45 min

Core Connections

The Core Connections in Lesson 1 provides a broad overview of relevant background knowledge for *Calling All Minds: How to Think and Create Like an Inventor*. Considering prior knowledge needed for comprehension is consistent with the CCSS three-part model concerning text complexity (specifically with regard to the qualitative dimension of knowledge demands). Students who used CKLA in earlier grades have had exposure to this relevant background knowledge (see section titled "Core Content Objectives Addressed in Core Knowledge Language Arts During Previous Grades"). For those students, Core Connections will serve largely as a review of important related content. Students who did not have CKLA in earlier grades might not have prior knowledge of this related content. For those students, Core Connections provides foundational background knowledge about topics addressed in this unit. The Core Connections section ensures that all students have adequate background knowledge for the unit.

During Core Connections for this unit, students will learn who inventors are and how they use inventions to solve a problem. Students will also understand the purpose of introductions in a text and learn about the book's author, Temple Grandin.

Reading

Calling All Minds: How to Think and Create Like an Inventor

Unit 2 reading lessons include comprehensive instruction in reading comprehension, vocabulary, and word work. For detailed information about these components, including reading groupings and comprehension question types, see Introduction to CKLA on pages 10–23 of the Unit 1 Teacher Guide.

This unit is one of eight CKLA Grade 6 units. It uses a trade book. It includes complex text and prepares students in Grade 6 for the increased vocabulary and syntax demands aligned texts will present in later grades. The book is about inventors and their inventions, from the viewpoint of inventor Temple Grandin, who is on the autism spectrum.

One notable characteristic of this book is that it utilizes multiple text types and structures to communicate information. For example, it is autobiographical when the author writes about her own life. It is informational when the author writes about other inventors and inventions. It is procedural when the author gives directions for projects and experiments. It often uses compare/contrast, problem/solution, and sequencing text structures. Additionally, it incorporates diagrams and other graphic and visual text elements to communicate information.

The CKLA Grade 6 materials are designed to address all CCSS ELA standards at this grade level. To achieve this goal of addressing all required standards, this Teacher Guide calls for students to read only designated selections from *Calling All Minds: How to Think and Create Like an Inventor* during their ninety-minute language arts instruction. If your schedule during other parts of the school day permits, we suggest you encourage your students to choose additional selections from the book to read, as they will gain an even deeper understanding of the content and issues addressed. If your school policy permits homework assignments, you might also suggest that students choose additional selections to read for homework.

While the selections that students will read are each relatively short, they include complex ideas and text that prepare students for the increased demands and vocabulary of later Grade

6 units and beyond. If you find that your students complete a particular day's reading activities in less than the allotted time, consider having your students practice rereading the selections aloud, read additional selections not included in this unit, and/or use the remaining time to devote to the writing lesson, as needed.

Writing

In this unit, students write and publish an explanatory text, incorporating text structures used in science writing.

For detailed information about the CKLA approach to Writing and the writing process, see pages 19–20 of Introduction to CKLA in the Unit 1 Teacher Guide.

Grammar

In this unit, students will work on grammar skills involving different sentence types (simple, compound, complex, and compound-complex) and frequently confused words (*fewer/less, affect/effect*).

Students are expected to apply these grammar skills to oral activities, the unit writing project, and other writing throughout Grade 6.

Morphology

In this unit, students will study Greek and Latin roots in number words.

Students are expected to apply these morphology skills to oral activities, the unit writing project, and other writing throughout Grade 6.

Spelling

During this unit's spelling lessons, students will practice spelling words related to the content of *Calling All Minds: How to Think and Create Like an Inventor,* as well as words related to the morphology features taught and commonly misspelled words as identified in the Core Knowledge Sequence.

Lesson 6 introduces spelling words and provide definitions for context. Students will not be responsible for identifying the meaning of each word on the spelling assessment. However, it is important that students know the definitions as they practice spelling so they have context for the words. After Lesson 6, students will take home an Activity Page listing the spelling words. The Activity Page includes an optional activity to practice writing the spelling words and learn their meanings. In Lessons 7 and 8, students will practice spelling the words by completing activities that use the words.

In Day 2 of Lesson 10, students will complete a spelling assessment. In addition to writing the words during the assessment, students will write a dictated sentence related to one or more of the words. The lessons include guidelines for administering the assessment and for analyzing spelling errors.

For detailed information about the CKLA approach to Spelling, see page 20 of Introduction to CKLA in the Unit 1 Teacher Guide.

Speaking and Listening

This unit allows for numerous speaking and listening opportunities, including read-alouds, class discussions, and small-group and partner activities. **For detailed information about the CKLA approach to Speaking and Listening, see pages 20–21 of Introduction to CKLA in the Unit 1 Teacher Guide.**

Fluency

While many students will have achieved adequate fluency by Grade 6, CKLA continues to provide resources to help students improve automaticity and fluency for better reading comprehension.

CKLA provides three opportunities for teachers to assess fluency during the year to determine which students can benefit from additional fluency support—in the Beginning-of-Year Assessment at the end of Unit 1 and in the Unit Assessments at the end of Units 4 and 8.

For students requiring additional fluency support, the optional Fluency Supplement, consisting of a variety of reading selections, is provided online at https://www.coreknowledge.org/free-resource/ckla-ancillary-materials-sixth-grade/. You may choose and use the selections at your discretion in any order or frequency.

For additional information about fluency resources in Grade 6 CKLA, see page 21 of Introduction to CKLA in the Unit 1 Teacher Guide.

Assessment

This unit includes a variety of assessment tools, including formative and summative assessments and progress-monitoring assessments targeting specific skills. **For an overview of assessment in CKLA, see pages 21–22 of Introduction to CKLA in the Unit 1 Teacher Guide.**

Activity Book

The Unit 2 Activity Book provides additional practice for students in reading comprehension, writing, grammar, spelling, and morphology, as well as student resources, enrichment pages, and opportunities for you to conduct formative assessments. Students will complete some Activity Pages in class as part of the lessons. Other Activity Pages may be assigned as homework.

The Activity Book also includes a section titled Student Resources, which includes a glossary of words in the Unit 2 reading selections, the Individual Code Chart, and resources for the unit writing project including the writing process diagram and editing symbols.

For detailed information about resources in the Activity Book, see pages 12–13 of Introduction to CKLA in the Unit 1 Teacher Guide.

Teacher Resources

At the back of this Teacher Guide, you will find a section titled Teacher Resources. In this section, information is included about the following:

- Glossary for *Calling All Minds: How to Think and Create Like an Inventor*
- Classroom Safety for Hands-On Activities
- Student Safety Contract
- Individual Code Chart
    - Encourage students who may have reading or spelling difficulty to use the Individual Code Chart whenever they are reading and/or writing throughout the day, not just during the language arts block. This reinforces the notion that the skills they are learning during language arts are meant to be applied whenever they are reading and writing.
- Anecdotal Reading Records
    - This chart can be used for recording anecdotal notes about students' reading abilities. You can record things such as persistent difficulty with specific sound-spellin correspondences, difficulty with certain digraphs/letter teams, di ficulty segmenting isolated words, and progress with specific skills
- Tens Charts for scoring student work
    - These charts were created for use with assessments that have a defined number of items (such as written assessments, End-of-Unit Comprehension Checks, and Activity Pages). However, you may use the Tens system to record informal observations, such as an end-of-lesson check-in, as well.
- Using Chunking to Decode Multisyllable Words
- The Writing Process
- Explanatory Text Rubric
- Explanatory Text Peer Review Checklist
- Explanatory Text Editing Checklist

Digital Components

Various resources that appear in this unit are provided as digital components. These include various posters, charts, graphic organizers, and images referenced in the Advance Preparation section of each lesson. It also includes the optional Decoding and Encoding Remediation Supplement and Online Fluency Supplement. All digital components can be found at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Lesson 1

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Core Connections**	45 min	Inventors and Inventions	Activity Pages 1.1, 1.2, 1.3
DAY 2: **Reading**	40 min	Read-Aloud: Introduction, pages 1–8	*Calling All Minds: How to Think and Create Like an Inventor* Activity Pages 1.4, 1.5, SR.1
	5 min	Word Work: *Innovation*	
Take-Home Material	*	Core Connections, Reading	Activity Pages 1.1, 1.2, SR.1

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Determine central ideas and summarize a text. (RI.6.1, RI.6.2, RI.6.3, RI.6.4, RI.6.5; RST.6–8.1, RST.6–8.2, RST.6–8.4)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Interpret information in diverse media formats and explain how it contributes to a text or topic. (SL.6.2)

Language

Use strategies, such as using context clues, as well as reference sources, such as print or online dictionaries, to determine or clarify the meaning of words. (L.6.4, L.6.4.a, L.6.4.c, L.6.4.d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

Academic Vocabulary

Academic vocabulary words support reading comprehension and may appear across a variety of materials, in language arts and in content areas. Understanding academic vocabulary may contribute to improved performance on assignments and assessments, as these words appear often in directions. Where applicable, general academic words are used throughout the unit, as they refer to all subjects—reading, writing, grammar, morphology, and spelling. They may appear in directions, assessments, spelling lists, Activity Pages, and discussion questions, among other places.

These words are underlined the first time they are included in each lesson. You may wish to define these words and use them intentionally throughout the unit so students hear them used in multiple ways; it is not necessary to teach the words ahead of time.

Following the word list is a chart of applicable Spanish cognates. Providing Spanish cognates may support Spanish-speaking students in comprehending the words in English.

1. **caption**, ***n.*** text that describes an image in a text
2. **chart, *n.*** information in the form of a graph, table, or diagram
3. **complex sentence, *n.*** a sentence that contains an independent clause and one or more dependent clauses
4. **compound-complex sentence, *n.*** a sentence made by combining two independent clauses and at least one dependent clause
5. **compound sentence, *n.*** a sentence made by combining two independent clauses
6. **diagram, *n.*** a drawing that shows how something works or the relationship between parts
7. **domain-specific vocabular , *n.*** words related to a specific subject a ea, often called technical vocabulary
8. **edit, *v.*** to make a text ready for publication by making improvements and corrections
9. **explanatory text, *n.*** text that explains how to do something or how something works
10. **fact, *n.*** something that is true or has been proven correct; something that is documentable or measurable and can't be changed
11. **formal writing, *n.*** text written for a formal or academic audience
12. **graphic features, *n.*** pictures or other images in a text that help to explain or enhance meaning
13. **illustration**, ***n.*** a picture that accompanies a text
14. **morphology, *n.*** the study of words and their forms
15. **opinion, *n.*** a view or judgment formed in someone's mind
16. **prefix, *n.*** word or part of a word placed at the start of another word or root that changes its meaning
17. **problem-and-solution text structure, *n.*** a way of organizing text in which information is presented as problems and solutions to those problems

18. **publish, *v.*** to present written work to an audience
19. **root word, *n.*** word or word part from which other words are formed by adding a prefix or suffix
20. **sequence text structure, *n.*** a text structure in which information or events are presented in the order in which they occur
21. **sidebar, *n.*** text set apart from the main text in a box or "on the side" of the page
22. **simple sentence, *n.*** a sentence containing one subject and one verb
23. **suffix, *n.*** word or part of a word placed at the end of another word or root that changes its meaning
24. **text features, *n.*** text elements such as headings, bold words, and sidebars that help to visually organize or communicate information in a text

Spanish Cognates for Academic Vocabulary in *Calling All Minds: How to Think and Create Like an Inventor*	
sentencia compleja-compuesta	*el prefijo*
el diagrama	*publicar*
vocabulario específico del dominio	*estructura de texto de problemas y soluciones*
texto formal	*estructura de texto de secuencia*
la ilustración	
la morfología	

ADVANCE PREPARATION

Core Connections

- Preview the free 6½-minute YouTube video "Temple Grandin on Her Search Engine" in the "About Temple Grandin" section of Temple Grandin's website; see page 12 of this Teacher Guide. Set up audiovisual equipment in the classroom so that students can view the video.
- Preview the source links on autism on page 12 of the introduction.
- Print photos of inventions and mini bios of inventors to display or share with students. There are inventors and inventions listed throughout the book *Calling All Minds: How to Think and Create Like an Inventor*. Some of these are covered in future lessons for this unit, but some are not. You may wish to do a quick preview to share with students some of those inventors who won't be covered in their readings. There are also ideas and stories about inventors on the Biography Online website. The above links can be found in the Digital Components: https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Reading

- Write the purpose for reading on the board/chart paper: *Summarize the central ideas presented by Temple Grandin in the introduction to* Calling All Minds: How to Think and Create Like an Inventor. Alternatively, you may access a digital version in the digital components for this unit.
- Bring in a retractable measuring tape to demonstrate the meaning of the Core Vocabulary word *retractable*.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

CORE CONNECTIONS 45 minutes

Inventors and Inventions

Introduce Inventors and Inventions 15 minutes

- Ask students to define *inventor* and *invention* in their own words.

SUPPORT: If students need a prompt, ask if any students have ever watched the television show *Shark Tank*. Explain that the people who appear on that show often are inventors.

- Ask students what qualities they think someone needs to become a good inventor. Write students' ideas on the board and discuss them as a class.
- Have students name inventors and inventions they may know. Share some of the mini biographies you prepared in the Advance Preparation section of this lesson.

Think About How Inventions Solve Problems 15 minutes

- Explain that inventions are designed to find a solution to a p oblem. Provide an example. For instance, you may tell students that there was a time when cell phones and smartphones did not exist. At one time, people had to use phones connected with wires to carry signals. Because of this, phones could not be easily moved or carried around. Cell phones changed that by allowing people to carry their phones anywhere they went. You may choose to go back further in time. There was once a time when phones did not exist at all. In the 1800s, if people wanted to communicate with someone long distance, they had to write letters and send those letters through the mail. Sometimes, it would take months for a letter to reach a person.
- Select a problem from the list below or have the class come up with a problem that needs a solution. Write the problem on the board.
    - Not waking up when the alarm goes off
    - Forgetting to turn off the oven after cooking

- Forgetting to charge my cell phone
- Difficulty opening a jar
- Bottles falling out of the refrigerator door when it is opened
- Perforated box opening not tearing properly
- Keeping items in a backpack dry on a rainy day
- Difficulty getting tape o f the roll

- Distribute and briefly eview Activity Page 1.3 with the students. Then separate the class into small groups. Give students approximately 10–15 minutes to discuss the problem. Ask each group to come up with an invention to solve the problem, using the Activity Page to guide them.
- Bring the class back together, and have groups share their inventions. Ask pointed questions about how the inventions will work, and guide students to think about what problems they might face in getting their inventions to work successfully. Explain that famous inventors failed many times before being successful. Part of inventing is about finding out what doesn t work and trying again.
- Point out that each group thought of a different or unique way to solve the problem. Use this as a segue to explain that we all have different ways of thinking, that all ways of thinking are valuable, and that anyone can be an inventor. Inventing, in particular, requires thinking in new ways.

Introduce the Author and Inventor Temple Grandin 10 minutes

- Tell students that in this unit they will read the book *Calling All Minds: How To Think and Create Like an Inventor* by Temple Grandin. Explain that Temple Grandin had both gifts and challenges as a child that led her to become a famous inventor. In her book, she tells her own story about being on the autism spectrum and becoming an inventor as well as the stories of other inventors and their inventions.
- Explain what *autism spectrum* means. Tell students that autism is a developmental disorder affecting social and sometimes intellectual abilities. The autism spectrum includes a wide variety of traits. People with autism range from severely disabled to highly functioning. Anyone with these traits is considered to be on the spectrum, although they may seem very different from each other.

Note to Teacher: You may wish to pause at this point to provide students additional information about autism, or you may do so at other points throughout the unit. Recommended sources for information are in the Digital Components for the unit. Remind students to be respectful when discussing people with autism and other differences.

- Play the 6½-minute video "Temple Grandin on Her Search Engine," available in the Lesson 1 Online Resources in the Digital Components at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Wrap Up 5 minutes

- To wrap up, discuss the following questions as a class.
  - What did your group find challenging in coming up with an invention? What was easy
  - Based on the video "Temple Grandin on Her Search Engine," what do you think makes Temple Grandin a successful inventor?
  - What qualities do you think a person needs to become an inventor? Do you think you could be an inventor?
- Tell students to keep their answers to these questions in mind as they read *Calling All Minds: How To Think and Create Like an Inventor* by Temple Grandin.

Note to Teacher: Explain to students that they may be doing some hands-on activities in this unit. Give students the Student Safety Contract on Activity Page 1.2 to sign and take home to have their parent or guardian sign. Students can also take home Activity Page 1.1 to share more about Unit 2 with their families.

DAY 2

READING 45 minutes

Read-Aloud: "Introduction" [pages 1–8]

Introduce the Book 5 minutes

- Ensure each student has a copy of the book *Calling all Minds: How to Think and Create Like an Inventor.*
- Read the title with students, and explain that this book is an explanatory or informational text.
- Have students turn to the table of contents. Either read several chapter titles aloud, or have students read them. Ask students to guess what the chapters titled "Levers and Pulleys" and "Things That Fly" will be about.
- Give students a few moments to flip th ough the book and comment on the images they see.
- Ask students to share any other thoughts they have about the book.

Note to Teacher: You will not read all the sections of *Calling All Minds: How to Think and Create Like an Inventor* as a class. Throughout the unit, you may ask students to read additional selections for homework and/or as class time permits.

Introduce the Selection 5 minutes

- Tell students you will read aloud the introduction. Students should follow along in their book as you read. Explain the purpose of an introduction. An introduction sometimes provides background information and will often outline the main ideas the author plans to present throughout the book.
- Have students turn to page 1 of *Calling All Minds: How to Think and Create Like an Inventor.*

Core Vocabulary

- Preview the core vocabulary words before reading the chapter.

Note to Teacher: Some teachers prefer to introduce vocabulary word(s) just before students read the page(s) on which the word(s) occur, rather than preview all of the words at once before reading the chapter.

- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *innovation*.
- Have students find the wo d on page 3 of the book.
- Explain that the glossary contains definitions of all the vocabulary wo ds in this book. Have students refer to the glossary on Activity Page SR.1. Point out that these words are listed in alphabetical order. Have students find the wo d, and ask a student to read its definition
- Explain the following:
    - The part of speech follows each word in an abbreviated format as follows: noun–*n*.; verb–*v*.; adjective–*adj*.; adverb–*adv*.
    - Alternate forms of the word appearing in the chapter may follow the definition. They may be a different part of speech than the original word.
- Then have students reference Activity Page 1.4 while you read each word and its meaning, noting the following:
    - The page number (for the first occur ence of the word in the introduction) appears in bold print after the definition
    - Words are listed in the order in which they appear in the introduction.

1. **innovation, *n*.** the act or process of making something new (**3**)
2. **social skills**, ***n***. verbal and nonverbal ways that someone uses to communicate and get along with other people (**3**)
3. **monotone, adj.** having a sound without a change in pitch or tone (**3**)
4. **diorama, *n.*** a model representing something in three dimensions (**dioramas**) (**4**)
5. **tinker, *v.*** to change something by trying out different things or ways to do something (**4**)
6. **technology, *n.*** the study and use of scientific knowledge, tools, and machines **5**)
7. **retractable, *adj.*** able to be pulled back in (**6**)
8. **piston, *n.*** a piece of metal within a cylinder that moves up and down (**pistons**) (**6**)
9. **menial, *adj.*** requiring little skill (**6**)
10. **patent, *n.*** an official paper that gives the c eator of an invention the right to be the only person to make and sell that invention for a certain period of time (**7**)
11. **ingenuity, *n.*** inventiveness, originality (**7**)
12. **serendipity, *n.*** achieving a positive result by accident; good luck (**8**)

Vocabulary Chart for the Introduction		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	dioramas patent pistons technology	ingenuity innovation menial monotone retractable serendipity social skills tinker
Spanish Cognates for Core Vocabulary	pistons	ingenio innovación retráctil
Sayings and Phrases	test run	

- Read the purpose for reading from the board/chart paper:

> Summarize the central ideas presented by Temple Grandin in the introduction to *Calling All Minds: How to Think and Create Like an Inventor*.

Read the Introduction — 20 minutes

Explain that a book's introduction is written to introduce readers to the book's main or central ideas. Have students turn to the Central Idea graphic organizer on Activity Page 1.5. Read the directions with students. Tell students that they will fill out the organizer as you read and discuss the text together as a class. Explain that students will fill in the main details from each page of the introduction on the organizer. Then students will use those details to help them determine the central ideas in the introduction. Lastly, students will use the graphic organizer to help them summarize the introduction.

Read the introduction aloud as students follow along in their books. Then, read and discuss the corresponding guided reading supports, rereading text as necessary to support the discussion. Guided reading supports in brackets are directional and not intended to be read aloud. All other phrases and sentences are intended to be read aloud verbatim. Whenever asking a guided reading support question, explicitly encourage students to refer to the text and reread prior to offering an answer.

Throughout this lesson and other lessons in the Teacher Guide, you will see certain questions or activities labeled either SUPPORT or CHALLENGE. These questions and activities are not intended to be used in all situations. The items labeled SUPPORT provide additional scaffolding and should be used with classes that would benefit from additional support. The items labeled CHALLENGE should be used with classes that would benefit from additional enrichment opportunities.

[pages 1–2]

Literal What incidents in the life of young Temple Grandin led to her interest in becoming an animal scientist and inventor?

- She was interested in horses and was encouraged by her family and headmaster at school to follow her interest. Her grandfather was an inventor who inspired her.

SUPPORT: Unless they are familiar with the care of horses, most students have likely never heard the terms *grooming* or *mucking out*. Explain that *grooming* means brushing and cleaning the horse's fur. Also explain that *mucking out* means cleaning the dirt, debris, and waste from animal stalls in a barn, such as those found on a horse farm or cattle ranch.

Inferential Examine the image on page 1. What does it show, and how does this help you understand the text?

- In the picture, Grandin is sitting atop a horse, showing her interest in horses, an interest that was possibly part of what led to her becoming an animal scientist.

Literal What was Grandin's grandfather's job?

- He was an inventor.

SUPPORT: Point out the diagram in the front matter of the book that shows the autopilot for planes invented by Grandin's grandfather.

Literal What is one thing Grandin's grandfather did that helped influence her interest in science?

- He allowed her to ask questions.

Literal What is a visual thinker?

- A visual thinker is someone who organizes the world through pictures, according to Grandin.

SUPPORT: If students are interested in learning more about what it means to be a visual learner, point out the page titled "Visualizing, Understanding, Creating" at the very beginning of the book.

Stop and Jot: Have students stop and jot a *who, what, when, where, why,* or *how* question about visual learners. As time allows, invite a few students to share their questions and discuss answers. Explain that sometimes students will need to keep reading in order to find an answe .

SUPPORT: Point out to students that they may come across some words in the introduction that they were first int oduced to in Core Connections on Day 1, and others that they have not seen or heard before. Explain that many of these words, such as *autism* and *spectrum*, are used throughout this book. As students read, they will gain a better understanding of these words and what they mean.

Inferential What are the main details on pages 1 and 2?

- Grandin's interest in animals and the influence of her grandfathe , an inventor, led her to become an inventor and animal scientist. Grandin is a visual thinker and on the autism spectrum. [Have students add these details to their graphic organizer.]

[pages 3–4]

Inferential What is Grandin's view of people who think differently from others?

- She believes that they can be creative, innovative, and inventive. She believes that there is no limit to the kinds of contributions they can make.

Literal Why was Grandin teased in high school?

- She didn't behave exactly like everyone else. She often repeated herself. Others didn't always understand her autism and were not sensitive.

Inferential How does Grandin view kids that others may label as "nerds and geeks"?

- She sees them as people who tend to win Nobel Prizes and run Silicon Valley. In other words, she sees them as people who can be very successful.

Note to Teacher: Explain that Silicon Valley is an area in the state of California famous for its inventions related to computers and technology.

CHALLENGE: Ask students if they are beginning to see any kind of pattern in what Grandin is talking about. Have students think deeply on what they have read so far. Ask: What is the main idea of what she is talking about? Allow volunteers to share their thoughts.

Inferential What did Grandin's grandfather need to do while he was inventing the autopilot technology for airplanes?

- He had to tinker and try different things to make his invention work.

SUPPORT: Explain that what Grandin is basically describing in this section is failure. Often, scientists and inventors fail many times before they finally succeed. ou may wish to point out to students that this is one of the major ideas of this book and that they will learn more about what Grandin calls "trial and error," learning by making mistakes, later in the book.

Inferential What are the main details on pages 3 and 4?

- People with autism think differently; they can do incredible things if allowed to pursue their interests. Grandin loves making things with her hands and has learned that sometimes you have to experiment to make things work. [Have students add these details to their graphic organizer.]

[pages 5–6]

LIteral What does Grandin herself say the main message of her book is and why?

- She says that the main message is "Make Things." By making things, people make new discoveries and invent new things.

Inferential In Grandin's view, why is taking things apart and putting them back together important?

- Taking things apart helps you to figu e out how they work.

Turn-and-Talk: Have students turn to a partner and discuss the question: Have you ever taken anything apart and put it back to together? Direct students to follow this question up with: What was it? After the brief discussion is over and if time permits, allow volunteers to share their discussions with the class.

Inferential Why is it helpful to understand how things work when creating a new invention?

- New inventions build on previous inventions. For example, newer car inventions come out of older car inventions. When inventors understand how one car works, they can build a newer car that works better.

SUPPORT: This question may be difficult for many students. If so, di ect them to the part of the text that discusses the example of the car. Explain that when cars were first invented, they looked very different than they do today, they could not travel as fast, they were less comfortable, and they were less sleek. But over the past 100 years, inventors have continually invented new designs and parts for cars so that today they look and feel very different from what they once did. For fun, ask students if they can think of ways that cars today are different from what they used to be. Some students may know that old cars did not have GPS or may have had a different kind of sound system for listening to music.

Literal What does Grandin say there is no substitute for?

- She says there is no substitute for real-world experience and working with your hands.

Inferential What are the main details on pages 5 and 6?

- Grandin says the message of her book is "Make Things." You have to take things apart and put them back together to understand how they work. There's no substitute for real-world experience and working with your hands. There is great pride in seeing something you created give people pleasure and help them. [Have students add these details to their graphic organizer.]

[pages 7–8]

Evaluative Thomas Alva Edison said, "Genius is one percent inspiration and ninety-nine percent perspiration." What do you think he meant by that?

- Possible answer: A single idea can lead to a new discovery or invention, but only after the inventor has put a lot of hard work into it.

SUPPORT: Point out to students that it has long been reported that Edison failed a thousand times before inventing the light bulb as we know it. This illustrates his saying about genius. He had an idea for the light bulb, but he did not invent it overnight. It took years of trying to make it and failing before he got it right.

Literal What are the three things Grandin learned from her book of inventors? List them in the same order Grandin does.

- 1) There's usually a fascinating story of how things got made. 2) Inventing takes hard work and patience. 3) Sometimes inventions are the results of serendipity.

Evaluative How do you think serendipity might play a role in the success of a new invention?

- Accept reasonable responses.

Literal According to Grandin, what are some of the problems we need new inventions to solve?

- Grandin says new inventions could be helpful for solving climate change, curing diseases, and ending hunger.

SUPPORT: You may choose to point out to students that climate change is the result of our use of fossil fuels, which puts more carbon into the atmosphere. Explain that it was new inventions such as the automobile and airplanes that have contributed to climate change and that we now need new inventions to undo the effects. Next, tell students that many diseases in the past have been cured or wiped out by the inventions of new vaccines but that new diseases are always popping up. And finall , state that scientists are working on modifying foods in ways that will help lessen hunger in the world.

Inferential What are the main details on pages 7 and 8?

- A patent protects an inventor's work by preventing others from stealing it. Women and people of color were once not allowed to own patents, and so their work was lost, but their stories are often the most interesting. New inventions are a result of "connecting the dots," hard work, patience, and luck. We need people with new ideas and inventions to solve the problems of the future. Making things can give your life meaning. [Have students add these details to their graphic organizer.]

Discuss the Introduction and Wrap Up the Lesson 10 minutes

To wrap up the discussion, remind students of the purpose for reading:

> Summarize the central ideas presented by Temple Grandin in the introduction to *Calling All Minds: How to Think and Create Like an Inventor.*

Turn and Talk: Have partners or small groups take 3–5 minutes to review the main details on their graphic organizers and use them to write a summary of the introduction on Activity Page 1.5. When they are done, invite groups to share their summaries with the class. Then ask the following questions.

Literal What are the central ideas in the introduction?

- Possible answers: People who think differently can do great things; there is value and satisfaction in working with your hands and making things; the work of women and people of color is valuable and should be remembered; new ideas and inventions are a result of hard work, patience, and luck.

Evaluative Now that you have read the introduction to *Calling All Minds: How to Think and Create Like an Inventor,* what do you think a central idea of the book will be?

- Accept reasonable responses. Possible answer: The central idea of the book may be that inventions have changed the way we live and will continue to change it. We need new inventors and inventions, and even people who think differently from others can make big contributions.

Word Work: *Innovation* 5 minutes

1. In the introduction, you read, "The more we learn about 'the spectrum' (the range of abilities and deficits an autistic person may have), the mo e we will understand different kinds of minds and how important different kinds of thinkers are—especially where creativity, innovation, and invention are concerned."
2. Say the word *innovation* with me.
3. *Innovation* means "the act or process of making something new."
4. Innovation is important if we want to travel into outer space.
5. What are some other examples of innovation that have made your life better?
   [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "My phone is an _____ that has made it easier for me to stay in contact with friends and family."]
6. What part of speech is the word *innovation*?
   - noun

Making Choices

[Use a *Making Choices* activity for follow-up.] I am going to read several sentences. If the sentence I read is about making something new, say that is *innovation*. If the sentence I read is *not* about making something new, say that is *not innovation*.

1. The student helped clean out the horse stalls every day.
   - not innovation
2. Some people love to read while others do not.
   - not innovation
3. Noticing how a bird's wings were shaped led to the invention of the airplane.
   - innovation
4. New technology helped us travel to the moon and back.
   - innovation

Take-Home Material

Reading

- Distribute copies of Letter to Family on Activity Page 1.1 for students to share with their families.
- Explain to students that they may be doing some hands-on activities in this unit. Give students the Student Safety Contract on Activity Page 1.2 to read with their families, sign, and have their parent or guardian sign.
- If students will be asked to complete any reading or Activity Pages as homework, have students take home the glossary on Activity Page SR.1 for use as a reference during this unit. It is recommended that you make copies of the glossary so that students can keep a copy of the glossary in class as well as at home.

Fluency

- For students who need extra fluency support, have them take home the optional fluenc selection.

Lesson 2

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Whole Group: Chapter 1, pages 9–18	*Calling All Minds: How to Think and Create Like an Inventor* Activity Page 2.1
	5 min	Word Work: *Stereotype*	
DAY 2: **Grammar**	15 min	Introduce Sentence Types	Sentence Types Chart Activity Page 2.2
Writing	30 min	Write an Explanatory Text: Plan	Activity Page 2.3
Take-Home Material	*	Reading, Grammar	*Calling All Minds: How to Think and Create Like an Inventor*, Chapter 1, pages 19–38 Activity Page 2.2

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Describe the different ways the author organizes the text and how different text features work together to contribute to the understanding of the text. (RI.6.1, RI.6.2, RI.6.3, RI.6.4, RI.6.5, RI.6.6, RI.6.7; RST.6–8.1, RST.6–8.4, RST.6–8.5, RST.6–8.6)

Writing

Brainstorm ideas for an explanatory text. (W.6.2, W.6.2a; WHST.6–8.2, WHST.6–8.2a)

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience. (W.6.4; WHST.6–8.4)

Develop and strengthen writing as needed by planning and drafting as needed. (W.6.5; WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Interpret information presented visually and explain how it contributes to the text. (SL.6.2)

Language

Demonstrate command of the conventions of English grammar and usage. (L.6.1, L.6.3)

Identify and use sentence types: simple, compound, complex, compound-complex. (L.6.3.a)

Determine the meaning of known and unknown multiple-meaning words using context, known roots and affixes, and reference materials as needed. (L.6.4, L.6.4.a–d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Read *Classroom Safety for Hands-On Activities* in the Teacher Resources section.
- Bring in individual rubber stamps and an inkpad to demonstrate how moveable type works.
- Write the purpose for reading on the board/chart paper: *Describe the different ways Temple Grandin organizes the text in Chapter 1, "Things Made of Paper," and uses different text features to contribute to the understanding of the text.*

Grammar

- Prepare and display the Sentence Types Chart on page 44.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Whole Group: Chapter 1 [pages 9–18]

Introduce the Chapter 10 minutes

- Tell students they will read part of Chapter 1 from *Calling All Minds: How to Think and Create Like an Inventor.*
- Remind students of the central ideas they identified in the int oduction in Lesson 1 about inventing and different kinds of thinkers. Tell students to keep these ideas in mind to see how they connect to the text as they read selections from the rest of the book.
- Explain that this book includes autobiographical elements and is an informational text. If needed, explain that an autobiography is a person's life story, written by that person. *Auto* means "self," and a biography is the story of someone's life.
- Have students page through the selection and notice the photographs, sidebars, and diagrams. Have students read some of the labels and captions. Ask students how they think these photographs, sidebars, and diagrams could be helpful to the reader. Point out that in this lesson students will learn more about these graphic features and text features that authors use to communicate information in an informational text.
- Have students turn to page 9. Have students read the chapter title, "Things Made of Paper." Discuss how things such as the placement at the top of the page and typeface different from the main text help readers to identify the chapter title on the page. This is an example of a text feature.
- Tell students that they will read pages 9–12 in class but will not complete the activity. Let students know that there are directions for making homemade paper on these pages that they may want to try at home, with their parents' permission.

Core Vocabulary

- Preview the core vocabulary words before reading the selection from Chapter 1.

Note to Teacher: Some teachers prefer to introduce vocabulary word(s) just before students read the page(s) on which the word(s) occur, rather than preview all of the words at once before reading the chapter.

- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *type*.
- Have students find the wo d on page 13 of the book.
- Explain that *type* is a multiple-meaning word. Students probably already know the meaning "to write by pressing keys on a keyboard or typewriter." There is another meaning of *type* in this selection that may be new to students.

- Explain that the glossary contains definitions of all the vocabulary wo ds in this book. Have students refer to the glossary on Activity Page SR.1. Point out that these words are listed in alphabetical order. Have students find the wo d *type*, and ask a student to read both its definitions
- Explain the following:
    - o The part of speech follows each word in an abbreviated format as follows: noun–*n*.; verb–*v*.; adjective–*adj*.; adverb–*adv*.
    - o Alternate forms of the word appearing in the chapter may follow the definition. They may be a different part of speech than the original word.
- Then have students reference Activity Page 2.1 while you read each word and its meaning, noting the following:
    - o The page number (for the first occur ence of the word in the selection) appears in bold print after the definition
    - o Words are listed in the order in which they appear in the chapter.

1. **trade, *n.*** a kind of work or craft (**12**)
2. **type**, ***n.*** metal letters used in printing (**13**)
3. **mold, *n.*** a hollow into which liquid metal is poured to give it shape when it hardens (**molds**) (**12**)
4. **impact, *n.*** the effect of one person or thing on another (**13**)
5. **alloy**, ***n.*** a mixture made of two or more different kinds of metal (**14**)
6. **molten**, ***adj*.** melted by heat (**15**)
7. **type**, ***v.*** to write by pressing letters on a keyboard (**typed**) (**15**)
8. **metallic**, ***adj.*** made of metal (**15**)
9. **slab**, ***n.*** a thick, flat piece of metal, stone, or conc ete (**15**)
10. **apprentice, *n.*** a person who is learning a skill or craft by working with an expert (**15**)
11. **stereotype, *n.*** **1.** a metal plate used in printing; **2.** an oversimplified idea that a person or group has certain common characteristics (**15**)
12. **indebted**, ***adj.*** owing thanks or gratitude (**17**)
13. **commercial, *adj.*** used for business as opposed to private or personal use (**17**)
14. **continuous, *adj*.** unbroken; without interruption (**17**)

Vocabulary Chart for Chapter 1, pp. 9–18		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	alloy apprentice metallic mold molten patent slab stereotype type	commercial continuous impact indebted trade
Spanish Cognates for Core Vocabulary	metálico patentar	commercial continuo
Multiple-Meaning Core Vocabulary Words	stereotype type	
Sayings and Phrases	connecting the dots; trial and error	

- Read the purpose for reading from the board/chart paper:

> Describe the different ways Temple Grandin organizes the text in Chapter 1, "Things Made of Paper," and uses different text features to contribute to the understanding of the text.

READ CHAPTER 1 — 25 minutes

[page 9]

Literal From what older word does the word *paper* come from? Why?

- The word *paper* comes from *papyrus*, a plant used to make paper in ancient Egypt.

Evaluative Why was paper an important invention?

- Accept reasonable answers.

[pages 10–12]

[Have students silently read the "Handmade Paper" activity on pages 10–12 (they will not be doing the activity, only reading about it). When students have finished reading, ask volunteers to point out the title, the materials list, the numbered steps, and the illustrations.]

Literal What does Step 2 ask you to do?

- Pulse the mixture in the blender until it resembles a thick soup.

Evaluative What do you think would happen if you skipped Step 7?

- Your handmade paper would take too long to dry.

Evaluative Why do you think the author put the materials and the instructions in separate sections?

- Answers should indicate that this makes the activity easier to follow and do. This makes it easier to be sure all of the supplies are available and collected before the activity is started.

Inferential How are the illustrations helpful in this activity?

- They show the steps to make them easier to understand.

[pages 12–13]

[Read aloud pages 12–13 of "In the Beginning." Have individual students take turns reading the rest of the selection aloud. You may also alternate between having students read aloud and read silently. Occasionally pause to ask questions in order to check for understanding and draw students' attention to key vocabulary and concepts. Use the guided reading supports listed below for this purpose.]

SUPPORT: Facilitate students' understanding of the following terms on page 12:

Smithing means to heat metal in an open flame, using tools to shape it.

A *guild* is a group of people who have the same trade or job. It is similar to a modern-day union.

SUPPORT: Students may have difficulty visualizing how moveable type was used in printing. Afte reading page 13, provide examples of rubber craft stamps. Explain that the stamp is backward, but will produce an image that can be read the right way when it is inked and pressed onto the paper.

Point out that in Gutenberg's movable type machine, the type was set backward, but would be legible, i.e., the right way around, when printed. Before movable type, printers had to carve an entire page of a book into a block, creating a new block for each page. Gutenberg's movable type provided a set of letters that could be arranged on a printing block to create a printed page and then removed and rearranged to print another different page.

Literal Who is the illustration of on page 12? How does the author let you know?

- The illustration is of Johannes Gutenberg. The label below the picture tells who he is. Gutenberg is the inventor of moveable type.

Literal According to "Gutenberg's Legacy," how did the availability of books change after the invention of moveable type?

- Before moveable type was invented, it was very time consuming to make even just one book, so far fewer books were made. Fifty years after the invention of moveable type, millions of books were printed!

Evaluative Why do you think the author says, "Moveable type was like the internet of its time"?

- Like the internet, moveable type was a revolutionary technology that made sharing information much faster.

Evaluative [Ask students to find the illustration of the moveable type machine. Point out that the label "Movable type machine" helps readers to identify what is in the illustration. Have students try to identify where the plates and type are.] How does the illustration help you to understand the description of the moveable type machine in the text?

- Answers will vary. Emphasize that authors use text and graphic features such as illustrations to show things that are difficult to describe in wo ds.

[pages 14–15]

[Have students read the two full paragraphs at the top of pages 14 and 15 and look at the diagram of the Linotype machine.]

Inferential What do you think the phrase *connecting the dots* means?

- Accept reasonable answers such as finding out how we got f om one thing to another, or in this case, how humans went from using papyrus to printed paper.

Inferential If lead and tin are kinds of metal, what do you think antimony is? What clues in the text helped you infer this?

- Antimony is another kind of metal. Both lead and tin are metal, and metals can be melted and mixed together in an alloy.

Evaluative [Point out the diagram of the Linotype machine.] How is a diagram different from an illustration?

- An illustration is usually just a picture. A diagram shows how something works. It includes arrows and labeled parts.

Inferential How is Chapter 1 both autobiographical and informational text?

- Temple Grandin begins by talking about a school field trip that she emembers, which is autobiographical. Then she introduces informational text when she talks about how the Linotype machine works and who invented it.

[Read "Please Don't Stereotype Me" on pages 15–18.]

SUPPORT: Point out that the informational section, or sidebar, about Ottmar Mergenthaler is set apart from the author's main autobiographical narrative about her school field trip by a box and a separate heading. These text features help to show visually that these are different types of text.

Inferential How does the heading "Please Don't Stereotype Me" give a clue about what information is in that section?

- The section is about Mergenthaler's stereotype machine. It is also a pun on the multiple-meaning word *stereotype*.

Evaluative Why do you think Mergenthaler is sometimes called "the second Gutenberg"?

- His contribution to printing was as important as Gutenberg's moveable type, but since he came after Gutenberg, he is the second.

Literal What does the illustration show? [Have students look up the meaning of *patent* in the glossary.] What does the illustration of a patent communicate that the definition does not?

- The illustration shows a patent for a Linotype machine. While the definition explains what a patent is, the illustration shows that a patent includes a diagram of the invention as well as the date issued and a number.

Stop and Jot: Have students stop and jot a *who, what, when, where, why,* or *how* question about the evolution of the printing process. As time allows, invite a few students to share their questions and discuss answers. Explain that sometimes students will need to keep reading in order to find an answe .

[pages 16–18]

Inferential What does Temple Grandin mean when she says that Mergenthaler was indebted to the inventors of the typewriter?

- She means that without the work of those men, Mergenthaler would not have been able to use a similar process in his Linotype machine. Mergenthaler used his knowledge of how the typewriter worked to invent the Linotype machine.

CHALLENGE: Have students look for all the words in the selection that contain the word *type*: *type* (pages 12–15, 17), *typewriter* (pages 14, 15, 17), *Linotype* (pages 14–16, 17–18), *stereotype* (pages 15–16), and *typist* (page 17). Have students use a dictionary or glossary to determine the meaning of each word in context. Then discuss how the meanings of all these words are connected.

Inferential What advantage did machines give people compared to the old way of producing books?

- The typewriter allowed people to write text much faster, and the Linotype machine let people produce more printed material much faster as well.

Evaluative What industries did Mergenthaler's invention change? How did it change them?

- Mergenthaler's invention changed the printing industry, which in turned changed the newspaper industry, as well as book and magazine publishing. It changed the industry by making the production of printed material faster and less costly.

Discuss the Chapter and Wrap Up the Lesson 5 minutes

Bring students back together, and refer them to the purpose for reading:

> Describe the different ways Temple Grandin organizes the text in Chapter 1 "Things Made of Paper," and uses different text features to contribute to the understanding of the text.

Use the following questions to discuss the chapter.

1. ***Evaluative*** How does Temple Grandin's autobiographical account of a school field trip work with the informational section about the Linotype machine to help you understand how the printing process changed over time?

- Answers may vary but may include that the history of the Linotype machine puts into context the author's experience. The field trip the author ecounts shows how Mergenthaler's 1885 invention still affects printing and communication today.

2. ***Evaluative*** What text and graphic features does Temple Grandin use to clarify and communicate information? What do you think the experience of reading the text would be like without them?

   - The author includes illustrations, diagrams, labels, captions, headings, and a sidebar. Without these text and graphic features, the text would probably be much more difficult to understand.

SUPPORT: If students still have trouble comprehending text and graphic features, go back through the text, and point them out. Ask students to imagine what it would be like to read the selection if it were just one big block of text. Would it be easier or harder? Explain that text and graphic features make a text easier and more interesting to read by providing visual elements that organize and explain information. You could also remind students that for Temple Grandin, it was easier for her to understand things as pictures and much more difficult for her to understand things that were only in words.

Note to Teacher: If there is time after the completion of the lesson, students may read Chapter 1, pages 19–38 or do one of the following hands-on activities: "Paper Snowflake" pages 25–26; "Kaleidoscope" pages 29–31. Alternatively, you might ask students to read or complete one of these activities for homework.

Word Work: *Stereotype* 5 minutes

1. In the chapter you read, "A stereotype was the actual metal plate that was used to print multiple copies."
2. Say the word *stereotype* with me.
3. *Stereotype* means the metal plate that served as a pattern in printing.
4. Using stereotypes has made printing books much easier.
5. What are some other examples of stereotype? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "A _____ allows publishing houses to print many copies of the same book."]
6. What part of speech is the word *stereotype*?

   - noun

Multiple-Meaning Word

[Use a *Multiple-Meaning Word* activity for follow-up. Tell students the word *stereotype* is a word with multiple meanings. Share the following with students.]

Meaning #1: *stereotype*—a metal plate used in printing Meaning #2: *stereotype*—an oversimplified idea that a person or group has certain common characteristics

I am going to read several sentences. Listen to the context, or the text surrounding *stereotype* in the sentence, for clues as to which meaning is being used. When you think a sentence is an example of Meaning #1, hold up one finger. When you think a sentence is an example of Meaning #2, hold up two fingers.

1. She doesn't fit the ste eotype of a person from the North because she doesn't like cold weather.

   o 2

2. The Western movie was full of stereotypes about cowboys.

   o 2

3. The publisher used a stereotype to print more copies of the book and to print them faster.

   o 1

4. He didn't want the lead character in his novel to be a stereotype but instead to be well rounded and unique.

   o 2

DAY 2

GRAMMAR 15 minutes

Sentence Types: Simple, Compound, Complex, and Compound-Complex

Introduce Sentence Types 15 minutes

- Remind students that they learned that all complete sentences have a subject (who or what the sentence is about) and a predicate (the part of the sentence that tells what the subject does).
- Point out the Sentence Types Chart you prepared in advance. Tell students that some sentences have more than just a subject and predicate. Sentences can be classified by their structure as simple, compound, complex, and compound-complex.
- Before you read the chart with students, explain the terms *independent clause* and *dependent clause*.
  - Explain that an independent clause is another term for a complete sentence. It has both a subject and a predicate. *I saw the dog* is an independent clause.
  - Explain that a dependent clause does not express a complete idea. It cannot form a sentence on its own because it does not have both a subject and a predicate. It is *dependent* on the rest of the sentence in order to express a complete idea. *When I saw the dog* is an example of a dependent clause. In order for it to express a complete idea, it needs to tell what happened when I saw the dog.
- Read through the Sentence Types Chart with students. Provide specific examples of each type of sentence as shown.

- A simple sentence has a subject and predicate: *I ran. I saw the dog.* Circle the subject *I* in both sentences. Underline the predicates *ran* and *saw the dog* in both sentences.
- A compound sentence is made of two independent clauses: *I saw the dog, and I ran*. Underline the two independent clauses *I saw the dog* and *I ran*. Then circle the comma and the word *and.* Explain that in a compound sentence, the two independent clauses are often connected by a comma followed by a coordinating conjunction. List some of the coordinating conjunctions that can be used in a compound sentence: *and, but, for, or, nor, so, yet.*
- A complex sentence contains an independent clause and a dependent clause: *When I saw the dog, I ran*. Underline the dependent clause *When I saw the dog*, and double underline the independent clause *I ran*. Explain that the independent clause *I ran* tells what happened when I saw the dog; it is a complete thought. Circle the comma. Explain that in a complex sentence, the independent clause and dependent clause are often joined with a comma.
- A compound-complex sentence contains two or more independent clauses with one or more dependent clauses: *When I saw the dog, I ran to him, and he was happy to see me.* Underline the dependent clause: *When I saw the dog*. Double underline the two independent clauses: *I ran to him*; *he was happy to see me*. Circle the comma after the word *dog* and the comma followed by *and* after the word *him*. Remind students that a comma is often used between a dependent and independent clause and that a comma followed by a coordinating conjunction is commonly used between two independent clauses.

Note to Teacher: Students will learn additional ways to punctuate compound sentences and nonrestrictive clauses in CKLA Unit 4 Grammar Lessons. For the purpose of this lesson, students only need to focus on identifying the sentence types.

Sentence Type	Contains	Example
Simple	one independent clause	I saw the dog. I ran.
Compound	two independent clauses connected by a comma and a coordinating conjunction (*and, but, for, or, nor, so, yet*)	I saw the dog, and I ran.
Complex	one independent clause and one dependent clause connected by a comma	When I saw the dog, I ran.
Compound-complex	two or more independent clauses and one or more dependent clause	When I saw the dog, I ran to him, and he was happy to see me.

- Write a simple sentence, and prompt students to help you expand it into a compound sentence. Tell students to refer to the list of coordinating conjunctions in the chart. Have students try expanding the same independent clause with different coordinating conjunctions. For example:

- Our basketball team practiced. (simple)
- Our basketball team practiced, so we were prepared for our game. (compound)
- Our basketball team practiced, and we won our game. (compound)
- Our basketball team practiced, but we lost our game anyway. (compound)

- Write a dependent clause beginning with a subordinating conjunction such as *before, after, if, when,* or *although*. Prompt students to complete the sentence to make a compound or compound-complex sentence. For example:
  - Although it was raining (dependent clause)
  - Although it was raining, we went on our picnic anyway. (complex)
  - Although it was raining, we went on our picnic anyway, and we had fun. (compound-complex)

SUPPORT: To reinforce understanding of sentence types in each of the examples, underline the independent clause, double underline the dependent clause, and circle the coordinating conjunction and comma. Provide additional examples as needed.

CHALLENGE: As time allows, ask partners to find and sha e examples of simple, compound, complex, and compound-complex sentences in *Calling All Minds: How to Think and Create Like an Inventor.*

- Have students turn to Activity Page 2.2. Briefly eview together the directions and do the first completed example item togethe . Tell students to complete the next item. Circulate around the room to be certain that students understand the directions. Tell students to complete the remainder of the Activity Page for homework.

WRITING 30 minutes

Write an Explanatory Text: Plan

Review 5 minutes

- Remind students that an invention solves a problem or makes something easier to do. For example:
  - Paper was invented because people had a need to record information.
  - The printing press was invented because people had a need to mass-produce information printed on paper.
- Share with students a problem that you have experienced and how you solved the problem with an invention. Keep it simple. Maybe your dog was tracking mud into the house and you solved the problem by placing a rubber mat that is usually sold for placement under litter boxes in front of your door.

Introduce Explanatory Text 5 minutes

- Tell students that they will explain an invention of their own or describe or improve on one mentioned in the book *Calling All Minds: How to Think and Create Like an Inventor.*

- If students choose an invention from the book, it should be from a section of the book that was not read in class.
- If students choose an invention of their own, encourage them to focus on simple problems that they deal with on a daily basis. Ask students to consider whether other students might be seeking solutions to the same problems.

Brainstorm — 10 minutes

- Tell students that today they will begin brainstorming about their inventions. Once students have finalized the information for their invention, they will write an explanatory text about it.
- To get started, have students complete the Brainstorm Graphic Organizer on Activity Page 2.3. Students may combine writing and drawing for this activity.
- Have students work independently to brainstorm.
- As students work, circulate throughout the room, monitoring students' progress and providing guidance and support as needed.

SUPPORT: For students who may have difficult , work with them individually to discuss small nuisances that they encounter during the day, for example, forgetting to bring their house keys or having trouble remembering all their homework. Talk about how they could solve this problem (perhaps a pocket inside their cell phone case for a key or a set of folders, one for each class). Explain that students will focus on thinking of and describing the solution they come up with for the problem.

Discuss — 5 minutes

Have students share and discuss their ideas with a partner. Tell partners to supply feedback. Students can ask and answer questions such as the following:

- What problem does this invention solve? How does it solve it?
- How does this invention make their lives easier or better?
- How does the invention work? What are its weaknesses?
  - If students are creating a new invention and can't explain how it works or their idea for how it works is not plausible, they should discuss with their partner ideas on how to improve their invention.
- Why will people want to use this invention?

Wrap Up — 5 minutes

- Have several student volunteers share their invention ideas with the class. Repeat the same discussion questions students used with partners, as needed.
- List student inventions on the board. Discuss what is similar and different about them and the problems they are meant to solve.

Take-Home Material

Grammar

- Have students take home Grammar Activity Page 2.2 and complete it for homework.

Writing

- If students did not complete Activity Page 2.3 during the Writing Lesson, have them complete it for homework.

Reading

- Have students read for homework *Calling All Minds: How to Think And Create Like An Inventor,* Chapter 1, pages 19–38.

Fluency (optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 3

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Whole Group: Chapter 2, pages 39–42, 50–51	*Calling All Minds: How to Think and Create Like an Inventor* Activity Page 3.1
	5 min	Word Work: *Engineer*	
DAY 2: **Morphology**	15 min	Introduce Greek and Latin Roots in Number Words	Greek and Latin Roots in Number Words Chart Activity Page 3.2
Writing	30 min	Write an Explanatory Text: Plan	Activity Pages 2.3, 3.3
Take-Home Material	*	Reading, Morphology	*Calling All Minds: How to Think and Create Like an Inventor*, Chapter 2, pages 43–49 and 52–79 Activity Page 3.2

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Understand how visual elements help communicate information in a text. (RI.6.1, RI.6.2, RI.6.3, RI.6.4, RI.6.5, RI.6.6, RI.6.7; RST.6–8.1, RST.6–8.4, RST.6–8.7)

Writing

Plan writing for an explanatory text. (W.6.2, W.6.2.a, W.6.2.c, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.2.a, WHST.6–8.2.c, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Interpret information presented visually. (SL.6.2)

Language

Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. (L.6.1)

Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word. (L.6.4, L.6.4.b)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Describe how visual elements in Chapter 2, "Levers and Pulleys," help communicate information.*

Writing

- Be sure that students have their work on Activity Page 2.3 from the previous lesson on hand so that they may consult it if necessary.

Morphology

- Prepare and display the Greek and Latin Roots in Number Words Chart and the sample sentences on Morphology Lesson pages 58–59.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Whole Group: Chapter 2 [pages 39–42, 50–51]

Introduce the Chapter 5 minutes

- Tell students they will read the first four paragraphs of Chapter 2, "Levers and Pulleys," on pages 39–42, as well as "In the Bag" on pages 50–51.
- Have students turn to page 39 of *Calling All Minds: How to Think and Create Like an Inventor.*

Core Vocabulary

- Preview the core vocabulary words before reading the chapter.

Note to Teacher: Some teachers prefer to introduce vocabulary word(s) just before students read the page(s) on which the word(s) occur, rather than preview all of the words at once before reading the chapter.

- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *engineer*. Have students find the wo d on page 39 of the book.
- Explain that *engineer* is a multiple-meaning word. Students may know the verb form of *engineer*, which means "to design and build something." Point out that there is another meaning of *engineer* in this selection that may be new to them and that it is closely related to this definition
- Explain that the glossary contains definitions of all the vocabulary wo ds in this book. Have students refer to the glossary on Activity Page SR.1. Point out that these words are listed in alphabetical order. Have students find the wo d, and ask a student to read its definition
- Explain the following:
    - The part of speech follows each word in an abbreviated format as follows: noun–*n*.; verb–*v*.; adjective–*adj*.; adverb–*adv*.
    - Alternate forms of the word appearing in the chapter may follow the definition. They may be a different part of speech than the original word.
- Then have students reference Activity Page 3.1 while you read each word and its meaning, noting the following:
    - The page number (for the first occur ence of the word in the chapter) appears in bold print after the definition
    - Words are listed in the order in which they appear in the chapter.

1. **engineer, *n***. a person who designs or builds complicated machines, structures, or other systems (**39**)
2. **atmosphere, *n***. the layer of gases surrounding a planet (**39**)
3. **abstract, *adj***. existing as a thought or idea without having a physical form (**40**)
4. **mathematician, *n.*** a specialist or expert in the field of mathematics **mathematicians**) (**40**)
5. **musical notation, *n*.** a system of written symbols that represent sounds (**musical notations**) (**40**)
6. **biographer, *n.*** a person who writes about someone else's life (**40**)
7. **perception, *n*.** the process of becoming aware of something using the senses (**41**)
8. **stimulate, *v*.** to encourage an interest or activity in something (**stimulated**) (**41**)
9. **genetic link, *n*.** traits caused by genes that were likely inherited from an ancestor (**41**)
10. **originator, *n*.** a person who starts, or originates, something new (**42**)
11. **file, *v*.** to make something a part of the official ecord (**42**)

Vocabulary Chart for Chapter 2 "Levers and Pulleys"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	biographer engineer genetic links mathematician musical notation	abstract atmosphere file originator perception stimulate
Spanish Cognates for Core Vocabulary	ingeniero	abstracto atmósfera estimular fila
Multiple-Meaning Core Vocabulary Words	engineer	abstract file
Sayings and Phrases	entrepreneurial spirit	

- Read the purpose for reading from the board/chart paper:

> Describe how visual elements in Chapter 2, "Levers and Pulleys," help communicate information.

Read Chapter 2 [pages 39–42; 50–51] 30 minutes

Have individual students take turns reading pages 39–42 and pages 50–51 aloud. [Do not read the "Famous Firsts" and "Founding Inventor" sections.] You may also alternate between having students read aloud and read silently. Occasionally pause to ask questions in order to check for understanding and draw students' attention to key vocabulary and concepts. Use the guided reading supports listed below for this purpose.

[page 39]

SUPPORT: Point out that many informational books or articles contain art, photographs, or diagrams. Tell students that these are designed to help the reader understand what the text is about. For example, a text may be about a difficult p ocess, such as how a piece of machinery or an aspect of nature works, and the art that accompanies it will help the reader visualize, or see, what the process looks like. Draw students' attention to the image above the chapter numbering and title.

CHALLENGE: What do the three images at the top of page 39 represent?

- They represent different kinds of levers and pulleys: a hinge on a box, a puppet that moves by pulling a string that moves the arms and legs, and a bucket that is moved by a pulley.

SUPPORT: Provide some background for the discussion of color spectrum on page 39. Explain that a spectrum is a band of all the different colors that we see on Earth. Ask students for one example of the color spectrum in nature. Students may describe a rainbow. Then have students tell what colors are in the rainbow's color spectrum. Some students may be aware of the acronym Roy G. Biv. If so, have them explain it. If not, tell them that this is a way to remember the colors in the rainbow. Each letter stands for a color: R stands for red. O stands for orange. Y stands for yellow. G stands for green. B stands for blue. I stands for indigo. V stands for violet. Also note that the colors go in the same order as the letters in the name Roy G. Biv.

Evaluative What do you think Temple Grandin's purpose is for repeatedly using the word *visualize*?

- She wants her readers to understand that visualizing something, or seeing it in their minds, helps them to better understand what is being discussed.

SUPPORT: To demonstrate visualization, have students pull out a plain sheet of paper. Ask students to visualize in their minds what a tree looks like. Have students draw what they see in their minds on their sheet of paper. Ask: How does what you drew look like what you visualized in your mind? If time permits, have volunteers share their art and explain how it represents what they visualized. Point out that though the drawings are all trees, they do not look the same. What each student drew is influenced by their drawing skills and what they visualized, which, in tu n, is based on their experiences.

Inferential How did Grandin's ability to visualize lead her to think about air pollution?

- Grandin thought of Earth's atmosphere as an apple peel. When she visualized smoke, she realized that the smoke was trapped under the apple peel, or actually, the atmosphere.

SUPPORT: Review the vocabulary term *atmosphere*. Explain to students that the atmosphere is difficult to see because it is made up of invisible gases. Howeve , the gases in the atmosphere are what helps make the sky appear blue on a sunny day. Changes in atmospheric pressure can also result in weather changes. Being able to see these weather changes helps us to better understand how the atmosphere works.

Think-Pair-Share: Have students turn to a partner and name or describe weather events that they have seen. Tell students to use descriptive words that help their listeners visualize what they are describing. As time allows, invite volunteers to share their answers with the class.

[page 40]

Literal Why is Temple Grandin able to easily translate abstract ideas into detailed drawings?

- Ever since she was young, she has been able to connect words to pictures she visualized in her mind.

SUPPORT: Have students look back at the drawings of the tree they made for the earlier SUPPORT above. Point out that these drawings are an example of what Temple Grandin is talking about when she says she can translate ideas into detailed drawings. When students are not outside to see a tree, they have an idea in their minds about what a tree looks like. When students drew their images of a tree, they were translating their ideas of a tree into detailed drawings.

Inferential What was different about the way Temple Grandin explained that she learned compared to the way students are taught in most schools?

- Most students are taught words first and then how to connect the wo ds to images. Temple Grandin pictured things first

Evaluative What are the advantages and disadvantages of thinking in words? in pictures? Support your answer.

- Accept supported answers.

Literal What details in the paragraph support Grandin's statement, "There are many different kinds of learners and thinkers"?

- Grandin points to mathematicians as people who learn by seeing patterns and sequences while other people learn through words or visual images.

Stop-and-Jot: Have students stop and jot a brief sentence describing the way Temple Grandin learns. Students may use one of these sentence starters as a guide:

- Grandin learns differently from others because _____.
- Grandin learns differently from others, but _____.
- Grandin learns differently from others, so _____.

(Sample sentences: *Grandin learns differently from others because she thinks in pictures rather than words. Grandin learns differently from others, but it is not always a disadvantage for her. Grandin learns differently from others, so she is able to understand and create the things she pictures.)* Have a few students read their sentences.

Literal What does the image on page 40 show?

- It shows a diagram of a cattle truck loading ramp that the author completed for her first customer.

Evaluative Does the diagram help you understand the way Temple Grandin's mind works? Explain your answer.

- The diagram shows the reader how her brain visualizes things before she makes them.

SUPPORT: Allow students to reread the text on the previous two pages. If students struggle to answer the question, suggest they pick up text directly from the book. For example, one answer to the question comes from Grandin herself: The diagram shows how she "translate[s] abstract ideas into detailed drawings." You might ask students how or why Temple Grandin's loading ramp might work in loading cattle. Her designs with curves, for example, allow the cattle to always move forward much more calmly then in other ramps which had sharp angles or sharp turns. Her designs flowed bette , more naturally, even though they might take up more room.

[page 41]

Inferential What does Grandin mean when she says that her grandfather stimulated her early interest in science and invention?

- He encouraged her interest in science and invention.

SUPPORT: Reiterate for students that a patent is a license given to someone for something they have invented, such as a device or process. Patents only last for a certain amount of time, and the patent holder must pay a periodic fee during that time.

SUPPORT: Note for students that the art on the page is a diagram, which differs from an illustration in that it shows how something works. Diagrams usually have labels. Point out that the words below the diagram are called a caption. A caption is text below a visual element that gives information about the visual. A caption may or may not be a complete sentence.

Literal What is shown in the diagram?

- The diagram shows the patent for a magnetic field esponsive device invented by the author's grandfather.

CHALLENGE: Turn to your partner. Use the diagram to try to explain what the invention is or how the invention works.

Inferential What does the visual element communicate that the text alone cannot?

- It helps the reader see what the text is discussing in order to better understand it.

Literal What other information does the patent show?

- Possible answer: It shows the name(s) of the people who filed the patent, the date the patent was filed, when the patent was app oved, the design of the device patented, and how the parts of the device fit and work togethe .

CHALLENGE: Ask students to brainstorm some of their favorite machines. These can be an automobile, a gaming device, a smartphone, a television, or any other type of mechanical device. Then instruct students to search on the internet for "patent" plus the name of their machine. This should be done outside of regular class time. As time permits, ask students to write down what they find and sha e it with the class.

[page 42]

Literal What detail in the text explains the purpose of the first patent act of 1790?

- It was passed to protect "any useful art, manufacture, engine, machine, or device, or any improvement thereon not before known or used."

Inferential What benefits come from taking out a patent on an invention?

- The inventor then owns the invention. That means the inventor can make money on the invention.

SUPPORT: Draw attention to the vocabulary term *originator* on this page. Ask: What is the root word of *originator*? *(origin)* What does the word *origin* mean? (*how something begins*) Explain that everything has a beginning; therefore, it has an origin. Machines and processes have origins, too. They are invented by someone. The inventor is the originator of the machine or process. In this case, then, *originator* is a synonym for *inventor*. Point out that the word can also apply to people who are not inventors. Ask students if they can name originators who are not inventors. *(people who make art, such as writers, painters, sculptors, musicians, etc.)*

Evaluative Why do you think freedom is necessary for innovation?

- Students' answers should reflect that the United States was founded on individual freedoms. These include the freedom to invent, market those inventions, and protect the inventor's work.

SUPPORT: Draw attention to the vocabulary term *file*. Point out that it has multiple meanings. In this case, it means "to make something a part of the official ecord." In this form, the word is a verb. Ask students what they think some of the other definitions might be. *(Possible answers: to place in a box, folder, or cabinet for preservation, verb; to smooth out a rough edge, verb; a tool with a roughened edge, noun; a folder containing papers or information, noun; a group of people walking in an orderly line, one behind the other, noun.)*

[Direct students to turn to page 50 and read pages 50–51 to themselves.]

[page 50]

Evaluative How is Margaret E. Knight similar to Temple Grandin?

- o As girls, both women preferred to play with tools and make toys rather than play with dolls.

Literal Why is Margaret E. Knight known as the "woman Edison"? What were some of her accomplishments?

- o Like the inventor Thomas Edison, Knight invented many useful devices, such as a machine for cutting shoes, a numbering device, a barbecue spit, and a window sash. She received more than twenty-five patents for her inventions

SUPPORT: Point to the section of the first paragraph that discusses Knight s first invention, a device for making looms in cotton mills safer. Focus on Knight's young age. She went to work in the mill at age 12, and not long after she invented the device to make looms safer.

Inferential Why do you think Knight didn't get a patent for her safety device for cotton mill machines?

- o Accept reasonable answers, such as the following: She was very young and probably didn't know that she should. It was not common for women to get patents. It was not common for children to get patents.

SUPPORT: Before asking the next question, send students back to the diagram of the patent on page 41. Then remind students that the author, Temple Grandin, was a visual learner as a child, and that she drew detailed art of her ideas.

Inferential If a person applies for a patent, what must that person have?

- o Students may say that a person must have detailed drawings of the invention or that a person should keep detailed records of the invention.

[page 51]

Literal How was Knight able to win her case against Charles F. Annan when he copied her invention for making flat-bottomed paper bags and applied for a patent before Knight?

- o Because she had saved her notes, Knight was able to prove that she had personal, detailed knowledge of the machine she invented.

SUPPORT: Explain to students that in the mid-to-late 1800s, women did not have the same rights they have today. For example, in most places, women were not allowed to vote or hold public office

They were barred from participating in many of the same jobs that men had, and they could not join many of the same institutions or groups. This is the reason Charles F. Annan believed that his argument (Knight was incapable "of the sophisticated knowledge required to build" her machine) would help him win his case. Knight proved, however, that not only was she capable of such knowledge, she was capable of much more. She went on to invent and patent many new devices.

Literal What is the image on page 51? How do you know?

- The caption says the patent is for Knight's "paper bag machine."

Note to Teacher: During the Pausing Point, you may choose to allow students to go to the government patent site and find out what they need to do to file a patent for an inventio

Discuss Chapter 2 and Wrap Up the Lesson — 10 minutes

Bring students back together, and remind them of the purpose for reading:

> Describe how visual elements in Chapter 2, "Levers and Pulleys," help communicate information.

Use the following questions to discuss the chapter. For each question, have students cite the specific passage in the text that provides the information needed to answer the question. If students have difficulty responding to the questions, reread pertinent passages of the chapter, and/or refer to specific images or graphics. If students give one-word answers and/or fail to use appropriate vocabulary in their responses, acknowledge correct responses by expanding students' responses using richer and more complex language. Have students answer in complete sentences by restating the question in their responses. It is highly recommended that students answer at least one question in writing and that several students share their writing as time allows.

1. ***Literal*** What kind of learner is Temple Grandin?
   - Temple Grandin is a visual learner.
2. ***Evaluative*** What are some of the other ways people learn?
   - Some people are visual learners, like Temple Grandin; others are tactile learners, who learn by doing something, like building something or taking something apart and putting it back together. Others learn by gathering information and forming patterns in their minds.
3. ***Evaluative*** Reread today's purpose for reading. Think about what you have learned about visual elements. How do visual elements help you understand the text in a book, article, or magazine?
   - Accept reasonable answers. Visual elements help me to better see what information the book, article, or magazine is conveying, which in turn helps me to better understand the bigger picture.
4. ***Inferential*** Why do you think it is important to include a detailed diagram of your invention when you file for a patent
   - Possible answer: It is important to include a detailed diagram when you file for a patent so that the device can be built based on the design shown.

Note to Teacher: If there is time after the completion of the lesson, you may choose to have students read Chapter 1, pages 42–49 and 52–79. Alternatively, you might ask students to complete one of the activities on these pages, "Jumping Jack" or "Puppet Theater and Curtain," for homework.

Word Work: *Engineer* 5 minutes

1. In the chapter, you read, "My grandfather was an engineer and inventor, and he would explain that the Earth's atmosphere has an effect on the sun's color spectrum, which is why the sky is blue."
2. Say the word *engineer* with me.
3. An *engineer* is a person who designs or builds complicated machines, structures, or other systems.
4. Gina was an engineer who designed airplane parts to make planes faster and safer.
5. What is something an engineer might do? Be sure to use the word *engineer* in your response. [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "An _____ might design a new part to solve a problem in an automobile."]
6. What part of speech is the word *engineer* in these examples?

   o noun

Multiple-Meaning Word

[Use a *Multiple-Meaning Word* activity for follow-up. Tell students that the word *engineer* is a word with multiple meanings that change the part of speech. Depending on how the word is used, it may be a noun or a verb. Share the following with students.]

> Meaning #1: *engineer—n.* a person who designs or builds complicated machines, structures, or other systems
>
> Meaning #2: *engineer—v.* to design or to build a machine, structure, or other system

I am going to read several sentences. Listen to the context, or the text surrounding *engineer* in the sentence, for clues as to which meaning is being used. When you think a sentence is an example of Meaning #1, hold up one finger. When you think a sentence is an example of Meaning #2, hold up two fingers.

1. The *engineer* designed a new part to make space shuttles safer.

   o one finge
2. Dominic wanted to *engineer* a design for space-age flight

   o two finger
3. Gina's job as an *engineer* involved a lot of math.

   o one finge

4. Malik had to *engineer* a way to get water from one part of the house to another.

   o two finger

DAY 2:

MORPHOLOGY 15 minutes

Greek and Latin Roots: *unus, bi, duo, tri, decem, centum*

Introduce Greek and Latin Roots in Number Words 15 minutes

Remind students that a root is the main element of a word that forms its meaning.

- Explain that many root words come from ancient languages such as Greek and Latin. Sometimes these roots appear at the beginning of English-language words, sometimes in the middle, and sometimes at the end.
- Focus students' attention on Greek and Latin root words that refer to numbers.
- Use the chart below to review the different root words that refer to numbers.

Root	Meaning	Examples
unus	one	universal; unicorn; unique
bi	two	bicycle; bimonthly; biped
duo	two	duo; duet; duology
tri	three	triangle; triathlon; triceratops
decem	ten	December; decimate, decimal
centum	one hundred	century; centipede; centigrade; centenarian

- Read through the chart with students, clarifying the root words and their definitions as needed.
- Return to the definition of *unus* as the Latin word for "one." Explain that unlike many other root words, this one is spelled differently when added to English-language words, but it still means "one." Tell students that it is usually shortened into the root word *uni*.

Note to Teacher: Some students may mistake words that begin with the prefi *un–* (meaning "no" or "not") for a word that begins with *uni*, for example, *uninteresting, uninstalled, uninhabitable,* and so on. Tell students that one way to tell the difference between these root words is how they are pronounced. Sound out for students *uni* and *un*, and have them repeat the sounds back to you.

- Ask students if they can think of any words that begin with *uni*. Add them to the chart.
- Remind students that the root words *bi* and *duo* mean "two." Then ask students if they can think of any words that begin with *bi* and *duo.* Add them to the chart. Point out that sometimes the *o* is dropped from the root, as in the word *duet* (a song sung by two people).
- Point out that the root word *tri*, meaning "three," is very similar to one of the root words meaning "two," *bi*. Ask students if they can think of any words that begin with *tri*. Add them to the chart.

- Remind students that the word *decem* is Latin for "ten." Students will likely think of the word *December*, which is our twelfth month. Point out that the name of the month came from ancient Rome, which only had ten months on its calendar. December was the tenth and final month on that calenda . Ask students if they can think of any words that contain *decem* in them. Add them to the chart.
- Point out that the word *century*, which means one hundred years, is derived from *centum.* Also mention that *centum* is another Latin word that may have a spelling change when it becomes a root word in English. It is often spelled *centi*. Ask students if they can think of any words that begin with the root *centi*. Add them to the chart.
- Explain that students will frequently run across words with these roots in science and math texts.
- Direct students to the following sentences that you displayed in advance for the lesson, and prompt students to choose a word from the chart to complete each sentence.
    - o One of the tires on my _____ is flat. (bicycle)
    - o In ancient Rome, _____ was the tenth month of the year. (December)
    - o A shape with three sides is a _____. (triangle)
    - o The two singers were a famous musical _____. (duo)
    - o That necklace is _____; I've never seen another one like it. (unique)
    - o A _____ is a period of one hundred years. (century)
- Have students turn to Activity Page 3.2. Briefly eview together the directions, and complete the first ow of each chart together. Then have students complete the rest of the activity. Circulate around the room to be certain that students understand the directions. Tell students to complete the remainder of the Activity Page for homework.

WRITING 30 minutes

Write an Explanatory Text: Plan

Review 5 minutes

- Remind students that they completed the Brainstorm Graphic Organizer on Activity Page 2.3 in Lesson 2 and will use the ideas they recorded to write their explanatory texts. This graphic organizer includes the problem their invention solves, along with the ways in which the invention solves that problem.
- Tell students that eventually they will use these ideas to write explanatory texts about their inventions.

Introduce Problem-and-Solution Text Structure 15 minutes

- Tell students that texts use specific kinds of structu es to communicate information. One of these text structures is called problem and solution. Remind students that a problem is an issue that needs to be taken care of or solved. A solution is how a problem is taken

care of or solved. Explain that the purpose of many texts is to present a common problem and then offer a solution for it.

- Introduce words and phrases that signal problem and solution text structure. For example, *the question is*, *the issue is*, and *the problem is* are phrases that signal a problem. *One answer is* and *one solution is* are phrases that signal a solution.

Develop Ideas 5 minutes

- Direct students' attention to the Problem-and-Solution Text Structure frames on Activity Page 3.3. Point out the signal words box, and provide some examples of sentences using these words.
    - If the sink is clogged, then no water will go down the drain.
    - Because our dog was growling in our front yard, the mail carrier skipped our house.
    - One reason for the big mess is that the paint was not dry inside the cabinets.
- Tell students they should consult Activity Page 2.3 to help them complete Activity Page 3.3. Explain that students will be able to combine these sentences with other sentences when they begin drafting.
- Circulate throughout the room, monitoring students' progress and providing guidance and support as needed.

Wrap Up 5 minutes

- Ask students to share the sentences they completed on the Activity Page. If students do not finish Activity Page 3.3 in class, have them take it home as homework

Take-Home Material

Reading

- Have students read for homework *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 2, pages 43–49 and 52–79.

Morphology

- Have students take home Activity Page 3.2 to complete for homework.

Writing

- If students did not finish Activity Page 3.3 during class, have them complete it for homework.

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 4

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Partners: Chapter 2, pages 79–83	*Calling All Minds: How to Think and Create Like an Inventor*
	5 min	Word Work: *Properties*	Activity Pages 4.1, 4.2
DAY 2: **Grammar**	15 min	Practice Using Different Sentence Types	Practice Using Different Sentence Types Chart Activity Page 4.3
Writing	30 min	Write an Explanatory Text: Plan	Activity Pages 2.3, 3.3, 4.4
Take-Home Material	*	Grammar, Writing	Activity Pages 4.3, 4.4

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Understand and analyze how individuals and ideas are introduced and developed in the text. (RI.6.1, RI.6.3, RI.6.4, RI.6.5; RST.6–8.1, RST.6–8.3, RST.6–8.4, RST.6–8.5)

Writing

Plan the writing of an explanatory text. (W.6.2, W.2.a, W.6.2c, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.2a, WHST.6–8.2c, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Language

Demonstrate command of the conventions of English grammar and usage. (L.6.1)

Vary sentence patterns for meaning, reader or listener interest, and style. (L.6.3, L.6.3a)

Use known strategies such as using context clues as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (L.6.4, L.6.4.a, L.6.4.c, L.6.4.d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Identify how individuals and ideas are introduced and developed in "Accidents Waiting to Happen."*

Writing

- Be sure that students have Activity Pages 2.3 and 3.3 from the previous lessons so that they may consult them if necessary.

Grammar

- Prepare and display the Practice Using Different Sentence Types Chart on Grammar Lesson page 69.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Partners/Whole Group: Chapter 2 [pages 79–83]

Introduce the Selection 5 minutes

- Tell students they will continue reading Chapter 2, the section "Accidents Waiting to Happen" and the two paragraphs that follow it.
- Explain to students that they will each partner with another student to learn about three inventors and the inventions they discovered by accident.
- Have students turn to page 79 in *Calling All Minds: How to Think and Create Like an Inventor.*

Core Vocabulary

- Preview the core vocabulary words before reading the chapter.

Note to Teacher: Some teachers prefer to introduce vocabulary word(s) just before students read the page(s) on which the word(s) occur, rather than preview all of the words at once before reading the chapter.

- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *petri dish*.
- Have students find the wo d on page 79 of the book.
- Explain that the glossary contains definitions of all the vocabulary wo ds in this book. Have students refer to the glossary on Activity Book page SR.1. Point out that these words are listed in alphabetical order. Have students find the wo d, and ask a student to read its definition
- Explain the following:
    - The part of speech follows each word in an abbreviated format as follows: noun–*n*.; verb–*v*.; adjective–*adj*.; adverb–*adv*.
    - Alternate forms of the word appearing in the chapter may follow the definition. They may be a different part of speech than the original word.
- Then have students reference Activity Page 4.1 while you read each word and its meaning, noting the following:
    - The page number (for the first occur ence of the word in the chapter) appears in bold print after the definition
    - Words are listed in the order in which they appear in the chapter.

1. **petri dish, *n***. a small, clear dish with a lid, used to grow microorganisms, such as viruses and bacteria (**79**)
2. **property, *n.*** a quality or characteristic belonging to a person or thing (**properties**) (**79**)
3. **secretion**, ***n***. a discharge such as tears or sweat produced by a cell, gland, or organ in the body (**secretions**) (**79**)
4. **microscope, *n.*** an instrument used for viewing objects too small to see with the human eye (**79**)
5. **fungus, *n.*** a spore-producing organism, such as mushrooms or mold, that feeds on organic matter (**79**)
6. **penicillin, *n.*** a group of antibiotics made from mold (**79**)
7. **Nobel Prize, *n.*** any one of six prizes awarded for outstanding achievement in a scientific, literary, or economic field **79**)
8. **chemist, *n.*** a scientist who studies characteristics of and changes in substances (**chemists**) (**80**)
9. **fibe -optic cable, *n.*** a cable that uses light to transmit high-speed data (**fibe -optic cables**) (**81**)
10. **psychologist, *n.*** a person who studies the way humans think and behave and why (**83**)

11. **millwright, *n.*** a person who designs, builds, or maintains a mill or mill machinery (**millwrights**) (**83**)

12. **welder, *n.*** a person who molds or fuses metal (**welders**) (**83**)

Vocabulary Chart for Chapter 2 Section "Accidents Waiting to Happen"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	chemist fiber-optic cable millwright Nobel Prize penicillin petri dish psychologist welder	fungus properties secretions
Spanish Cognates for Core Vocabulary	cable de fibra óptica penicilina psicóloga/psicólogo	propeidades secreciónes
Multiple-Meaning Core Vocabulary Words		properties

- Read the purpose for reading from the board/chart paper:

> Identify how individuals and ideas are introduced and developed in "Accidents Waiting to Happen."

Read Chapter 2 [pages 79–83] 20 minutes

Pair students to read the selections together. You may wish to use any or all of the following pairings: strong readers with readers who need more support; readers of similar skill levels; or English learners with native speakers. Student pairings should change throughout the year. As students read, circulate among the class, monitoring students' focus and progress.

Explain to students that they will read the section titled "Accidents Waiting to Happen" on pages 79 through 83 in Chapter 2. Explain to students that for this lesson, they will read each page silently and then will take turns reading each page aloud. Students can ask their partner for help with sounding out or defining words as necessary. As students read, they should each fill out their own copy of Activity Page 4.2 to help them learn the material. Tell students that they may discuss the Activity Page answers with each other as they complete them. The Activity Page will have prompts that guide students to not only comprehend the selection but also analyze how the inventors and inventions are introduced, developed, and illustrated.

During partner reading, you may choose to work with individuals or small groups who need extra help while others are reading. Use the scripted SUPPORTS and CHALLENGES here to provide additional assistance to students.

[page 79]

Literal How do many discoveries in science happen?

- o They happen by accident.

Literal How did Scottish scientist Alexander Fleming hope to help in the war effort?

- o He hoped to cure soldiers of infections that were often more deadly than the wounds that caused them.

Literal What was Fleming experimenting with when he made his discovery?

- o He was experimenting with bodily secretions, such as tears, mucus, and phlegm.

SUPPORT: Direct students to the vocabulary word *properties*. Explain that this word has more than one meaning. Ask students to offer different definitions of the wo d *(land and any buildings on it; the possessions of a person or group)*. Point out that here, the definition is "qualities or characteristics belonging to a person or thing."

Literal When Fleming discovered that he had left the lid off one of his petri dishes, what did he do?

- o He put the petri dish under a microscope to examine it.

Inferential Why was it fortunate that he didn't throw it out?

- o He discovered a mold that could kill bacteria. Bacteria can make people sick, so finding something that could kill bacteria might help people who we e sick.

Literal What did this "mold juice" later come to be called?

- o It later came to be called penicillin.

SUPPORT: Most infections are caused by microorganisms invading the body. Explain that penicillin is known as an antibiotic (from the Greek *anti*, which means against, and *bio*, from the Greek word for life; in this case antibiotics work against microbic life), a medicine that can prevent the growth of or destroy some microorganisms that are harmful to us. Note that because some people are allergic to penicillin, they have to take alternative antibiotics to destroy the microorganisms that cause these harmful infections.

[page 80]

Inferential Why should you not be "grossed out" by fungus?

- o It can have life-saving properties.

Inferential Think back on what you learned about Temple Grandin in the previous lesson. How might inventor Stephanie Kwolek and Temple Grandin be alike?

- o Possible answers: As children, they both took a hands-on approach to the world around them. They both had curious scientific minds. They both g ew up to be scientists.

Literal In 1946, Kwolek became one of the first women to do what?

- Kwolek went to work at Dupont, a well-known chemical company.

Inferential What act led to Kwolek making a great scientific discovery?

- Kwolek persisted in studying a milky solution everyone else thought should be thrown in the trash.

Stop and Jot: Have students stop and jot a *who, what, when, where, why,* or *how* question about how Kwolek's example fits the section s theme of a scientific discovery being made by accident. As time allows, invite a few students to share their questions and discuss answers. Explain that sometimes students will need to keep reading or do their own research to find an answe .

Note to Teacher: Point out that Grandin uses two sources to introduce facts about Stephanie Kwolek: The Chemical Heritage Foundation and *The New York Times.* Explain that in informational text, writers use sources to obtain and validate their information. Naming sources is called "citing," and it is important to do so in order to avoid plagiarism.

[page 81]

Literal What great discovery did Kwolek make, and what is it used for?

- She discovered Kevlar, a synthetic fiber used for body armo , suspension bridges, heavy-duty rope, tires, safety helmets, fibe -optic cables, fi e-resistant mattresses, and so on.

CHALLENGE: Have students think about the many different things Kevlar has been used for since its discovery. Ask students to take two of the items mentioned in the text and discuss them with their partner. Direct students to consider, for example, what fibe -optic cables might be used for or what in Kevlar would make it a good material for building suspension bridges. If time permits, allow volunteers to share what they discussed with the class.

Evaluative In the section that was read for Lesson 3, Grandin points out that Margaret Knight did not benefit from her invention of a safety device for looms in cotton mills. In this section, Grandin points out that Kwolek did not profit from her discovery of Kevlar. What bigger idea is Grandin trying to get across?

- Possible answers: Many inventors lost money from their devices because they were unable or not allowed to patent them, resulting in others profiting f om them. Women inventors have historically been discriminated against by either not knowing how or being unable to patent their inventions.

Inferential How does Grandin introduce the discovery of Velcro? How was it accidental?

- She first int oduces us to George de Mestral, the man who invented it. It was accidental in that de Mestral was hiking when he found the burrs sticking to his clothes and later learned they had little hooks on them. This got him to thinking about how to make a "zipperless zipper."

Inferential Why does Grandin say that it must have involved "a lot of trial and error" before George de Mestral developed Velcro?

- It took de Mestral many years after his discovery of the burdock burrs to develop Velcro.

Literal Where does the name *Velcro* come from?

- o It is a mixture of the words *velvet* and *crochet*.

[page 82]

Literal Name some of Velcro's many uses.

- o It keeps astronauts from floating o f the floor of their spacecrafts. It keeps artificia hearts in place. It has been used for golf gloves, drink holders, and an anti-bed-wetting device.

SUPPORT: If you have a device that uses Velcro, such as a belt or computer cord wrap, bring it in to show students. You may want to pass around the device and allow students to press the Velcro together or pull it apart. Have partners tell some of the ways they have seen Velcro used. If time permits, allow students to share their examples with the class.

Inferential How does the diagram of de Mestral's patent represent his ideas?

- o Possible answer: It provides an illustration of how his "separable fastening device" works.

SUPPORT: Remind students of what they learned in the last lesson. Patents serve more than one purpose. They show how something works, and they help protect the owner of the patent.

Discuss Chapter 2 and Wrap Up the Lesson — 10 minutes

Bring students back together, and remind them of the purpose for reading:

> Identify how individuals and ideas are introduced and developed in "Accidents Waiting to Happen."

How does Grandin introduce the inventors and their inventions in the text? Is this effective?

- o Grandin introduces each inventor and tells a story about what they discovered accidentally. This makes the text interesting to read.

Display the following sentence frames. Ask students to think about how the three inventors are introduced and developed in the text as students formulate their answers.

Stephanie Kwolek invented Kevlar because _____.

Stephanie Kwolek invented Kevlar, but _____.

Stephanie Kwolek invented Kevlar, so _____.

Remind students that "because" sentences explain why, "but" sentences show a change in direction, and "so" sentences tell what happens as a result. Give students two minutes to write on their own. Then ask them to share their answers. Possible answers may include:

Stephanie Kwolek invented Kevlar because she decided to test a milky solution headed for the trash.

Stephanie Kwolek invented Kevlar, but she didn't make any money from her discovery.

Stephanie Kwolek invented Kevlar, so we now have many new products and materials that we benefit from every day.

Repeat this exercise for Alexander Fleming and George de Mestral.

Point out that students have just read about three different inventors who think in three different ways. Then read aloud the two paragraphs that follow "Accidents Waiting to Happen" on pages 82–83. Discuss these pages using the following questions.

1. ***Inferential*** What do you think Grandin is saying about the way problems often need to be solved?
    - o Possible answer: She says that sometimes you need to bring different perspectives to a problem. A problem may require an engineer, a chemist, a psychologist, and so on.
2. ***Evaluative*** How does the section "Accidents Waiting to Happen" support the idea that we need different kinds of thinkers?
    - o Each inventor thinks in a different way and solves a different kind of problem.

Word Work: *Properties* 5 minutes

1. In the chapter, you read, "He had been experimenting with the healing properties of bodily secretions, like tears, mucus, and phlegm."
2. Say the word *properties* with me.
3. The word *Properties* means "qualities or characteristics belonging to a person or thing."
4. The qualities or characteristics that define an object a e its properties.
5. What are other examples of properties? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "Solid structure and transparency are _____ of ice."]
6. What part of speech is the word *properties*?
    - o noun

Synonyms

What are synonyms of, or words and phrases that have a similar meaning to, *properties*? [Prompt students to provide words such as *characteristics, attributes, traits, features,* or *elements*. As students discuss synonyms, guide them to use the target word in a complete sentence, such as: "A synonym of *properties* is *characteristics*."]

DAY 2

GRAMMAR 15 minutes

Sentence Types: Simple, Compound, Complex, and Compound-Complex

Practice Using Different Sentence Types 15 minutes

- Remind students that they have learned about simple, compound, complex, and compound-complex sentence types. Now students will practice varying these sentence types in their writing for meaning, interest, and style.
- Show examples of writing that does not vary sentence types and how to fix it.
    - Write: *Timothy played with the dog. The dog ran away. Timothy chased the dog. The dog got lost.*
    - Explain that these are all simple sentences. Note that rather than using only simple sentences, writers will often use different types of sentences to keep their readers engaged.
    - Write: *When Timothy played with the dog, it ran away. Timothy chased the dog, but it got lost.*
    - Point out how varying the sentence types makes the text sound more natural.

Note to Teacher: During Writing in Lessons 3 and 4, students learn about problem-and-solution text structure and sequence text structure. You don't have to explicitly teach text structures in the grammar lesson, but some sentence examples can be related to those text structures covered in the writing lessons.

- Use the chart below to review the different sentence types.

Type of Sentence	Examples
simple	1. Skylar watched the train. 2. David ran home.
compound	1. Skylar watched the train, and David ran home. 2. Katie played on her phone, and her brother watched TV.
complex	1. Because her room was cold, Imani put on a sweater. 2. Ricky refused to go outside until it got warmer.
compound-complex	1. Because they were bored, Katie played on her phone, and her brother watched TV. 2. Ricky refused to go outside until it got warmer, but Gina preferred to play outside.

- Read through the chart with students, clarifying each sentence type. Explain that simple sentences have one subject doing one action, compound sentences are two simple sentences that can be combined with an *and* and a comma, complex sentences contain one part that can stand on its own as a sentence and another part that cannot, and compound-complex sentences combine compound sentences with complex sentences. Go over each example in the chart, and explain each part.
- Have students turn to Activity Page 4.3. Briefly eview together the directions and complete the first item togethe . Then have students complete the rest of the activity. Circulate around the room to be certain that students understand the directions. Tell students to complete the remainder of the Activity Page for homework.

WRITING 30 minutes

Write an Explanatory Text: Plan

Review 5 minutes

- Remind students that texts use specific kinds of structu es to communicate information. Tell students that in the previous lesson, they learned about problem-and-solution text structure. When writers use this structure, they present a problem and then offer one or more solutions.
- If students struggle with understanding problem-and-solution text structure, have them review Activity Page 3.3 from the previous lesson.

Introduce Sequence Text Structure 15 minutes

- Introduce sequencing text structure by explaining that a sequence is the order in which things happen or are related.
- Tell students that the purpose of many texts is to show the sequence, or order, in which events occurred. For example, history books often show historical events in sequence. Many technical texts show the sequence in which objects or processes are designed, built, or carried out.
- Introduce words and phrases that signal sequencing text structure. For example, words such as *first*, *second*, *before*, *next*, and *then* signal a sequence.
- Explain that students will need to use sequencing text structure to describe how their invention is built or how it works.

Develop Ideas 5 minutes

- Have students complete the Sequencing Text Structure graphic organizer on Activity Page 4.4. Tell students that this graphic organizer will serve as an outline for part of their explanatory texts. Students may write in complete sentences or fragments as they use the provided sequence words and phrases to help map out their outlines. Students may also employ numbers or bullets for this section.

- Tell students that their explanatory texts should include visuals. Students should begin sketching or locating their visuals now and include them with their graphic organizers.
- Point out that a visual can be anything that helps provide more information. Illustrations, photographs, icons, symbols, and diagrams are all examples of visuals. Labels, captions, numbers, arrows, or dotted lines can be used with a visual to make its purpose more clear.
- Tell students they can look at the visuals in *Calling All Minds: How to Think and Create Like an Inventor*. Some pages to look at include 10–11, 14, 45, 62, and 68–69.

Wrap Up 5 minutes

- Ask students why it is important to include sequencing text structure in their final explanatory texts. Then, have a few students share the sentences they completed on the Activity Page.

Take-Home Material

Grammar

- Have students take home Grammar Activity Page 4.3 and complete it for homework.

Writing

- If students did not finish Activity Page 4.4 in class, have them complete it for homework

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 5

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Close Reading: Chapter 4, pages 123–132	*Calling All Minds: How to Think and Create Like an Inventor* Activity Pages 5.1, 5.2
	5 min	Word Work: *Aerodynamic*	
DAY 2: **Morphology**	15 min	Practice Greek and Latin Roots in Number Words	Greek and Latin Roots in Number Words Chart Activity Page 5.2
Writing	30 min	Write an Explanatory Text: Draft	Writing Journals Activity Pages 2.3, 3.3, 4.4, 5.3
Take-Home Material	*	Reading, Morphology, Writing	*Calling All Minds: How to Think and Create Like an Inventor,* Chapter 4, pages 132–143 Writing Journals Activity Page 5.2
Optional	30 min	Mid-Unit Comprehension Check	Activity Page PP.1

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Understand technical and domain-specific vocabulary. (RI.6.1, RI.6.3, RI.6.4, RI.6.5, RI.6.6; RST.6–8.1, RST.6–8.4)

Writing

Draft an explanatory text. (W.6.2, W.6.2b, W.6.2d, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.2b, WHST.6–8.2d, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Language

Use known strategies such as using context clues, Greek or Latin affixes and roots, as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (L.6.4, L.6.4.a–d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Use context and reference tools such as the glossary in this unit to define technical and domain-specific vocabulary in the chapter "Things that Fly."*
- Have print or online dictionaries available for student use.

Writing

- Be sure that students have Activity Pages 2.3, 3.3, and 4.4 from the previous lessons so that they may consult them if necessary.

Morphology

- Display the Greek and Latin Roots in Number Words Chart from Lesson 3.

Fluency (Optional)

- Choose and make copies of a text selection from the online *Fluency Supplement* to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the *Optional Fluency Assessment Guide* in Teacher Resources. See the introduction of this Teacher Guide for more information on using the *Fluency Supplement*.

DAY 1

READING 45 minutes

Close Reading: Calling All Minds: Chapter 4 [pages 123–132]

Review 5 minutes

- Remind students that science writing often contains technical vocabulary words specific to th subject being covered. Sometimes these are called domain-specific vocabular . For example, a text about aviation, or flying, will contain technical wo ds related to planes and flight
- Explain that technical words can sometimes be confusing, but there are ways to determine their meaning.

- Students can look for context clues in the text surrounding technical words.
- Sometimes, a technical word will be defined in the text with a wo d that is easier to understand. Sometimes, a definition of the word will be provided.
- In some cases, students may need to look up the definition of a wo d online, in a dictionary, or in a glossary.

Introduce the Chapter — 5 minutes

- Tell students they will read Chapter 4, starting at the beginning on page 123 and going through the section "What a Drag" ending on page 132.
- Have students turn to page 123 of *Calling All Minds: How to Think and Create Like an Inventor.*
- Ask students to read the chapter title "Things That Fly." Have students predict what the selection will be about and what kinds of domain-specific vocabulary might be included

Core Vocabulary

- Preview the core vocabulary words before reading the chapter.

Note to Teacher: Some teachers prefer to introduce vocabulary word(s) just before students read the page(s) on which the word(s) occur, rather than preview all of the words at once before reading the chapter.

- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *fishtailing*.
- Have students find the wo d on page 123 of the book.
- Explain that the glossary contains definitions of all the vocabulary wo ds in this book. Have students refer to the glossary on Activity Page SR.1. Point out that these words are listed in alphabetical order. Have students find the wo d, and ask a student to read its definition
- Explain the following:
  - The part of speech follows each word in an abbreviated format as follows: noun–*n*.; verb–*v*.; adjective–*adj*.; adverb–*adv*.
  - Alternate forms of the word appearing in the chapter may follow the definition. They may be a different part of speech than the original word.
- Then have students refer to Activity Page 5.1 while you read each word and its meaning, noting the following:
  - The page number (for the first occur ence of the word in the chapter) appears in bold print after the definition
  - Words are listed in the order in which they appear in the chapter.

1. **fishtail, *v.*** (of the rear end of a moving vehicle) to move back and forth from one side to another (**fishtailin**) (**123**)
2. **evacuate, *v.*** to remove a person or group of people from a dangerous place or situation (**123**)
3. **flex, *v***. to bend or move (**124**)
4. **cockpit**, ***n.*** the part of the plane with the flight instruments and pilot(s) (**24**)
5. **fuselage, *n.*** the part of the plane with the flight attendants and passengers **124**)
6. **prop plane, *n.*** a plane that is powered by a propeller (**124**)
7. **aerodynamic, *adj.*** relating to the branch of mechanics that deals with flying and moving through air (**125**)
8. **phenomenon, *n.*** an observable event or fact (**130**)
9. **perpendicular, *adj.*** having two lines that intersect at a right angle, such as the lines that make the uppercase letters T and L (**130**)
10. **aeronautical, *adj.*** having to do with the science of building or flying ai craft (**130**)
11. **taper, *v.*** to make narrower toward one end (**tapering**) (**131**)
12. **tenacity, *n.*** determination (**131**)
13. **perseverance, *n.*** steady persistence to achieve a goal (**132**)

Note to Teacher: The words *lift* and *drag* have been omitted from the Core Vocabulary list but are included in the glossary so that students can practice looking them up while reading. Here are their definitions

lift, *n*. an upward force acting on a wing in relation to the movement of air (**129**)

drag, *n*. the force that resists the movement of air (**129**)

Vocabulary Chart for Chapter 2 "Things That Fly"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	aerodynamic aeronautical cockpit fishtailing fuselage prop plane	evacuate flex perpendicular perseverance phenomenon tapering tenacity

Spanish Cognates for Core Vocabulary	fuselaje aerodinámica/aerodinámico aeronáutica/aeronáutico	flexionar fenómeno perpendicular perseverancia tenacidad
Multiple-Meaning Core Vocabulary Words		flex tapering
Sayings and Phrases	white-knuckled	

- Read the purpose for reading from the board/chart paper:

> Use context and reference tools such as the glossary in this unit to define technical and domain-specific vocabulary in "Things That Fly."

Read Chapter 4 — 20 minutes

The practice of close reading involves directing students' attention to specific aspects of a text. The guided reading supports in this close reading of Chapter 4 are intended to provide this focus and are labeled as follows:

- **VOC** indicates questions or comments that focus on vocabulary to explain meanings or check student understanding and may highlight multiple-meaning words or idioms.
- **SYN** indicates questions or comments that focus on syntax to explain complex sentences and syntactic structure.
- **COMP** indicates questions or comments that focus on students' understanding of the text. These questions require text-based responses and are sequenced to build a gradual understanding of the key details of the text. Students may provide multiple responses using different pieces of evidence, grounding inferences logically in the text.
- **LIT** indicates questions or comments that focus on literary devices, which are techniques an author uses to produce a specific e fect, such as alliteration, similes, metaphors, etc.

Not all question types will be included in each close reading lesson.

These labels and their explanations are for your reference and are not intended to be shared with students. Also, guided reading supports in brackets are intended to guide you in facilitating discussion and should not be read verbatim to students. Guided reading supports not presented in brackets should be read aloud verbatim.

There are many ways for students to respond to the questions. Vary how you elicit students' responses to promote student engagement. For example:

- Have students work in pairs. Following each question, direct students to consult with their partner about the correct response before one student responds.

- Have students work in small groups of three or four students. Following each question, direct students to consult with others in their group about the correct response before one student responds.
- Following a question, have all students provide a written response before one student responds orally.

Note to Teacher: An incident on a plane is described on the first page of this chapter that might be frightening to some students—it was frightening to the author, and she explains how she got over her fear. Explain to students that being afraid to fly is a common fear but that accidents rarely happen. Let students know that one way to get over a fear of flying is to lea n how airplanes operate. Doing so will help students understand just how safe planes actually are.

Before reading, ask students to share any experiences they may have had riding in an airplane.

[Read the chapter title and the first paragraph on page 123.

LIT/Evaluative Why might Grandin have included the sentence, "Those were the days when you got dressed up to fly on a plane"?

- o Accept reasonable responses. Possible answer: It is a detail included to help the reader picture the time and place of the scene.

SUPPORT: Temple Grandin refers to her headset as resembling a stethoscope. Either print an image of a stethoscope, or describe one to students (a small object that a doctor holds to a patient's chest to hear the patient's heartbeat). Explain that knowing the definitions of wo ds helps readers better understand what they are reading and better visualize it.

COMP/Literal What happened to Temple Grandin between her senior year in high school and her first year in college?

- o A flight she was on had p oblems and had to make an emergency landing.

SUPPORT: Grandin says that the "stewardesses were screaming for us to put our safety belts on." Explain that a stewardess is a term used in the past for a flight attendant. Flight attendants are crew members who get passengers what they need during the flight and try to make them safer and more comfortable. Therefore, when a flight attendant di ects the passengers to put on their safety belts or makes other reasonable requests, it is important that the passengers do so.

[Read through the end of page 124.]

SUPPORT: Explain to students that an Instamatic camera was a type of camera popular from the early 1960s to the late 1980s. Polaroid Swingers were another line of cameras produced in the mid-1960s to around 1970. Ask students to guess the approximate time period in which the airplane incident with Temple Grandin took place using context clues. (Based on context clues given here, this incident probably took place sometime in the mid-to-late 1960s.)

COMP/Inferential How did the incident on the plane affect Grandin, and what did she do as a result?

- o The incident made her nervous about flying on planes. She eacted by learning more about airplanes to make them less frightening.

SUPPORT: Some students may be unaware of what the term *white-knuckled* means. Explain that when people get scared or are nervous, they sometimes clench their fists or hold onto something really tightly. This will cause the skin around their knuckles to appear white. Have students clench their fists and observe the skin a ound their knuckles.

COMP/Literal Name one thing that makes airplane wings so safe.

- o They are designed to flex so that they will not b eak off during flight

SUPPORT: Explain that the word *flex* has multiple meanings, most of which derive from the word *flexible*. When something is flexible, it is bendable. "Designed to flex" means that the wings e designed to bend a little with the wind. If something is inflexible, a st ong wind is more likely to break it off. If instead something moves with the wind, it is far less likely to break off.

CHALLENGE: Ask students what they know about the meaning of the root *flex* and how it relates to the word *flexible*.

VOC/Literal Grandin writes that one time she had the opportunity to fly in the cockpit of an airplane. How would you define the word *cockpit*?

- o The cockpit is the place where the pilots sit to operate an aircraft.

VOC/Inferential What is a prop plane? [To help students answer this question, ask them what the word *prop* might be short for. You may want to present students with pictures of airplanes that have a propeller.]

- o A prop plane is a plane powered by a propeller.

[Tell students to read the first full paragraph on page 125 closel .]

VOC/Inferential What do the words *sky, birds, kites, planes,* and *airplanes* suggest about the definition of the word *aerodynamic*?

- o They suggest that *aerodynamic* has to do with flying, the sk , or air.

[Read the rest of page 125 through the end of the first paragraph on page 126.]

LIT/Inferential What does Grandin mean when she says of model airplanes, "If it wasn't aerodynamic, I didn't see the point."

- o She's saying she wasn't interested in model airplanes because they didn't fly after they were built.

COMP/Inferential In Lesson 3, you learned that Grandin is a visual learner and thinker. What evidence on this page backs this up?

- o She says that she always loved watching things in the sky. She says that when making her bird kite, she tipped the wings up in the same way she had seen her father do with a paper plane.

COMP/Inferential Based on Grandin's explanation of aerodynamics, what is one thing you could do to try to fix your model airplane if it didn't fly?

- o You could point the wing tips up.

COMP/Literal How did Grandin know that the Flying Nun's aerodynamics were off?

- o The Flying Nun's wing tips were pointed down.

LIT/Inferential How does the author's use of the photograph at the bottom of page 125 support your answer to the previous question?

- o The Flying Nun's headwear (wimple) has wingtips that are pointing downward instead of upward.

[Have students independently read through the activity "My Childhood Bird Kite" on pages 126–129. Note that students will not be doing the hands-on activity during this Reading Lesson. Alternatively, you can have students skip this section during the Reading Lesson and discuss it later during a pausing point or another occasion when there is enough time for students to do the activity in conjunction with their reading.]

SYN/Literal How does the author indicate the materials that will be needed for the "My Childhood Bird Kite" activity?

- o She uses the words "You'll need" followed by a colon and a bulleted list of materials.

SYN/Inferential What do the numbers 1–9 in the activity indicate?

- o The numbers are the steps you need to follow in order to make the bird kite.

COMP/Evaluative Based on what you have learned about aerodynamics in this chapter, what do you think would happen to your kite if you skipped step 5?

- o The kite would not fl , or it would not fly well

SYN/Evaluative Why do you think the author puts the "Note" on page 128 in italic type?

- o The author probably wants to show that this note is separate from the main instructions for the kite.

Turn-and-Talk: Tell students to turn to a partner and explain in their own words what the diagram on page 129 shows.

[Read aloud the paragraph on pages 129–130.]

COMP/Literal How do planes reduce the amount of drag as they lift off the ground?

- o Winglets redirect the flow of air to educe drag.

[Direct students' attention to the last four sentences in the paragraph.]

COMP/Inferential How does Grandin believe most inventions begin? How does this reinforce the kind of thinker she is?

- o She believes that most inventions begin as observations. This comment reinforces the fact that Grandin is a visual thinker in that when she is confronted with a problem, she thinks back to what she has observed in the past.

Read "What a Drag"

[Read the section "What a Drag" on pages 130–132.]

SYN/Inferential [Remind students that they have learned about visual and text features in earlier lessons.] What does the box around the section "What a Drag" indicate?

- The box indicates that this is a separate section of text, different from the main narrative in the chapter.

COMP/Literal What did Richard Whitcomb attend college to become?

- He attended college to become an aeronautical engineer.

SUPPORT: Point out that *aeronautical* has the root word *aero* in it. Ask students to identify another word from the lesson with *aero* in it. *(aerodynamic)* Then ask students if they can name any other word that contains *aero*. Ask students to try to identify what they think the word *aero* means based on the words it appears in. If students understand the definitions of *aerodynamic* and *aeronautical,* they should be able to figu e out what *aero* means. If not, ask students what the word sounds like. *(air)* Then point out that *aeroplane* and *airplane* are synonyms and have the same meaning. That's because the word *aero* means "air."

COMP/Literal What are two benefits of reducing drag on a plane?

- The plane can go faster, and it saves on fuel.

VOC/Literal How did a Coke bottle provide the answer to making some airplanes faster? Use the word *taper* or *tapering* in your answer.

- By shaping the airplane's body to taper in a way similar to the shape of a Coke bottle reduced drag.

COMP/Literal What was another design Richard Whitcomb came up with to reduce drag?

- He designed winglets on an airplane's wings.

Discuss Chapter 4 and Wrap Up the Lesson — 10 minutes

Remind students of the purpose for reading:

> Use context and reference tools such as the glossary in this unit to define the meaning of technical and domain-specific vocabulary in "Things That Fly."

Call on volunteers to share a new domain-specific wo d related to flying that they lea ned from the day's reading. Ask students to explain how they figu ed out the word's meaning. If students used context clues, ask them to find the clues in the text and sha e them with the class.

Continue the wrap-up by displaying the following sentence frames. Encourage students to complete the sentences using words related to flying that they have lea ned.

- Airplane wings don't break off because _____.
- In order to fly faste , airplanes need _____.

Allow students 2–3 minutes to complete the sentence frames in writing. Then invite students to share and discuss their answers. Sample answers:

- Airplane wings don't break off because they are made to flex during flig .
- In order to fly faste , airplanes need to reduce drag.

Note to Teacher: If there is time after the completion of the lesson, you may choose to have students read Chapter 4, pages 132–143. Alternatively, you might ask students to complete the activity "Kite" on these pages for homework.

Word Work: *Aerodynamic* 5 minutes

1. In the chapter, you read, "If it wasn't aerodynamic, I didn't see the point."
2. Say the word *aerodynamic* with me.
3. *Aerodynamic* means relating to the branch of mechanics that deals with flying and moving through air.
4. Birds are aerodynamic because they use air currents to help them fl .
5. What are some other examples of objects being aerodynamic? [Ask two or three students to use *aerodynamic* in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences. For example: "The shape of a football makes it _____."]
6. What part of speech is the word *aerodynamic?*
   - adjective

Related Words

[Use a *Related-Words* activity for follow-up. Tell students that the root of the word *aerodynamic* is *aero*, which means "relating to air" or "relating to flight." Ask students to name any words they know with the root *aero* and say what those words mean (*aeronautical, aerosol*). Then have students complete the following sentence frame: The words _____ and _____ are related because they share the root *aero*, which means _____.]

DAY 2

MORPHOLOGY 15 minutes

Greek and Latin Roots: *unus, bi, duo, tri, decem, centum*

Practice Greek and Latin Roots in Number Words 15 minutes

Remind students that a root is the main element of a word that forms its meaning.

- Review with students what they learned in Lesson 3 about Greek and Latin root words that refer to numbers.
- Display and review the chart from Lesson 3 to remind students of the different root words that refer to numbers.

Root	Meaning	Examples
unus	one	universal; unicorn; unique
bi	two	bicycle; bimonthly; biped
duo	two	duo; duet; duology
tri	three	triangle; triathlon; triceratops
decem	ten	December; decimate
centum	one hundred	century; centipede; centigrade; centenarian

- Read through the chart with students as a refresher, clarifying the root words and their definitions as needed
- Point out to students that they will often find wo ds with number roots in science and math texts. Understanding number roots can help students understand domain-specific vocabulary in these subject areas.
- Have students take home Activity Page 5.2 and complete it as homework. Briefly eview together the directions and the first completed example in the chart. Then have students complete the rest of the activity. Circulate around the room to be certain that students understand the directions.

WRITING 30 minutes

Write an Explanatory Text: Draft

Review 5 minutes

- Review that writing a text typically involves a draft stage, during which writers first writ down what they want to say. Once a draft is complete, the writer gives it a careful read to determine what works and what doesn't. Then, the draft is edited to create a fina version. Sometimes, writers need only a first draft; other times, they may need several
- Remind students that they have been learning about domain-specific vocabular . Prompt students to discuss how domain-specific vocabulary might be important in an explanatory text.

Introduce Domain-Specific Vocabulary 15 minutes

- Explain to students that their descriptions of problems, solutions, and procedures may require them to use words that are unique or special to a particular field. For example, if a person has invented a way to keep baseball cleats, or shoes, from smelling, that person may need to use baseball-related vocabulary such as *infield* and *batter*.
- Have students turn to Activity Page 5.3, Domain-Specific ocabulary. Read aloud each category and the words in the box beneath it. Tell students that such words are known as domain-specific vocabular . Writers should be aware that their audience may not be familiar with these terms. Thus, it is necessary to define them at the point that they a e first used in a text.

- Have students complete the Domain-Specific ocabulary table on Activity Page 5.3. Tell students that they can use the Unit 2 Glossary; also, provide them with print or online dictionaries to help them.
- Explain to students that not only will they need to identify and understand the domain-specific vocabulary elated to their invention, they will also need to make those words understandable for anyone reading their text.

Draft 5 minutes

- Tell students that it is now time to begin writing their explanatory texts about their inventions. Students will use the sentences, details, sketches, and domain-specific vocabulary table they have compiled in the Activity Book pages to begin drafting their explanatory essays in their Writing Journals.
- Explain that students' explanatory text begins with an introduction. This should be one paragraph that introduces the invention and tells why students are writing about it. Go over the structure of an introductory paragraph.
    - Topic sentence: the first sentence of the paragraph that describes b oadly what it is about. Students should name their invention in their topic sentence.
    - Supporting sentences: 2–3 sentences that give details about or explain the topic sentence.
    - Provide an example such as the following:

      My invention is the automatic plant waterer. Lots of people forget to water their plants regularly. Often, their plants die because of this. The automatic plant waterer solves this problem.
- Explain that in addition to their introductory paragraph, students should do the following:
    - Use text structure in the remaining paragraphs that helps to describe their invention and how it works, such as problem/solution and sequencing.
    - Include facts and details that help the reader understand the topic.
    - Include domain-specific vocabular , as well as explanation of terms that could be unfamiliar to most readers.

SUPPORT: Circulate as students draft their explanatory texts. To help students choose appropriate text structures and develop their writing, use questions and prompts such as the following:

- What do you want to say about your invention? What text structure could work to say that? Why?
- I see that you are writing about _____. What is one domain-specific vocabulary term that could help you describe that?
- Do you think readers will understand what you wrote about _____? What could you do to make that clearer?

Wrap Up 5 minutes

- Ask students to share the domain-specific vocabulary they completed for Activity Page 5.3 and explain how the vocabulary relates to their particular invention.
- Invite volunteers to read a paragraph from their draft and explain what text structure they used in the paragraph and why.

Take-Home Material

Reading

- Have students read for homework *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 4, pages 132–143.

Morphology

- Have students take home Activity Page 5.2 and complete it for homework.

Writing

- Have students continue work on their explanatory text drafts in their Writing Journals for homework if needed.

Fluency (Optional)

- Have students take home a text selection from the *Online Fluency Supplement* if you are choosing to provide additional fluency practice

Mid-Unit Comprehension Check

- You may wish to pause one day before proceeding to Lesson 6 so you can assess students' comprehension of the content presented in the first half of this unit
- During your next ELA period, administer the Mid-Unit Comprehension Check on Activity Page PP.1. This assessment will take approximately 30–45 minutes for students to complete.
- You may choose to collect the assessments so a grade can be assigned, and/or you may review the answers with students after they complete the assessment. This is a good opportunity to use the Tens scoring system to gather formative assessment data. Information about the Tens scoring system appears in the Teacher Resources section of this Teacher Guide.
- You may use the remainder of the period for remediation and/or enrichment, including having students reread passages or use the Pausing Point activities on pages 150–153 of this Teacher Guide.

Lesson 6

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Independent: Chapter 3, "A Short History of Glue" pages 89–93 and "Paper Chase" pages 119–122	*Calling All Minds: How to Think and Create Like an Inventor* Activity Pages 6.1, 6.2, 6.3
	5 min	Word Work: *Modification*	
DAY 2: **Spelling**	15 min	Introduce Spelling Words	Activity Page 6.4
Writing	30 min	Write an Explanatory Text: Draft	Writing Journals Activity Page 6.5
Take-Home Material	*	Reading, Spelling, Writing	*Calling All Minds: How to Think and Create Like an Inventor*, Chapter 3, pages 84–88 and 93–118 Activity Page 6.4 Writing Journals

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Identify problem and solution, cause and effect, and sequential text structures used in informational text. (RI.6.1, RI.6.3, RI.6.4, RI.6.5, RI.6.6, RI.6.7; RST.6–8.1, RST.6–8.4, RST.6–8.5, RST.6–8.6, RST.6–8.9)

Writing

Draft and develop a formal style in an explanatory text. (W.6.2, W.6.2.b, W.6.2.e, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.2b, WHST.6–8.2e, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Language

Use phonics and syllabication to spell words correctly. (L.6.2.b)

Use knowledge of language and its conventions when writing, speaking, reading, or listening. (L.6.3)

Use known strategies such as using context clues as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (L.6.4, L.6.4.a, L.6.4.c, L.6.4.d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Identify problem-and-solution, cause-and-effect, and sequential text structures used in informational text.*

Spelling

- Write and display the spelling word list from page 93 on the board or chart paper.

Fluency (Optional)

- Choose and make copies of a text selection from the online *Fluency Supplement* to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the *Optional Fluency Assessment Guide* in Teacher Resources. See the introduction of this Teacher Guide for more information on using the *Fluency Supplement*.

DAY 1

READING 45 minutes

Chapter 3 "A Short History of Glue" and "Paper Chase" [pages 89–93, 119–122]

Review Text Structure 5 minutes

- Review that writers use text structure to organize information in an explanatory or informational text. Being able to recognize text structures helps readers to better understand a text.
- Remind students of the text structures they learned about in the Writing Lessons 3 and 4.
    - o Problem and solution: A *problem* is presented followed by a *solution to that problem.*

- Sequence: Events are discussed in *sequence*, or the order in which they happened or should happen. In procedural text, these events are sometimes numbered as steps.

- Tell students that in Lesson 6 they will also focus on another text structure used in informational text.
  - Cause and effect: Text is organized by *causes* (what makes something happen) and *effects* (what happens as the result of a cause).

Introduce the Chapter — 5 minutes

- Tell students they will read Chapter 3, the sections titled "A Short History of Glue" and "Paper Chase," pages 89–93 and 119–122.
- Explain that in the first selection of the lesson, students will lea n how the glue we use today was first developed. ell students that in the second selection, they will learn how modern-day staplers were invented. If you have a stapler, hold it up for students to see.
- Have students turn to page 89 in *Calling All Minds: How to Think and Create Like an Inventor.*

Core Vocabulary

- Preview the core vocabulary words using the routine established in the Core Vocabulary section of Reading Lessons 1–5 of this unit.
- Begin with the word *mascot* on page 89 of the book.

1. **mascot, *n***. a person or thing that acts as a symbol for an event, organization, or team (**89**)
2. **companion**, ***n***. a person or thing often in the company of another person or thing (**89**)
3. **hygienic, *adj.*** clean and/or healthy (**90**)
4. **efficient, *adj.*** productive (**90**)
5. **automated, *adj.*** carried out by machines (**90**)
6. **revolution, *n.*** one turn around a fixed course **90**)
7. **dispense, *v.*** to distribute or provide (**dispenses**) (**91**)
8. **contestant, *n.*** a person who takes part in a contest or competition (**contestants**) (**92**)
9. **evolve, *v.*** to change over time (**evolved**) (**119**)
10. **insignia, *n.*** a mark of membership or rank in an organization (**120**)
11. **cinch, *v.*** to secure (**120**)
12. **modification, *n.*** a change in something, usually to improve it (**121**)

Vocabulary Chart for Chapter 3 "A Short History of Glue" and "Paper Chase"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	automated hygienic modification revolution	cinch companion contestants dispense efficient evolved insignia mascot serendipity
Spanish Cognates for Core Vocabulary	automatizada/automatizado higiénica/higiénico modificación revolución	mascota compañera/compañero eficiente dispensar serenidad evolucionada/evolucionado cincha
Multiple-Meaning Core Vocabulary Words	revolution	cinch efficient evolved
Sayings and Phrases	domino effect	

- Read the purpose for reading from the board/chart paper:

> Identify problem-and-solution, cause-and-effect, and sequential text structures used in informational text.

Read Chapter 3, "A Short History of Glue" and "Paper Chase" 25 minutes

Have students read the selections independently and complete Activity Pages 6.2 and 6.3. You may choose this time to work with individuals or small groups who need extra support by helping them to complete the two Activity Pages using the guided reading supports below. Have these students read small chunks of text silently before pausing to ask questions. If students' answers indicate that they are comprehending the text, allow them to read longer chunks before pausing. If students' answers indicate difficulty in comprehension, have them read aloud. If students have trouble decoding words, you may suggest they refer to the Individual Code Chart, SR.4 in the Activity Book.

Read "A Short History of Glue"

[pages 89–93]

SUPPORT: Have students read the title of the selection. Ask students to think about the different ways that they use glue. Then ask: What problems can glue help people solve?

- Possible answers: It can fix tears in paper or ca dboard, hold model parts together, and fix cracks or b oken pieces in household items.

Evaluative Before 1856, what would happen to milk if it wasn't refrigerated?

- o The milk would spoil.

Literal How did Gail Borden solve the problem of milk spoiling?

- o He invented a new process to make condensed milk, which doesn't spoil as quickly.

SUPPORT: Many students may be unaware of what condensed milk is. Explain that condensed milk is milk with approximately 60 percent of its water content removed, resulting in it having a thick, creamy appearance and texture. Though it can spoil just like regular milk, it takes a lot longer to do so.

Inferential How was the rotary milking parlor hygienic?

- o It washed the cows before milking them.

Inferential What was one effect of being able to milk so many cows at once?

- o Farmers would be able to milk more cows every day, so they could raise larger herds. Then they could produce more milk to sell.

SUPPORT: Remind students that a cause is an event that makes something else happen. An effect is the result of what happens because of that cause. A by-product is a good example of an effect. Many students will not know what a by-product is. Explain that sometimes, more than one effect can result from a cause. For instance, once milk is taken from a cow, it goes through different types of processes, some to make the milk many people drink, others to make the cheese many people eat, and so on. During one of these processes, there is a second result, or effect: a protein called casein is removed from the milk. This makes casein a by-product of milk.

SUPPORT: Explain that there are many ways authors can show sequence in a text. One way is through the order in which events are presented on a page (though this is not always the case). Point out the dates 1856 and 1932 on page 90. Explain that dates are one way authors show sequence in a text. Then explain that another way authors show sequence is through signal words such as *first*, *next*, and *later*. Guide students in completing the sequence in item 1 on Activity Page 6.2.

SUPPORT: Provide some context for the patent diagram on page 91. Explain further that when a person buys something at the store that needs to be put together, it usually contains directions. These directions usually assign each part of the object a number. A diagram in the directions then shows how the numbers fit togethe . A patent can sometimes act in a similar way. While it doesn't necessarily show how each part fits togethe , it does give a number to each in a sort of sequential order to help viewers understand how the object will work. For added effect, you may choose to share the directions from something you've put together at home. If so, pass it around the class for students to see as you talk about it.

SUPPORT: Use the following questions to help students answer item 2 on Activity Page 6.2.

- What is cyanoacrylate? (It is a form of plastic that hardens when exposed to air.)
- What causes cyanoacrylate to harden? (It hardens when exposed to air.)
- What was the effect of Harry Coover and Fred Joyner realizing the supersticky qualities of cyanoacrylate? (They developed Super Glue, which is widely used today.)

Inferential Why might cyanoacrylate make good Super Glue?

- o When it first comes out of the bottle, it would be soft and easily fit into or ound things that are broken. Because it would harden quickly in the air, it would then hold the broken material together.

SUPPORT: One of the inventors of Super Glue said that it was "one day of serendipity and about ten years of hard work." Remind students that in a previous lesson, they learned about famous or useful inventions that came about by accident. Remind students that *serendipity* is another word for good luck.

Evaluative Why do you think Temple Grandin calls Harry Coover's appearance on *I've Got a Secret* one of the greatest stunts of all time?

- o By showing how strong the glue was, Coover's appearance provided free advertising for Super Glue.

Read "Paper Chase"

[pages 119–122]

Note to Teacher: Use the prompts below to support students' reading of "Paper Chase" and to help them complete Activity Page 6.3.

SUPPORT: Point students to the word *evolved* on page 119. Explain that the word can have more than one meaning. Most people associate it with biological changes over long periods of time, but it can also be used to describe social and technological change. After students read page 119, ask them how *evolved* is being used here. *(It is being used to describe technological change.)* When technology evolves, the changes make the technology better.

Literal What invention came about once paper had been created?

- o Staples were invented after paper was created.

SUPPORT: Ask students what Grandin means by the term *domino effect*. If students do not know, set up a simple demonstration. Either bring in actual dominoes, or use other items around the classroom that are similar, such as books. Set them up in a single row, fairly close together. Ask students what would happen if you knocked the last one in the row down. Then demonstrate the effect. Ask: How was the invention of paper like a domino effect? *(It resulted in the invention of other items, such as staples and staplers.)*

Literal What were some of the problems with early staplers?

- o Staples could only be loaded one at a time.

Literal Describe the innovations of 1877 and 1895 that improved how staplers worked.

- In 1877, a stapler was invented to bend the wire underneath the paper to cinch or hold pages together. In 1895, a stapler was made that could have multiple staples loaded into it all at once.

Literal What were some of Jack Linsky's accomplishments during his lifetime? List them in the order in which he accomplished them.

- Possible answers: At 14 years old, Linsky was a delivery boy at a stationary company. At 19, he opened his own stationary wholesale store. In 1939, he changed the way staplers are loaded, which made them easier to use.

SUPPORT: Demonstrate Linsky's improvement on the stapler by either using the classroom's stapler, borrowing one from another classroom, or bringing one from home. Open the top of the stapler, and remove the connected row of staples.

SUPPORT: Ask students if they can think of other inventions that came after the invention of paper. Pencils, pens, erasers, crayons, paper cups, and cardboard are some other inventions that resulted from the invention of paper.

Discuss Chapter 3 and Wrap Up the Lesson — 5 minutes

Bring students back together, and review the purpose for reading: *Identify problem-and-solution, cause-and-effect, and sequential text structures used in informational text.*

- Review the answers to Activity Pages 6.2 and 6.3.
- Point out how these selections show how authors of informational text can use different text structures to communicate information. For example, the text describes how Borden's company came to invent a new type of glue. It does this by describing the order in which the events occurred. In cause-and-effect text structures, the cause, or what makes an event happen, is usually presented first, followed by the e fect, or what happened as a result of the cause.

SUPPORT: Sometimes one cause can have multiple effects, some of which were not expected. For instance, the invention of petroleum fuels gave people an inexpensive fuel for driving cars, heating homes, and generating electricity. It also increased carbon dioxide in the atmosphere, which has been causing climate change. These are all effects.

Ask students how they can tell the difference between a problem and a solution when they read text. (A problem is something that needs to be solved or fixed; a solution is something that is done to resolve the problem. Words and phrases like *problem*, *fixed*, *solved*, and *answer* can all signal a problem-and-solution relationship.)

Ask students to describe cause and effect. (A cause makes something happen; an effect is the result of a cause. Words and phrases like *caused*, *because of*, and *as a result* signal a cause-and-effect relationship.)

Ask students what words help them understand the sequence that something happens when they read a text. (Some words that signal sequence are *first*, *second*, *third*, *next*, *then*, *before*, *after*, *later*, and *last*.)

To wrap up, give students a chance to brainstorm a list of ideas or simple sentences about the accomplishments of Gail Borden, Henry Jeffers, Harry Coover, Fred Joyner, George McGill, Henry R. Heyl, Eli Hotchkiss, and Jack Linsky. For example:

- Gail Borden owned a milk company.
- Gail Borden invented a new process to produce milk.
- A by-product of making condensed milk is casein.
- Gail Borden used casein to make glue.
- Harry Coover invented Super Glue.
- Fred Joyner invented Super Glue.
- George McGill invented the stapler in 1866.
- Henry R. Heyl improved the stapler in 1877.
- Eli Hotchkiss introduced staple strips in 1895.
- Jack Linsky improved staple strips in 1939.

Explain that there is usually more than one way to combine ideas in a sentence. Using several ideas from the list, model one example of how to combine ideas into a single sentence. For example: *When Gail Borden, who owned a milk company, invented condensed milk, it produced a by-product called casein, which he then used to make glue.*

Think-Pair-Share: Have partners work together to write at least one sentence that combines three ideas from the list. Then have the class come together to share their sentences.

Note to Teacher: If there is time after the completion of the lesson, you may choose to have students read the rest of Chapter 3, pages 84–88 and 93–118. Alternatively, you might ask students to complete one of the activities on these pages, "Violin Plant Stand," "Homemade Stilts," "Sailboat," "Marionette," or "Papier-Mâché Puppet Head," for homework.

Word Work: *Modification* 5 minutes

1. In the chapter, you read, "In 1939, Linsky made one modification that changed the way staplers work: he opened up the top of the stapler so the staples could be easily loaded top down into the body of the stapler."
2. Say the word *modification* with me.
3. *Modification* means a change in something, usually to improve it.
4. This machine needs one simple modification to make it run faste .
5. What are some other examples of modifications to technology that you have lea ned about? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "The alarm system in the building needs one _____ before it will work."]
6. What part of speech is the word *modification*?

   o noun

Appositive Sentences

Use an *Appositive* activity for follow-up. Explain to students that an appositive can be a phrase in a sentence that defines a person, place, or thing.

- Show the following example of a sentence with the appositive phrase underlined: Her companion, a friend who had known her all her life, went with her to France.
- Explain that the appositive phrase "a friend who had known her all her life" defines the noun *companion*.
- Point out the commas, and explain that the appositive phrase is separated from the rest of the sentence by commas.
- Cover or cross out the appositive phrase, and read aloud the sentence without it. Explain that the phrase can be removed from the sentence without making the sentence incomplete.
- Provide the following sentence frame for the word *modification*, and have students fill in the appositive phrase: The bicycle's modification, _____, helped it go faste . Invite students to share their answers.

CHALLENGE: Students who have a solid understanding of appositives may benefit f om being challenged to complete the activity without a sentence frame.

DAY 2

SPELLING 15 minutes

Introduce Spelling Words 15 minutes

- Explain that students will learn 12 new spelling words. Some are related to the book *Calling All Minds*, and others contain the roots *decem*, *tri*, and *uni.* These words do not follow one single spelling pattern. Tell students they will be assessed on these words and will write a dictated sentence including one or more of these words in Lesson 10.
- Introduce the words by writing them on the board/chart paper. First say the word aloud, and then sound out each syllable, naming each letter aloud as you write it. Continue syllable by syllable until the word is spelled correctly. You may wish to use the pronunciation chart to guide students in saying the words.

1. amateur	7. philosopher
2. analyze	8. similar
3. answer	9. sophomore
4. December	10. teacher
5. develop	11. triangle
6. inventor	12. universe

Pronunciation/Syllabication Chart

- The following chart includes pronunciation and syllabication information for the spelling words. The first column lists the wo ds. The second column breaks the words into decodable sounds based on the Core Knowledge code approach to decoding words. The third column lists syllable types in each word. This information is provided so you can present any new, unfamiliar spelling words in a way that calls upon and reinforces the manner in which students were taught to decode and encode in the earlier grades.
- Remind students they can refer to the Individual Code Chart, which lists each sound in the English language followed by all the possible ways that the given sound could be spelled; the spellings for each sound are listed in the order of frequency with which they occur in English, from most frequent to least frequent spelling. The Individual Code Chart is located in the Activity Book (Activity Page SR.4) and in the Teacher Resources in the Grade 6 Ancillary Materials.
- As you introduce and write each word, it may be helpful if you point out particular spelling patterns within each word and show students where these spellings are reflected on the Individual Code Chart. For example, you might note that the word *inventor* includes a less common spelling for /er/ in the third syllable of the word (i.e., the third syllable is pronounced /ter/ but spelled "tor") and then point out the "or" spelling for /er/ that is included on the Individual Code Chart.
- If you are unfamiliar with the CKLA phonics approach and/or have limited phonics training, you may also find the following materials, in the eacher Resources at the back of this Teacher Guide, helpful: "Using Chunking to Decode Multisyllable Words" and "Sound and Spelling of Schwa." CKLA uses a sound-spelling notation that follows linguistic and dictionary conventions, making each notation easier to see and read. For example, the word *costly* is notated as /kost*lee/.

Word	CK Code	Syllable Type
amateur	/am*ə *cher/	closed*schwa*r-controlled
analyze	/an*ə *liez/	closed*schwa*open
answer	/an*ser/	closed*r-controlled
December	/dee*sem*ber/	open*closed*r-controlled
develop	/də *vel*ə p/	schwa*closed*schwa
inventor	/in*ven*ter/	closed*closed*r-controlled
philosopher	/fə *los*ə *fer/	schwa*closed*schwa*r-controlled
similar	/sim*ə *ler/	closed*schwa*r-controlled
sophomore	/sof*mor/	closed*r-controlled
teacher	/tee*cher/	open*r-controlled
triangle	/trie*aeng*ə l/	open*closed*schwa
universe	/ue*nə *vers/	open*schwa*r-controlled

Spelling Word Definition Chart

- After writing and pronouncing the words, use the following Spelling Words Definition Chart to define each wo d and provide an example of how to use it in a sentence.

Spelling Word	Definition	Example Sentence
amateur	a nonprofessional who pursues a study or sport as a pastime	The amateur athlete was training for the Olympics.
analyze	to study or examine something	The detective wanted to analyze the evidence.
answer	the solution to a problem	The child found the answer to the riddle in the back of the book.
December	the twelfth month of the year	December is the last month of the year.
develop	to cause something to become more advanced	Scientists are always looking to develop new ways to do things more efficiently.
inventor	a person who comes up with a new device or process	The inventor filed a patent for her invention.
philosopher	a person who thinks deeply on academic subjects	The philosopher wanted to know the secrets of the universe.
similar	having many of the same or closely related traits	Scientists have long known that birds and dinosaurs are similar.
sophomore	a person in their second year of high school or college	Next year, all sophomores will become juniors.
teacher	a person who helps others learn	The teacher appreciated the hard work her students had done.
triangle	a geometrical shape having three sides	An A-frame house is shaped like a triangle.
universe	all of space and the matter it contains	The universe contains what appears to be an infinite number of stars.

- Tell students the word list will remain on display until the assessment so they can refer to it in their classroom work until then.
- Have students take home Activity Page 6.4 to practice the spelling words.

WRITING 30 minutes

Write an Explanatory Text: Draft

Introduce Formal Style 5 minutes

- Tell students that an explanatory essay should have a formal style, rather than an informal one. This means that the words and phrases students choose should reflect p oper speech rather than the slang or idioms they might use when talking with their friends.

- Explain to students that, typically, formal style also does not involve the following:
    - o contractions (doesn't, don't, isn't, won't, etc.)
    - o abbreviations at first use of a term, o ganization, place, etc. (National Aeronautics and Space Administration versus NASA)
    - o exclamations

Practice 10 minutes

- Give students a few pairs of words or terms, and ask them to identify which word or term is more formal. Examples include the following: *blow up* versus *explode*; *go against* versus *oppose*; *say no* versus *reject*; *unresponsive* versus *tight lipped*.
- Have students complete the Informal and Formal Language Table on Activity Page 6.5 to practice what they have learned.

Draft 10 minutes

- Remind students to use a formal style during the drafting process. Have students go back through their drafts and look for examples of informal language that should be changed to formal language.
- Tell students that style may also be addressed during peer review and revision.

SUPPORT: As needed, help students identify informal language and change it to formal language. Point to a sentence in a student's draft, and ask them to read it aloud. Use prompts such as the following: *I heard you read the phrase _____. Does that sound like something you would say to a friend or something you would read in a book? How could you change that to formal language?*

Wrap Up 5 minutes

- Students should continue drafting for homework as needed. Remind students to gather any notes, completed Activity Pages that they will need, and their Writing Journals.

Take-Home Material

Reading

- Have students read for homework *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 3, pages 84–88 and 93–118.

Spelling

- Have students take home Activity Page 6.4 and complete it for homework.

Writing

- Have students continue working on their drafts in their Writing Journals for homework.

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 7

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Close Reading: Chapter 4, pages 142–150	*Calling All Minds: How to Think and Create Like an Inventor* Activity Pages 7.1; Trial and Error Chart A globe
	5 min	Word Work: *Transatlantic*	
DAY 2: **Morphology**	15 min	Introduce Prefixes *uni–*, *di–*; Suffixes *–er*, *–or*	Prefix and Suffix Charts Activity Page 7.2
Spelling	5 min	Practice Spelling Words	Activity Page 7.3
Writing	25 min	Write an Explanatory Text: Draft	Writing Journals Activity Page 7.4
Take-Home Material	*	Reading, Morphology, Spelling, Writing	*Calling All Minds: How to Think and Create Like an Inventor*, Chapter 4, pages 150–152 Writing Journals Activity Pages 7.2, 7.3, 7.4

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Compare and contrast the information gained from reading about a topic with the information gained from hands-on experience. (RI.6.1, RI.6.3, RI.6.4, RI.6.5, RI.6.6, RI.6.7, RI.6.9; RST.6–8.1, RST.6–8.3, RST.6–8.4, RST.6–8.5, RST.6–8.6, RST.6–8.7, RST.6–8.9)

Writing

Write an explanatory text. (W.6.2, W.6.2b, W.6.2f, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.2.b, WHST.6–8.2.f, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Interpret information presented in diverse formats (e.g., visually, quantitatively) and explain how it contributes to the topic and text. (SL.6.2)

Language

Use known strategies such as using context clues, Greek or Latin affixes and oots, as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (L.6.4.a–d)

ADVANCE PREPARATION

Reading

- For this lesson, each student will build two paper airplanes, a simple paper airplane and a more complex paper airplane. For each, students will need one sheet of 8½ x 11-inch paper as well as a ruler.
- Prepare a Trial and Error Chart to display for students. This chart can be found in the Reading Lesson on page 106.
- Write the purpose for reading on the board/chart paper: *Compare and contrast how information in a written text versus a hands-on activity communicates the concept of "trial and error."*

Morphology

- Prepare and display the Prefix and Su fix Charts on page 108.

Writing

- Choose a conclusion from one of the chapters the students have already read in *Calling All Minds: How to Think and Create Like an Inventor.* Display the conclusion for the class to see. Be prepared to mark parts of it as described in the Writing Lesson.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Whole Group: Chapter 4 [pages 142–150]

Introduce the Chapter 5 minutes

- Remind students that they read part of Chapter 4 in Lesson 5 and learned about Temple Grandin's interest in flying as well as science innovations elated to aerodynamics. Students will continue to learn more about flight in this lesson as they ead more from Chapter 4 and learn how to make paper airplanes more aerodynamic.
- Explain to students that as they read this lesson and perform the hands-on activities, they should compare and contrast how information from different parts of the text helps them understand the concept of "trial and error." Point out that, as students make their paper airplanes, they may encounter problems or make some mistakes that they have to correct. Assure students that this is okay and is something scientists face on a regular basis. It is an example of "trial and error," i.e., experimenting with different ways of doing something to find the most successful way to do it
- Have students turn to page 142 of *Calling All Minds: How to Think and Create Like an Inventor.*

Core Vocabulary

- Preview the core vocabulary words using the routine established in the Core Vocabulary section of Lessons 1–5 of this unit.
- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *crease* on page 143 of the book.

1. **crease, *n***. the line that is created when something is folded (**143**)
2. **sleekness, *n***. the quality of being straight and smooth in design, without any parts sticking out (**145**)
3. **balsa wood**, ***n.*** a lightweight wood used for making models (**146**)
4. **transatlantic, *adj.*** crossing the Atlantic Ocean (**146**)
5. **glider, *n.*** a light aircraft or toy that glides on air (**146**)
6. **rudder, *n.*** a mechanism used to steer a ship, boat, submarine, or aircraft (**146**)
7. **stabilizer, *n.*** a device used to keep something steady, or stable (**146**)
8. **clockwise**, ***adj.*** the direction in which the hands of a clock move (**147**)
9. **trial, *n.*** a test of the performance, qualities, or suitability of something; an experiment (**147**)
10. **malleable, *adj.*** able to be pressed into a different shape (**147**)
11. **molecular structure, *n.*** the location of atoms and groups of ions and how they relate to each other in a molecule (**147**)

12. **sulfur, *n.*** a nonmetallic chemical (**148**)

13. **lead, *n.*** a metal that is denser than most but also malleable (**148**)

14. **airplane simulator, *n.*** a training device that replicates an airplane's flight mechanisms; also known as a flight simulator **airplane simulators**) (**150**)

15. **navigate, *v.*** to plan, direct, or sail a route or course, usually in a form of transportation such as a car, ship, or airplane (**navigating**) (**150**)

Vocabulary Chart for Chapter 4		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	airplane simulator balsa wood glider lead molecular structure rudder stabilizer sulfur transatlantic	clockwise crease malleable navigate sleekness
Spanish Cognates for Core Vocabulary	el estabilizador estructura molecular transatlántico	malleable navegar
Multiple-Meaning Core Vocabulary Words	lead	
Sayings and Phrases	trial and error nose-dive newly minted	

- Read the purpose for reading from the board/chart paper:

> Compare and contrast how information in a written text versus a hands-on activity communicates the concept of "trial and error."

Read Chapter 4 — 20 minutes

Have individual students take turns reading the chapter/selection aloud. You may also alternate between having students read aloud and read silently. Occasionally pause to ask questions in order to check for understanding and draw students' attention to key vocabulary and concepts. Use the guided reading supports listed below for this purpose.

[pages 142–143]

[Have a student read aloud the last paragraph on page 142, beginning with the sentence, "The first planes I ever flew were made of paper." After the student has read the paragraph ending on page 143, have them stop.]

Evaluative What do you think Grandin means when she says, "A simple paper airplane can teach you a lot."

- Answers will vary but should draw a connection between science or inventing and the act of building a paper airplane. Students should also understand that for airplanes to get off the ground and fl , their designs should maximize lift and minimize drag.

SUPPORT: If students struggle with the above question, remind them that Temple Grandin is a scientist and that her book, *Calling All Minds: How to Think and Create Like an Inventor*, is about science, specifically inventors and their inventions. So within this context, it would make sense that she is referring to something about science.

Evaluative How might you "learn pretty quickly through trial and error"?

- Answers will vary but may include that she means that when you make a lot of mistakes you learn from them or that trying something and making a mistake is a quicker way to learn than by having it explained.

[Have students continue reading the narrative on page 146, skipping the paper airplane activities. Explain that students will have an opportunity later in the lesson to complete the hands-on activity.]

[page 146]

SUPPORT: Make certain that students understand that Charles Lindbergh's plane, *Spirit of St. Louis*, was a full-size plane, not a model plane.

Inferential What qualified Paul Guillow to make toy airplanes?

- He was a retired World War I pilot.

Literal What incidents led to an increase in people being interested in aviation, or flight?

- Charles Lindbergh flew f om New York City to Paris, France, in his airplane *Spirit of St. Louis.*

Literal How did Grandin vary the test flights for her toy plane?

- She launched it from different heights. She adjusted the wings. She took it out on windy days. She experimented with different circumstances and ways to fly the plane.

Evaluative Did you find the directions for assembling the glider step-by-step easy to understand? What would have helped in understanding the directions?

- Answers may vary, but some students may find the di ections difficult to understand and/or visualize. A drawing or diagram might make the directions easier to understand.

[page 147]

[Read the first two paragraphs on page 147.

Evaluative Why did the plane have adjustable wings?

- By adjusting the wings, you could prevent nose-dives or midair stalls.

SUPPORT: Some students may not understand what the term *nose-dive* means. You may choose to illustrate the term with your hand or ask volunteers if they know the answer and would like to tell the class.

Literal Compare Grandin's original toy plane to her new one. What were the differences?

- The original toy plane would fly six to eight feet o f the ground. The new toy plane would barely get off the ground before crashing, even after Grandin adjusted the wings or when she tried different takeoff areas.

Inferential How do Grandin's experiments with the second plane represent the concept of "trial and error"?

SUPPORT: Review the meaning of the phrase "trial and error," i.e., experimenting with different ways of doing something until you find the most successful way to do it

- Each experiment she conducted to get the plane off the ground was a trial. When there was an error and the plane failed to fl , she would make adjustments and try again. She was using trial and error to attempt to fix a p oblem.

Read "Trial and Error"

[Have students read the section titled "Trial and Error" beginning at the end of page 147 to page 149.]

Literal What did the process of "vulcanizing" do?

- It made natural rubber products more malleable so they wouldn't melt when they became too hot or crack when they became too cold.

SUPPORT: If students do not understand what the word *malleable* means, explain that it describes a material's ability to be pressed into a different shape. To help students understand, show them a rubber product. Explain that the product is a solid yet is bendable. It seems hard yet is soft enough to move inward when pressed.

Inferential How did Charles Goodyear "unlock the molecular structure of rubber"?

- He accidentally left raw rubber, sulfur, and lead on a stove together. As they heated up, they became malleable.

CHALLENGE: Remind students that in the Lesson 4 section "Accidents Waiting to Happen," they read about some of the famous "accidental" discoveries in science. Ask students to recall some of those discoveries and inventions and what made them accidental. Have volunteers describe how this discovery was similar to those. Accidental discoveries are found through serendipity.

Note to Teacher: Point out to students that not all accidents result in important scientific discoveries. In fact, accidents can sometimes result in dangerous situations. For example, accidentally leaving things burning on a stove could lead to fi e.

Inferential It took five years for Goodyear to perfect his rubber material. What does this tell you about how trial and error played a role in his process?

- o It implies that Goodyear went through many trials and errors to perfect his material.

Literal What were some things Goodyear's invention was used for?

- o It was used for shoes, pencil erasers, life jackets, balls, hats, rafts, roofs, floors, assembly lines, shock absorbers, and tires.

Evaluative What was a patent unable to do for Goodyear's family?

- o It was unable to save his family from going into debt.

SUPPORT: Explain that while patents give the patent holders financial rights over their invention, it does not completely prevent others from stealing it. Often, when someone steals the idea of a patent, the patent holder has to take that person to court. This can be a long and expensive process.

Literal What was the relationship between Charles Goodyear and The Goodyear Tire & Rubber Company?

- o The Goodyear Tire & Rubber Company was named after Charles Goodyear, but otherwise there was no relationship.

Literal Frank Seiberling invented a machine to make tires. How did this machine improve tire production?

- o Up until that time, each tire had to be made by hand. The machine, however, could make sixty tires in the time it took to make five ti es by hand.

[page 150]

[Before students read, remind them that before the discussion on trial and error, they were reading about Temple Grandin's recent attempt to fly a Guillow's plane that she had recently purchased. Ask students to read only the first paragraph on the page.]

Evaluative How do you think Temple Grandin's trials and errors with her second toy airplane compare to Charles Goodyear's trials and errors in developing rubber?

- o After Temple Grandin put her second plane together, she experienced problems and had to repeatedly test the plane with variations to get it to fl . Charles Goodyear spent five years doing the same thing with rubber to invent the kind of rubber we know and use today.

Inferential What is Grandin saying about the importance of hands-on experience in this paragraph?

- o She believes that no kind of training can substitute for the learning that takes place from actual hands-on experience.

Hands-On Activity 10 minutes

Have students transition to the hands-on activity on page 143. You may choose to have students work individually or in pairs. Students will first do the "Simple Paper Airplane" activity followed by the "Complex Paper Airplane." Then students will compare what they learned about "trial and error" through doing the activity versus reading the section "Trial and Error."

Students will need a ruler and at least two sheets of plain paper measuring 8½ x 11 inches, though they may wish to have more in case they make errors in their paper planes and have to start over.

Note to Teacher: You may choose to have students do the hands-on activity for homework and complete the wrap-up at the beginning of the next lesson. If you do the activity in class, set up a designated area of the classroom where students can test-fly their airplanes, or arrange for time to take them outside or to a large space such as a cafeteria or gymnasium.

Stop and Jot: Suggest that students stop and jot a *who, what, when, where, why,* or *how* question about paper airplanes. Students can try to answer their question through the hands-on process of making the paper airplane.

Circulate amongst students, and use the following prompts to discuss their work.

Simple Paper Airplane

[pages 143–144]

Literal What materials do you need to begin the "Simple Paper Airplane"?

- o I need at least two 8½-x-11-inch sheets of paper, as well as a ruler.

Literal/Inferential What are two possible uses for a ruler in this activity?

- o A ruler can help measure the paper and make the folded creases sharp and flat

Inferential When putting together an object from directions, why is it important to do it in the proper sequence?

- o If you don't follow directions in the correct order, you may not be able to put the object together, or it might not work properly.

Evaluative What do you think would happen if you did Step 3 first? What do you think would happen if you skipped Step 2?

- o The plane might not fl .

Evaluative Why do you think the author included diagrams? Which is more helpful to you, the written directions or the diagrams? Why?

- o The author includes diagrams because sometimes it helps to see a step visually.
- o Answers will vary.

Evaluative How well does your paper airplane fly? What do you think you could do to improve it?

- o Answers will vary.

Complex Paper Airplane

[pages 144–145]

Literal Which steps are the same as the Simple Paper Airplane? Which steps are different?

- Steps 1 and 2 are the same; Steps 3 and 4 are different.

Evaluative Do you have trouble understanding one of the steps? What is hard about it? What could you try differently?

- Answers will vary. Discuss with students what they might do differently, and allow them to try it on their own.

Evaluative Which of your airplanes flies better? Why do you think that is?

- Answers will vary. Encourage students to explain their reasoning.

Discuss Chapter 4 and Wrap Up the Lesson — 5 minutes

Bring students back together, and remind them of their purpose for reading:

> Compare and contrast how information in a written text versus a hands-on activity communicates the concept of "trial and error."

Present the following chart, and have students use it to guide a discussion about what they learned about trial and error from the author's recounting of her own experience, the author's section on Charles Goodyear, and the students' own experiences while doing the hands-on activity.

Trial and Error		
Temple Grandin's Experience with Toy Planes	**Charles Goodyear's Experience with Inventing Rubber**	**Your Experience Making a Paper Airplane**
Possible answer: Sometimes Grandin's planes did not get off the ground. Sometimes they crashed after takeoff, but she kept trying until it worked. She launched the toy planes from different heights, adjusted the placement of the wings, and launched them on windy days. This taught her a lot about aerodynamics and flight.	Possible answer: Goodyear's "vulcanizing" process was initially an accident, but it took him five years to perfect it. This shows that he had to go through a process of trial and error before his product was ready for the market.	Answers will vary. Conclude the discussion by asking students to share how the hands-on activity helped them to better understand the process of "trial and error" that Grandin presents in her writing.

Note to Teacher: Have students read *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 4, from page 150 to the section break on page 152, for homework.

Word Work: *Transatlantic* 5 minutes

1. In the chapter, you read, "The following year, Charles Lindbergh made his famous transatlantic flight f om New York to Paris in his *Spirit of St. Louis.*"
2. Say the word *transatlantic* with me.
3. *Transatlantic* means crossing the Atlantic Ocean.
4. Engineers hope to someday build a transatlantic tunnel to get from New York City to Paris, France.

SUPPORT: Point out the Atlantic Ocean on a globe. Now locate New York City and Paris. Ask a student to demonstrate, using their finger, a possible transatlantic path between New York City and Paris.

1. What are some other examples of transatlantic crossings? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "The famous ship *Titanic* sank while making its first _____ crossing."]
2. What part of speech is the word *transatlantic*?
   - o adjective

Making Choices

[Use a *Making Choices* activity for follow-up.] I am going to read several sentences. If the sentence I read describes something that is transatlantic, say that is *transatlantic*. If the sentence I read does *not* describe something that is transatlantic, say that is not *transatlantic.*

1. The tourists flew f om New York to London.
   - o That is transatlantic.
2. The crossing guard helped the students across the busy intersection.
   - o That is not transatlantic.
3. We rowed our boat across the river.
   - o That is not transatlantic.
4. In the 1800s, people would travel from the United States to Europe in steamships.
   - o That is transatlantic.

DAY 2

MORPHOLOGY 15 minutes

Prefixes *uni–, di–;* Suffixes *–er, –or*

Review 5 minutes

- Remind students that they have learned about prefixes and su fixes.
  - o A prefi is a word part placed at the beginning of another word to change or clarify its meaning.
  - o A suffi is a letter or group of letters added to the end of a word to change or clarify its meaning.

Introduce Prefixes *uni–, di–;* suffix *–er, –or* 15 minutes

- Remind students that they learned about Greek and Latin root words in Lessons 3 and 5. Among these root words were *uni* (meaning "one") and *di* (meaning "two"). Explain that these Greek and Latin roots are also English prefixes.
- Display the new Prefixes and Su fixes Charts you p epared for this lesson.
- Read through the new prefixes, their meanings, and examples with students

PREFIX	MEANING	EXAMPLE	MEANING
uni–	one	unicycle	a vehicle with one wheel
di–	two	dichotomy	a division into two categories

- Next, introduce the suffixes *–er* and *–or* by displaying and reading through the chart.

SUFFIX	MEANING	EXAMPLE	MEANING
–er	more	warmer	more warm
–er	one who	teacher	one who teaches
–or	one who	inventor	one who invents

- Explain that one meaning of the suffix *–er* is "more." When you add *–er* to the end of an adjective, it means more of whatever that word means. For example, adding *–er* to *hot* results in *hotter*. Something that is hotter has more heat than something that is simply hot. Add *–er* to *red*, and you get *redder*. Ask students to think of other words that mean "more of" when you add the suffix *er*. *(These words may include denser, smaller, taller, bigger, funnier, and so on.)*
- Tell students that the suffix *er* may also have another meaning when added to a verb. When the suffixes *–er* and *–or* are added to a verb, it means "one who." For example, adding *–or* to the word *invent* means "one who invents," and adding *–er* to teach means "one who teaches." Ask students to come up with other words in which the suffix *er* or *–or* indicates "one who". *(These words may include editor, firefighter, doctor, winner, educator, and so on.)*

- CHALLENGE: Students can look for *–er* and *–or* words meaning "one who" in *Calling All Minds: How to Think and Act Like an Inventor*. Some examples include *inventor*, *aviator*, *thinker*, and *teacher*.
- Have students turn to Activity Page 7.2. Discuss the directions. Allow students to work on the assignment in pairs or small groups. If time permits, bring the students back together to discuss the results of their work. If students do not complete the Activity Page in class, they may do so for homework.

SPELLING 5 minutes

Practice Spelling Words 5 minutes

- Explain that students will practice spelling the 12 words they learned in Lesson 6. Some are related to the book *Calling All Minds: How to Think and Create Like an Inventor* while others contain the roots *decem, tri,* and *uni.*
- Pass out Practice Spelling Words, Activity Page 7.3, and go over the directions. Tell students to complete the spelling practice for homework.

WRITING 25 minutes

Write an Explanatory Text: Draft

Introduce Drafting a Concluding Statement 5 minutes

- Explain that a conclusion is the end of a piece of writing. It typically does the following:
  - Restates the purpose of the writing.
  - Summarizes the main ideas that support the purpose.
  - Closes the writing with a final statement. It may emphasize the purpose, connect to a bigger idea such as a real-world situation, or ask readers to take a particular action.
- Tell students that their explanatory essays will need concluding statements. Remind students that this is their opportunity to review how their invention solves a particular problem. Tell students that their concluding statement should also leave readers thinking about something interesting.

Develop a Concluding Statement 10 minutes

- Display a concluding statement that you chose from *Calling All Minds: How to Think and Create Like an Inventor.* Go through the statement, marking the parts as you go. You may choose to use the following example.
  - For the hands-on activity titled "Complex Paper Airplane," Grandin concludes: "This plane is very aerodynamic because of the sleekness and will have less drag because of its narrow wings. This plane will fly fast!"

- Using the Concluding Statement Pyramid on Activity Page 7.4, note that this statement points to the problem Grandin is trying to solve: how to make a complex paper airplane fl .
- Grandin's concluding statement shows what elements of the complex paper airplane help it to fly (its sleekness and its nar ow wings).
- Grandin then completes her conclusion by stating that the airplane will fly fast as a result of its design.

- Point out how Grandin relies on personal anecdotes in many cases to conclude her chapters. Ask students to think about how they could do something similar in their own essays.
- Have students use the Concluding Statement Pyramid on Activity Page 7.4 to plan their own conclusions.
  - Restate the problem.
  - Summarize how the invention solves the problem.
  - Conclude with a final idea that you want eaders to remember, such as how your invention solves a specific eal-world problem, why it is a great idea, or how it connects to something that is important to people.
- Once students have filled in the pyramid, have them draft their concluding statement on the back of the Activity Page.

SUPPORT: If students have trouble deciding on a final sentence for their conclusion, explain that the last thing readers read in an informational text is often what they remember most. So students should think: *What idea do I most want readers to remember about my invention?* For instance, Grandin doesn't just state that her paper airplane design works, she states that it will fly *fast*. This is appealing to readers who want to make paper airplanes. With this in mind, invite partners to share their concluding statements with one another and brainstorm ideas for a final sentence.

Complete the Draft — 15 minutes

- When students have finished their concluding statement on Activity Page 7.4, they can finish their drafts in their riting Journals.
- As students write, circulate around the room, monitoring their progress and providing guidance and support as needed.

SUPPORT: Work with individual students or with a small group, focusing on students who may not have fully completed the planning phase of the writing process.

Note to Teacher: You may choose to have students work on their Activity Page in class and finish their drafts for homework

Wrap Up 5 minutes

Ask student volunteers to read aloud their completed conclusions. Invite other students to share what they think is effective about the conclusion.

Tell students to bring their completed texts for review in the next writing lesson.

Take-Home Material

Reading

- Have students read for homework *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 4, from page 150 to the section break on page 152.

Morphology

- Have students take home Activity Page 7.2 to complete for homework.

Spelling

- Have students take home Activity Page 7.3 to complete for homework.

Writing

- Have students complete Activity Page 7.4 and their drafts in their Writing Journals for homework.

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 8

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Small Groups: Chapter 4, pages 152–157	*Calling All Minds: How to Think and Create Like an Inventor* Images of a hot-air balloon and a dirigible to display 3½-minute video clip of the Wright brothers Activity Pages 8.1, 8.2
	5 min	Word Work: *Aviators*	
DAY 2: **Grammar**	15 min	Introduce Frequently Confused Words: *fewer/less; affect/effect*	Greek and Latin Roots in Number Words Chart Activity Page 8.3
Spelling	5 min	Practice Spelling Words	Activity Page 8.4
Writing	25 min	Write an Explanatory Text: Share, Evaluate, Revise	Writing Journals Explanatory Text Rubric, Explanatory Text Peer Review Checklist Activity Pages 8.5, 8.6, 8.7
Take-Home Material	*	Reading, Spelling, Writing	*Calling All Minds: How to Think and Create Like an Inventor*, Chapter 5, pages 171–208 Activity Pages 8.3, 8.4 Writing Journals

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Distinguish between facts and opinion and understand the author's point of view. (RI.6.1, RI.6.3, RI.6.4, RI.6.6; RST.6–8.1, RI.6–8.4, RST.6–8.6, RST.6–8.8)

Writing

Share and evaluate an explanatory text. (W.6.2, W.6.4, W.6.5; WHST.6–8.2, WHST.6–8.4, WHST.6–8.5)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Interpret information presented in diverse media formats. (SL.6.2)

Language

Demonstrate command of conventions of standard English grammar and usage when writing or speaking. (L.6.1)

Recognize variations from standard English in writing. (L.6.1.e)

Use phonics and syllabication to spell words correctly. (L.6.2.b)

Use known strategies such as using context clues, Greek or Latin affixes and roots, as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (L.6.4, L.6.4.a–d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Locate images of a hot-air balloon and dirigible to display online.
- Read the resources on autism in the Digital Components for Unit 2, and be prepared to discuss autism with students.
- Locate and prepare to play the video clip of the Wright brothers. This video and the resources on autism in the above paragraph can be found in the Unit 2 Digital Resources at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/
- Write the purpose for reading on the board/chart paper: *Distinguish between facts and opinion, and identify the author's point of view.*

Writing

- Be prepared to display the Explanatory Text Rubric on page 178 of the Teacher Resources section of this Teacher Guide.
- Draw or enlarge to display the Peer Review Checklist found on Activity Page 8.6.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Small Groups: Chapter 4 [pages 152–157]

Introduce the Chapter 5 minutes

- Tell students they will read another section of Chapter 4. Remind students that they have already read multiple selections from Chapter 4, which deal with things that fl . In addition to learning about author Temple Grandin's own interest in flying and flying machines an how it came about, students have also learned about some aspects of the history of aviation, as well as inventions and modifications to technology important to that histor .
- Explain that in this lesson, students will learn more about the history of flight and the inventors who made it happen. This time, however, students will be asked to distinguish between facts in the text and opinions expressed by the author. Students will also learn about point of view. Tell students that the selection focuses on how the author feels about inventors who inspired her interest in flight as well as how she feels about autism s role in influencing innovation
- Have students turn to page 152 to begin their reading.

Core Vocabulary

- Preview the core vocabulary words using the routine established in the Core Vocabulary section of Reading Lessons 1–5 of this unit.
- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *survivable* on page 153 of the book.

1. **survivable, *adj.*** not fatal; able to be survived (**153**)
2. **steerable**, ***adj.*** able to be mechanically controlled or guided (**153**)
3. **dirigible, *n.*** an aircraft with a rigid structure that is filled with lighte -than-air gas or hot air to make it float **153**)
4. **propulsion, *n.*** the action of being pushed forward (**154**)
5. **aviator, *n.*** a person who flies ai craft; a pilot (**aviators**) (**154**)
6. **Smithsonian, *n.*** the name of a national collection of museums in Washington, DC (**154**)
7. **diagnose, *v.*** to recognize as having a disease or medical condition (**diagnosed**) (**156**)

Vocabulary Chart for Chapter # 4 "Things That Fly"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	aviators dirigible propulsion Smithsonian	diagnosed steerable survivable
Spanish Cognates for Core Vocabulary	aviadoras/aviadores dirigible espectro propulsion síndrome	diagnosticada/diagnosticado sobrevivible
Multiple-Meaning Core Vocabulary Words	dirigible	
Sayings and Phrases		

- Read the purpose for reading from the board/chart paper:

Distinguish between facts and opinion, and identify the author's point of view.

Read Chapter 4 — 30 minutes

Discuss Fact and Opinion

- Ask students how they would define a fact and an opinion. As necessary, review the definitions of these Academic ocabulary words.
  - **fact, *n.*** something that is true or has been proven correct; something that is documentable or measurable and can't be changed
  - **opinion, *n.*** a view or judgment formed in someone's mind
- Present the following sentences and ask them to respond to each one aloud with either "fact" or "opinion": George Washington was the first p esident of the United States. *(fact)* George Washington was a very good president. *(opinion)*
- Explain that a fact can be proved true by researching its accuracy in other resources or through experimentation. An opinion cannot be proved true or false because it is an individual's personal idea or feelings about something.

Establish Small Groups

Before reading the chapter, divide students into two groups using the following guidelines:

- Small Group 1: This group should include students who need extra scaffolding and support to read and comprehend the text. Use the guided reading supports to guide students through reading the text and completing Activity Page 8.2 together. This is an excellent time to make notes in your anecdotal records.
- Small Group 2: This group should include students who are capable of reading and comprehending text without guided support. These students may work as a small group, as partners, or independently to read the text, discuss it with others in Small Group 2, and then complete Activity Page 8.2. Make arrangements to check that students in Small Group 2 have answered the questions on Activity Page 8.2 correctly. You may choose to do one of the following to address this:
    - o Collect the pages and correct them individually.
    - o Provide an answer key for students to check their own or a partner's work after they have completed the Activity Page.
    - o Confer with students individually or as a group at a later time.

The following guided reading supports are intended for use with Small Group 1. Guided reading supports in brackets are intended to guide you in facilitating discussion and should not be read verbatim to students. Guided reading supports not in brackets should be read aloud verbatim. After students read several lines of text, ask students if they have any questions, if anything was confusing, or if anything was hard to understand.

[pages 152–153]

[Read pages 152–153, stopping at the box title "It's a Bird, It's a Plane."]

Evaluative Where did much of Temple Grandin's curiosity about flight come from?

- o Grandin read about the Wright brothers in her book of inventors.

Literal Who were the Wright brothers?

- o They are the brothers often credited with inventing the first airplane

Literal How did humans first attempt to fly?

- o They used hot-air balloons.

Evaluative Do you think it was a good idea to send animals up into the sky before humans? Explain your reasoning.

- o Some students might agree that animals should have been sent up first to see whether the trip was survivable by humans. Other students might believe that it was unfair to send animals up first and that something di ferent could have been done.

SUPPORT: Point students to the word *dirigible.* Explain that this word has two meanings. The first meaning is "steerable." *Steerable* means that it can be steered, or moved in a specific direction, the way a car or a bicycle can be moved in a specific di ection using the steering wheel or handlebars. The second meaning is "an airship that is lighter than air." Dirigibles are different from hot-air balloons because they are steerable in a way that hot-air balloons are not.

Literal What is another name for a dirigible?

- Another name for a dirigible is *zeppelin*.

Inferential Which would be better for long-distance travel, a hot-air balloon or a dirigible, and why?

- A dirigible would be better for long-distance travel because it can be more easily steered. Hot-air balloons tend to go where the wind takes them, which wouldn't be a very reliable way to travel.

SUPPORT: Ask students whether their answer to the above question was a fact or an opinion. Point out that "which is better" is an opinion question. However, opinions can sometimes have facts in them. For example, "A dirigible would be better for long-distance travel" is an opinion, but "it can be more easily steered (than a hot-air balloon)" is a fact. Explain that when a person is giving an opinion, they should learn the facts first and then base their opinion on those facts.

[pages 153–154]

[Have students read the box on page 153 through the end of page 154.]

Inferential Before Sir George Cayley had the idea to stabilize wings, how did most inventors maneuver their wings when attempting to fly?

- They flapped them like bi ds' wings.

CHALLENGE: Ask student volunteers why they think early inventors would have thought flapping wings would get them off the ground. Have a few share their ideas with the class.

Literal Sir George Cayley wrote a book describing three important elements to flying—lift, propulsion, and control. What part of an airplane is related to each of these elements?

- Lift is related to the shape of the airplane's wing, propulsion to the propeller or engine, and control to the rudder on the airplane's tail, used for steering.

Literal What were some of the things that contributed to the Wright brothers' success?

- They were both interested in machinery and how things worked. They built things such as bicycles. They had patience and discipline. They used a "bottom-up" method to acquire knowledge.

Inferential Before they even tried to build their first airplane, the Wright brothers wrote a letter to the Smithsonian Institution (a museum in Washington, D.C.). What were they looking for?

- They wanted all the information they could get about humans' attempts to fl .

[pages 155–156]

[Have students read page 155 to the end of the box on page 156.]

Turn-and-Talk: According to the text, with each flight, the right brothers tested and modified thei planes. Recall what you learned in the previous lesson. What concept does "testing and modifying" illustrate? Discuss your ideas with your partner. *(It illustrates the concept of trial and error.)*

Inferential What does the image on page 155 show? What would we call this machine today?

- It shows the patent for the Wright brothers' "flying machine." oday, we would call this an airplane.

SUPPORT: Show the 3½-minute video clip of the Wright brother's first flight.

[pages 156–157]

[Have students read the remainder of page 156 to the three arrows on page 157.]

SUPPORT: After reading the section but before asking the following questions, explain to students that autism is a developmental disorder characterized by difficulties with social interaction, communication, and repetitive behaviors. Individuals with Asperger's generally have average or above intelligence, good language skills, and often exceptional skills in a certain area, such as music, math, etc.

Inferential Is Grandin's belief that the Wright brothers may have been autistic or had Asperger's a fact or an opinion, and why?

Note to Teacher: Temple Grandin uses the term "Asperger's" to refer to highly functioning individuals on the autism spectrum. The term is no longer used for a variety of reasons. Grandin uses the term in her book, so we have left it in these questions so as not to be confusing. However, you might want to use the term "high functioning autistic person" instead.

- It is an opinion. Grandin does not know this for a fact; she is making a guess based on facts she knows about characteristics of autism and about the Wright brothers.

SUPPORT: Explain to students that a person's opinions are influenced by their experiences, likes and dislikes, and point of view. For example, a writer who loves aerodynamics will have a different point of view about flying than someone who dislikes ae odynamics. Ask students to read page 156 carefully before answering the next question.

Evaluative What is Grandin's point of view about many inventors?

- She believes that they fall on the autism spectrum.

Inferential Is Grandin's point of view a fact or an opinion? Use the text to support your answer.

- Her belief is an opinion. She writes, "It's ultimately impossible to diagnose a person after they are gone." Therefore, she cannot know for certain whether these inventors, including the Wright brothers, were on the autism spectrum.

Evaluative Why does Grandin believe that people with autism who get out and experience the world will see their autistic traits diminish?

- She believes this because of her own experiences.

Literal What is "bottom-up thinking"?

- It is when you gather data and then arrive at a hypothesis.

Inferential What is Grandin's point of view about her own model of learning?

- She sees herself as a bottom-up thinker.

Evaluative What type of thinker do you think you are and why?

- Some students may say that they are bottom-up thinkers because they gather data and arrive at a hypothesis, while others may see themselves as top-down thinkers because they come up with a hypothesis and set out to prove it true.

Discuss Chapter 4 and Wrap Up the Lesson — 10 minutes

Have the class come back together to discuss the purpose for reading:

> Distinguish between facts and opinion, and identify the author's point of view.

Discuss that opinions in informational text are not necessarily bad and that readers can look at the evidence in the text and from their own experiences as well as from other resources to decide for themselves whether they agree or disagree with the author's opinion. Point out that the author uses phrases such as "I think" and "In my experience" to signal when she shares information that is her opinion, not a fact. Ask the following questions to help students remember what they have learned about facts, opinions, and point of view.

1. ***Literal*** Does Grandin believe that the Wright brothers were top-down or bottom-up thinkers?
   - She believes that the Wright brothers were bottom-up thinkers.
2. ***Inferential*** Grandin writes, "Probably the most radical innovation was stabilizing the wings instead of having them flap like bi ds' wings." Which words signal that this sentence is an opinion?
   - The words "Probably the most radical innovation" signals that this sentence is an opinion.
3. ***Evaluative*** Do you agree or disagree with the author's point of view about autism in this chapter? Explain your reasoning.
   - Answers will vary.

Note to Teacher: If there is time after the completion of the lesson, you may choose to have students read Chapter 5, pages 171–208. Alternately, you may choose to have students do one of the following hands-on activities: "Müller-Lyer Illusion," "Ames Trapezoidal Window," "Stereoscope," "Ames Illusion Room," "Solar System Diorama," or "Compass Flower."

Word Work: *Aviators* — 5 minutes

1. In the chapter, you read, "The Wrights became the first aviators to make stable tu ns."
2. Say the word *aviators* with me.
3. *Aviators* means people who fly ai craft. It is a word often used to describe early pioneers of flight, befo e flying was common
4. The airplane's pilot and copilot were the best aviators in the business.
5. What are some other examples of people who are aviators in the text? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "Sir George Cayley and Count Ferdinand von Zeppelin were some of the world's first _____."
6. What part of speech is the word *aviators*?
   - noun

Appositive Sentences

Use an *Appositive* activity for follow-up. Explain to students that an appositive can be a phrase in a sentence that defines a person, place, or thing.

- Show the following example of a sentence with the appositive phrase underlined: The geologist, a scientist who studies Earth, took a rock sample back to her lab for study.
- Explain that the appositive phrase "a scientist who studies Earth," defines the noun *geologist*.
- Point out the commas, and explain that they separate the appositive phrase from the rest of the sentence.
- Cover or cross out the phrase, and read aloud the sentence without the phrase. Explain that it can be removed from the sentence without making the sentence incomplete.
- Provide the following sentence frame for the word *aviators*, and have students fill in the appositive phrase: The aviators, _____, tested a new flight design.
- Invite students to share their answers.

CHALLENGE: Students who have a solid understanding of appositives may benefit f om being challenged to complete the activity without a sentence frame.

DAY 2

GRAMMAR 15 minutes

Frequently Confused Words: *fewer/less; affect/effect*

Introduce Frequently Confused Words 15 minutes

- Explain to students that there are some words that have similar meanings or spellings but that are not interchangeable. Because of their similar meanings or spellings, people frequently get them confused. Two examples are *fewer/less* and *affect/effect.*

fewer/less

- Point out to students that *fewer* and *less* do not have the same meanings, though their meanings are similar. *Fewer* means "not as many" while *less* means "not as much." *Many* refers to things that can be counted. *Much* refers to things that cannot be counted.
    - o People, animals, and books are countable, as in 1, 2, 3, and so on, and would be described using the word *fewer*.
    - o Water, space, and temperature are measurable but not countable in the same way and would be described using the word *less*.
- Illustrate this concept for students by using each word in a sentence.
    - o There are fewer people here today than there were yesterday.
    - o There was less water in the bottle after I took a drink.
    - o Fewer animals were adopted this week.

- Wait until the soup is less hot to eat it.
- Fewer books were returned to the library this month.
- There is less space for me to do my homework.

- Have students complete the following sentence frames in class using the word *fewer* or *less.*
  - _____ moms attended the event this year. *(fewer)*
  - On cold days, the runners drink _____ water than usual. *(less)*
  - How many _____ cars were in the lot this afternoon? *(fewer)*
  - The teacher used _____ gas taking her new car to work. *(less)*

affect/effect

- Next, discuss the words *affect* and *effect* with students.
  - *Affect* is usually a verb, or action word; it means to change or impact something.
  - *Effect* is usually a noun; it means the result of a change.
- Provide the following examples. (Note that *affect* can have the suffi_ *–ed* added if it is being used in the past tense.)
  - *Affect*: The change in leadership affected how people in town acted. The drop in gas prices affected how much people drove. The pandemic affected the way people shopped.
  - *Effect*: The new rules will go into effect immediately. The medicine had a positive effect on Dan's health.
- Have students complete the following sentence frames in class using the word *affect* or *effect.*
  - The new speed limited _____ how fast everyone drove. *(affected)*
  - The teacher's praise had a strong _____ on the student. *(effect)*
  - The movie's _____ on everyone was shocking. *(effect)*
  - The sale _____ the store's prices. *(affected)*
  - How did studying _____ your test grade? *(affect)*
- Provide students with Activity Page 8.3, and go over the directions with them. Have students complete it at home.

Practice Spelling Words 5 minutes

- Explain that students will practice spelling the 12 words they learned in Lesson 7. Some are related to the book *Calling All Minds: How to Think and Create Like an Inventor* while others contain the roots *decem, tri,* and *uni.* These words do not follow one single spelling pattern. Tell students they will be assessed on these words.

- Pass out Practice Spelling Words, Activity Page 8.4, and go over the directions. Tell students to complete the spelling practice for homework.

WRITING 25 minutes

Explanatory Text: Share, Evaluate, Revise

Introduce Explanatory Text Rubric 5 minutes

- Display the Explanatory Text Rubric you prepared before class, and have students turn to Activity Page 8.5. Read it with students, explaining that this rubric will be used for evaluating, editing, and revising their drafts.
- Remind students that readers should be able to follow or complete the steps as described through the text and visuals in their explanatory text.
- Explain that it is useful to have someone else review your draft and provide suggestions about how to improve it.

Peer Review 10 minutes

- Display the Explanatory Text Peer Review Checklist that you prepared before class, and have students turn to Activity Page 8.6.
- Tell students that they will complete Activity Page 8.6 as they read a classmate's draft of their explanatory text. Explain the following guidelines for providing peer review feedback:
    - Feedback should be relevant to the genre and checklist.
    - Feedback should be specific. (Don t just say that the writing is "good"; explain why it is good.)
    - Suggestions for improvement should be respectful and helpful.
- Direct peer review partners to try to complete or to explain in their own words any steps outlined in the drafts.
- Tell writers that as their partners go through their review, they should record any clarifying questions their partners ask in the Clarifying Questions chart on Activity Page 8.7. After all questions have been recorded, tell students to write the answers.
- Then, ask partners to read each other's explanatory texts and to complete the Explanatory Text Peer Review Checklist on Activity Page 8.6.

Revise 10 minutes

- Have students use the Explanatory Text Peer Review Checklist and Clarifying Questions to begin revising their drafts.
- Tell students that they can continue working on their revisions in their Writing Journals for homework.

Take-Home Material

Reading

- Have students read for homework *Calling All Minds: How to Think and Create Like an Inventor,* Chapter 5, pages 171–208.

Spelling

- Have students complete Activity Page 8.4 for homework.

Morphology

- If students did not complete Activity Page 8.3 during Morphology, have them complete it for homework.

Writing

- Have students continue revising their explanatory texts in their Writing Journals for homework.

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 9

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Close Reading: Chapter 5, pages 208–212	*Calling All Minds: How to Think and Create Like an Inventor* Ruler, protractor, compass, T square Activity Page 9.1
	5 min	Word Work: *Colleague*	
DAY 2: **Grammar**	15 min	Practice Frequently Confused Words: *fewer/less; affect/effect*	Activity Page 9.2
Morphology	15 min	Practice Prefixes *uni–, di–*; and Suffixes *–er, –or*	Prefixes and Suffixes Chart from Lesson 7 Activity Page 9.3
Writing	15 min	Write an Explanatory Text: Edit	Writing Journals Activity Pages 9.4, SR.3
Take-Home Material	*	Grammar, Morphology, Writing	Activity Pages 9.2, 9.3 Writing Journals

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Cite evidence in the text to support ideas and conclusions about the text. (RI.6.1, RI.6.2, RI.6.3, RI.6.4, RI.6.5, RI.6.6, RI.6.7; RST.6–8.1, RST.6–8.2, RST.6–8.4, RST.6–8.5, RST.6–8.6, RST.6–8.7, RST.6–8.8)

Writing

Edit an explanatory text. (W.6.2, W.6.4, W.6.5, W.6.6; WHST.6–8.4, WHST.6–8.5, WHST.6–8.6)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on Grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Language

Demonstrate command of the conventions of standard English grammar, usage, capitalization, punctuation, and spelling when writing. (L.6.1, L.6.2, L.6.3)

Use known strategies such as using context clues, Greek or Latin affixes and roots, as well as reference sources such as print or online dictionaries, to determine or clarify the meaning of words. (L.6.4, L.6.4.a–d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Cite textual evidence to support ideas and conclusions about the text.*

Morphology

- Make sure the Prefixes and Su fixes Chart f om Lesson 7 is displayed.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 45 minutes

Close Read: Chapter 5 [pages 208–212]

Review 5 minutes

- If students read Chapter 5, pages 171–208 for homework, ask them what they recall, and review the points below:
    - o In that section, Temple Grandin discusses the Müller-Lyer illusion, which is two straight lines with an arrow attached to each end. On one line, the arrows point inward toward

the line; on the other, the arrows point outward, away from the line. The result is that the lines, though the same length, appear to be different lengths. The line with the arrows that point outward appears longer than the line with the arrows pointing inward. This is just one example of an optical illusion.

- Ask students to tell in their own words what they think an optical illusion is.
    - o Optical means having to do with the eye and illusion is a deceptive or false appearance. An optical illusion is something that appears to the eye to be other than what it actually is.

Introduce the Chapter — 5 minutes

- Tell students they will continue to read the rest of Chapter 5 in class.
- Have students turn to page 208 and point out the word *architectural*. Ask students if they know what an architect is (a person who designs and plans structures such as homes, office buildings, and schools). The wo d *architectural*, then, refers to planning and building structures. Before an architect can begin to build a structure, however, they need a plan. Such a plan includes not only written ideas, but also drawings that will help the architect and their team complete the job of building the structure. Ask students what they think they will learn about the architectural process in this chapter.

Core Vocabulary

- Preview the core vocabulary words using the routine established in the Core Vocabulary section of Lessons 1–5 of this unit.
- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *blueprint* on page 208 of the book.

1. **blueprint, *n***. a plan for where things go; a technical drawing or model of a structure (**208**)
2. **facility**, ***n.*** a structure or building used for a specific purpose **facilities**) (**208**)
3. **carbon, *n.*** a chemical element used for fuel or to help build things (**210**)
4. **filament, *n.*** a thin wire or thread that conducts heat or electricity (**210**)
5. **prodigious, *adj.*** impressive or remarkable (**210**)
6. **draftsman, *n.*** a person who makes detailed drawings or plans that are technical in nature (**210**)
7. **installation, *n.*** the process of putting something in place (**210**)
8. **illuminate, *v.*** to make something bright or visible; to make something clear or understandable (**210**)
9. **T square, *n.*** a technical drawing instrument used for horizontal lines or right angles (**T squares**) (**212**)
10. **colleague, *n.*** a person who is a coworker (**212**)

Vocabulary Chart for Chapter # "[Chapter Title]"		
Vocabulary Type	**Tier 3 Domain-Specific Words**	**Tier 2 General Academic Words**
Core Vocabulary	blueprint carbon draftsman filament installation T squares	colleague facilities illuminate prodigious
Spanish Cognates for Core Vocabulary	carbón filament instalación	colega Iluminar
Multiple-Meaning Core Vocabulary Words		illuminate

- Read the purpose for reading from the board/chart paper:

Cite textual evidence to support ideas and conclusions about the text.

Read Chapter 5 [pages 208–212] 25 minutes

Close Reading

The practice of close reading involves directing students' attention to specific aspects of a text. The guided reading supports in this close reading of Chapter 5 are intended to provide this focus and are labeled as follows:

- **VOC** indicates questions or comments that focus on vocabulary to explain meanings or check student understanding and may highlight multiple-meaning words or idioms.
- **SYN** indicates questions or comments that focus on syntax to explain complex sentences and syntactic structure.
- **COMP** indicates questions or comments that focus on students' understanding of the text. These questions require text-based responses and are sequenced to build a gradual understanding of the key details of the text. Students may provide multiple responses using different pieces of evidence, grounding inferences logically in the text.
- **LIT** indicates questions or comments that focus on literary devices, which are techniques an author uses to produce a specific e fect, such as alliteration, similes, metaphors, etc.

Not all question types will be included in each close reading lesson.

These labels and their explanations are for your reference and are not intended to be shared with students. Also, guided reading supports in brackets are intended to guide you in

facilitating discussion and should not be read verbatim to students. Guided reading supports not presented in brackets should be read aloud verbatim.

There are many ways for students to respond to the questions. Vary how you elicit students' responses to promote student engagement. For example:

- Have students work in pairs. Following each question, direct students to consult with their partner about the correct response before one student responds.
- Have students work in small groups of three or four students. Following each question, direct students to consult with others in their group about the correct response before one student responds.
- Following a question, have all students provide a written response before one student responds orally.

Support: If students forget the meanings of any of the vocabulary terms discussed at the beginning of Lesson 9, refer them to Activity Page 9.1 or the glossary on Activity Page SR.1.

Read Chapter 5

[Have students read page 208 aloud or silently, starting with the first full paragraph that begins with the words, "The first time I encountered." Ask students to stop at the end of the paragraph.]

VOC/Literal What does the word *blueprint* mean?

- o a plan for where things go; a technical drawing or model of a structure

SUPPORT: Encourage students to use context clues to answer the question. Tell students that there are clues throughout the first paragraph that will help them understand the meaning of the word. These clues include "architectural floor plans," "highly detailed layout drawing of the enti e plant and the grounds it was built on," and the final sentence in the first paragrap

COMP/Inferential How did Temple Grandin learn what a blueprint showed?

- o With the blueprint in hand, she walked around the building and its grounds, comparing structures she saw in real life with what was on the blueprint.

Stop and Jot: Have students stop and jot a *who, what, when, where, why,* or *how* question about blueprints. As time allows, invite a few students to share their questions and discuss answers. Explain that sometimes students will need to keep reading in order to find an answe .

[Have a student read aloud the second paragraph on page 208.]

COMP/Literal Name the three actions Grandin took to further learn how blueprint drawings relate to structure.

- o 1. She went out to the feedlots and measured existing cattle-handling facilities.
- 2. She used the measurements to make a first draft of a drawing what she emembered.
- 3. She went back out to the feedlot to determine whether her drawing was correct.

[Have students read the first paragraph of page 209.]

LIT/Literal What idea does Grandin offer to help her readers learn more about blueprints?

- She asks readers to make a blueprint of their bedrooms.

Note to Teacher: You may want to ask students to make a blueprint of their bedroom for homework.

VOC/Literal What word does Grandin use to describe the electrical connections or outlets of the room when drawn on the blueprint?

- She calls the electrical connections and outlets "schematics."

CHALLENGE: Have students choose a widely visited room in the school and make a blueprint of it from memory. Have students draw the furniture where they remember it being, put lines where the doors are, and show where the windows (if there are any) are. When students are done, have them trade their drawings with a partner to get feedback on it. Have students ask their partners what room they think it is.

[Have students read the first paragraph of the box titled "Let There Be Light" on page 209. The paragraph continues onto page 210.]

COMP/Inferential Why might Lewis Latimer's contributions to two famous inventions be called "instrumental"?

- Accept reasonable answers. A possible answer might be that those inventions were the telephone and the light bulb, which revolutionized life throughout the entire world.

SUPPORT: Explain that the word *instrumental* means "important to making something happen." Sometimes, a person may come up with a new invention. Over time, however, other people add to or change the invention in some way to make it better. This is what Latimer did with the telephone and the light bulb.

[Have students read the first full paragraph on page 210.

COMP/Evaluative What facts from the text support the idea that Lewis Latimer's accomplishments were extraordinary?

- He was the son of escaped slaves. He enlisted in the army at the age of 15 and received an honorable discharge. At 17, he was hired into the office of a patent company. He taught himself drafting. He was promoted to head draftsman. By the age of 25, he was earning $20 a week.

SUPPORT: Explain that in the mid-1800s, $20 a week was considered a great deal of money. In the 1860s, masons only made around $13.50 a week on average, privates in the army earned around $11 a week, fi emen around $9 a week, and carpenters under $8.50 a week.

VOC/Inferential Consider what you learned about drafts and blueprints on the previous page. Consider what Lewis Latimer did for a living. Then answer the question: What is a draftsman?

- A draftsman is a person who makes detailed drawings or plans that are technical in nature.

SUPPORT: Point out to students that draftsmen can be women as well as men. The gender-neutral term that can be used for anyone is *drafter*. Ask students to name the female draftsman (or drafter) they have been reading about. *(Temple Grandin)*

SYN/Inferential Why is the term *water closet* followed by the word *bathroom*?

- The word *bathroom* is another term for *water closet*.

SUPPORT: Remind students that in several previous lessons, they learned about appositives, which are terms or phrases that appear before or after a noun phrase to provide more information about it. Provide students with examples if necessary. Examples: My aunt, Lucinda Price, is coming to our house today. The dog, a golden retriever, was found nearby. In the first example, *Lucinda Price* is an appositive for *aunt*. In the second, *golden retriever* is an appositive for *dog*.

- [Have students read the second full paragraph on page 210.]

COMP/Evaluative Grandin states that Latimer's "talent must have been prodigious." What evidence from the text supports this conclusion?

- He was recognized by the owners and promoted to draftsman. He went from earning $3 a week to $20 a week.

COMP/Literal For what inventions did Latimer have a patent?

- He held patents for an improved water closet, an early air conditioning and sanitizing system, a locking rack for hats and coats, a safety feature for elevators, and the filament for Edison s light bulbs.

SUPPORT: Point out the word *illuminate*. Explain that it has two different but related meanings. It means "to make something bright or visible," but it also means "to make something clear or understandable." Note for students that this is a rare case in which both definitions of a wo d apply in a single sentence.

COMP/Inferential The last sentence on the page says that Latimer "helped illuminate our lives inside and out." What does the author mean?

- She means that he helped invent items related to the light bulb that literally made things brighter or more visible. She also means that he gave us a clearer understanding of how to improve existing inventions.

[Have students examine the patent on page 211.]

COMP/Evaluative How do the images of patents help you understand the text better?

- Students may say that they show two examples of Lewis Latimer's inventions/ modifications. By seeing these, we can better understand how Latimer s mind worked and what he did that was so extraordinary.

SUPPORT: Remind students of the various patents they have learned about throughout this unit, including those in Chapter 2. In that chapter, they learned about the patent that Grandin's own grandfather took out, as well as one taken out by Margaret Knight. If time permits, allow students to look back at those patents (which appear on pages 41 and 51).

[Have students read the paragraph at the bottom of page 211.]

COMP/Inferential In the first sentence of the paragraph, Grandin says that she did not know how to use drafting tools. Using evidence from the rest of the paragraph, explain how Grandin learned to use drafting tools.

- She watched another draftsman use his drafting tools. She also learned how to read the drawings. She bought the same pencil and tools that her fellow draftsman used and pretended she was that draftsman when drawing.

Turn-and-Talk: Have students turn to a partner and discuss anything they may have learned to do by watching someone else. If time permits, have volunteers share with the class some of what they learned.

[Have students read all of page 212.]

COMP/Literal According to Grandin, why is drafting considered a "universal language"?

- Drafting is considered a "universal language" because blueprints can be understood by any builder, engineer, architect, or designer.

SUPPORT: Show and explain the drawing tools that Grandin used in creating her drawings: ruler, protractor, compass, and T square.

COMP/Inferential What evidence from the text supports the conclusion "the process of drafting has changed since Grandin first learned the skill."

- When Grandin first started making mechanical drawings, they we e done by pencil. Today, they are mostly done by computers.

COMP/Literal In the final paragraph, Grandin writes, "It wasn't enough to be a visual thinker." What else did she need?

- She needed to communicate her ideas in drawings.

Discuss Chapter 5 and Wrap Up the Lesson 5 minutes

Bring students back together, and remind students of the purpose for reading:

> Cite textual evidence to support ideas and conclusions about the text.

Use the following prompts to discuss and wrap up the lesson.

1. ***COMP/Evaluative*** Consider everything you have learned in the text so far in this lesson. What can you conclude about why it's important for draftsmen to be able to put their ideas on paper for others to see?

- Answers will vary but may state that it is important for draftsmen to put their ideas on paper so that other people can build what the draftsmen planned or designed.

2. ***COMP/Inferential*** What evidence from the text supports your conclusion in the previous question?

- Answers will vary but should cite specific evidence f om the text that supports students' conclusion.

Note to Teacher: If there is time after the completion of the lesson, you may choose to have students do one of the following hands-on activities in Chapter 5: "Müller-Lyer Illusion" pages 179–180; "Ames Trapezoidal Window" pages 181–182; "Ames Illusion Room" pages 197–200; "Solar System Diorama" pages 200–203; "Compass Flower" pages 206–207.

Word Work: *Colleague* 5 minutes

1. In the chapter, you read, "I still keep all my original drawings in a flat file in my hom in case I need to refer to them or share them with a colleague."
2. Say the word *colleague* with me.
3. A *colleague* is a person with whom one works in a profession.
4. My colleague and I worked to finish the job togethe .
5. What are some other examples of a *colleague* that you are aware of at school or somewhere else? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "Davy Jones was a _____ of Temple Grandin."]
6. What part of speech is the word *colleague*?
   - o noun

Making Choices

[Use a *Making Choices* activity for follow-up.] I am going to read several sentences. If the sentence I read is about a colleague say that is a *colleague*. If the sentence I read is *not* about a colleague, say that is not a *colleague*.

1. The two coteachers taught the class together.
   - o That is a colleague.
2. My friend and I like to ride bikes together.
   - o That is not a colleague.
3. Rico sent his coworker Mia an email about the work deadline.
   - o That is a colleague.
4. The clerk at the store helped me find the toothpaste aisle since I wanted to buy toothpaste.
   - o That is not a colleague.

DAY 2

GRAMMAR 15 minutes

Confused Words: *fewer/less; affect/effect*

Practice Frequently Confused Words: *fewer/less; affect/effect* 15 minutes

- Remind students that some words have similar meanings or spellings but are not interchangeable. Because of this, people frequently get them confused. Point out that students learned about two of these examples in Lesson 6: *fewer/less* and *affect/effect.*

- Refresh students' memory about the slightly different meanings of the words *fewer* and *less*. *Fewer* means "not as many" while *less* means "not as much." *Many* refers to things that can be counted. *Much* refers to things that cannot be counted. Provide additional examples: People and toys are countable. Orange juice is not. Cats are countable. Lava is not.
- Illustrate this concept for students by using each word in a sentence.
    - There are fewer people here today than there were yesterday.
    - There are fewer toys on the floor no .
    - There's less orange juice in the carton.
    - There are fewer cats in the neighborhood.
    - Less lava is coming out of the volcano now.
- Next, discuss the words *affect* and *effect* with students. Point out that *affect* is usually a verb, or action word; it means to change or impact something. *Effect* is usually a noun. It is the result of a change. Provide some new examples. (Note that *affect* can have the suffi –*ed* added if it is being used in the past tense.)
    - *Affect*: News of the event affected how people acted. How did the teacher's speech affect your point of view?
    - *Effect*: The whistle had a weird effect on the dog. The effect was to prevent criticism.
- Pass out Activity Page 9.2. Go over the directions for the first half with students, and answer any questions they may have. If students are unable to finish the activity in time, allow them to finish it as homework

MORPHOLOGY 15 minutes

Prefixes *uni–, di–;* Suffixes *–er, –or*

Practice Prefixes *uni–, di–;* Suffixes *–er, –or* 15 minutes

- Display the Prefixes and Su fixes Chart f om Lesson 7, and remind students that they learned about the root words *uni* (meaning "one") and *di* (meaning "two") in Lesson 8.
- Remind students that one meaning of the suffi –*er* is "more." When the suffix –*er* is added to the end of a word, it means "more" of whatever that word means.
- Remind students that when the suffixes –*er* and –*or* are added to a word, it means "one who."
- Go over the directions for Activity Page 9.3 with students, and answer any questions they may have. If students are unable to finish the activity in time, allow them to finish it a homework.

WRITING 15 minutes

Write an Explanatory Text: Edit

Edit 15 minutes

- Explain to students that writers always have to edit their work to check for errors in grammar, spelling, and punctuation. This is the final step befo e they publish their writing.

Note to Teacher: You may wish to incorporate the Grammar and Morphology Lessons with the editing exercise in today's Writing Lesson. Tell students that when they edit their explanatory texts, they will look for and correct any errors in grammar and morphology as well as spelling and punctuation.

- Display the Explanatory Text Editing Checklist, and have students turn to Activity Page 9.4. Call on volunteers to read the items on the checklist aloud. Explain that students will use this checklist to find and cor ect errors in their drafts. Then students will complete a final draft for publication.
- Allow students five minutes to ead their drafts and use the Editing Checklist to look for errors. Then pause and call on volunteers to share an error they found and fixed
- Remind students that they can also refer to the Proofreading Symbols Chart on Activity Page SR.3 to help them edit their drafts.
- Students can finish editing their drafts in their riting Journals and then complete a final draft on separate paper. If students have computer access, you may want to ask them to type their drafts.

Take-Home Material

Grammar

- If students did not complete Activity Page 9.2 during the class, have them complete it for homework.

Morphology

- If students did not complete Activity Page 9.3 during the class, have them complete it for homework.

Writing

- Have students finish evising their drafts in their Writing Journals and then complete.

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 10

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Reading**	40 min	Read-Aloud: Epilogue, pages 213–217	*Calling All Minds: How to Think and Create Like an Inventor* Activity Page 10.1
	5 min	Word Work: *Components*	
DAY 2: **Spelling**	15 min	Assessment	Activity Page 10.2
Writing	30 min	Write an Explanatory Text: Publish	Final drafts of explanatory text Activity Page SR.2

Primary Focus Objectives

By the end of this lesson, students will be able to:

Core Content Objectives

Read a science biography and demonstrate understanding through discussion and writing.

Reading

Determine how the epilogue sums up the central ideas in a book and provides a conclusion. (RI.6.1, RI.6.2, RI.6.4, RI.6.5, RI.6.6; RST.6–8.1, RST.6–8.2, RST.6–8.4, RST.6–8.5, RST.6–8.6)

Writing

Publish an explanatory text. (W.6.2. W.6.4, W.6.6; WHST.6–8.2, WHST.6–8.4, WHST.6–8.6)

Speaking and Listening

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly. (SL.6.1, SL.6.1.a–d)

Language

Use phonics and syllabication to spell words correctly. (L.6.2.b)

Use known strategies such as using context clues as well as reference sources such as print or online dictionaries to determine or clarify the meaning of words. (6.4, L.6.4.a, L.6.4.c, L.6.4.d)

Acquire and use accurately grade-appropriate general academic and domain-specific words. (L.6.6)

ADVANCE PREPARATION

Reading

- Write the purpose for reading on the board/chart paper: *Describe how the epilogue sums up the central ideas in the book and provides a conclusion.*

Spelling

- Erase or remove the classroom list of spelling words before conducting the spelling assessment.

Writing

- Display the Writing Process Chart on Teacher Resources page 177.

Fluency (Optional)

- Choose and make copies of a text selection from the online Fluency Supplement to distribute and review with students who need additional fluency practice or to use as fluency assessment. If you choose to assess students, use the Optional Fluency Assessment Guide in Teacher Resources. See the introduction of this Teacher Guide for more information on using the Fluency Supplement.

DAY 1

READING 35 minutes

Read-Aloud: Epilogue [pages 213–217]

Introduce the Epilogue 10 minutes

- Tell students they will read the epilogue of *Calling All Minds: How to Think and Create Like an Inventor.*
- Some students may be unaware of what an epilogue is. Explain that many books have a prologue and an epilogue. The prologue comes at the beginning of the book and is usually an introduction to the story or theme. The epilogue comes at the end of the book and is a conclusion. Sometimes it tells what happens to the characters after the story is over.
- Have students turn to page 213 to begin their reading.

Core Vocabulary

- Preview the core vocabulary words using the routine established in the Core Vocabulary section of Reading Lessons 1–5 of this unit.
- Begin by telling students that the first vocabulary wo d they will encounter in the selection is *psychological* on page 213 of the book.

1. **psychological, *adj***. having to do with the mind (**213**)
2. **physician, *n.*** a person qualified to practice medicine; a doctor **physicians**) (**213**)
3. **biological, *adj.*** physical; having to do with the body or life (**213**)
4. **component, *n.*** a part of a larger body, object, or system (**components**) (**213**)
5. **sensory sensitivity, *n.*** an awareness of the information being received through one's senses; a characteristic of autism (**sensory sensitivities**) (**213**)
6. **oversensitivity, *n.*** a condition related to having more than the usual awareness of one's environment and surroundings; a tendency to become easily upset by something in the external environment (**213**)
7. **vaccine, *n.*** a substance used to protect people or animals against diseases (**vaccines**) (**213**)
8. **headmaster, *n.*** the person in charge of a private school; the principal (**214**)
9. **journal, *n.*** a magazine or newspaper that focuses on a particular subject or profession (**215**)

Vocabulary Chart for the Epilogue

Vocabulary Type	Tier 3 Domain-Specific Words	Tier 2 General Academic Words
Core Vocabulary	biological physicians psychological vaccines	components headmaster journal oversensitivity sensitivities sensory
Spanish Cognates for Core Vocabulary	biológica/biológico psicológica/psicológico svacunas	components ensorial sensibilidades
Multiple-Meaning Core Vocabulary Words		journal

- Read the purpose for reading from the board/chart paper:

> Describe how the epilogue sums up the central ideas in the book and provides a conclusion.

Read the Epilogue 25 minutes

Read the epilogue aloud as students follow along in their books, pausing to read and discuss the corresponding guided reading supports. (You may choose to have students take turns reading paragraphs of the epilogue.) Guided reading supports in brackets are directional and not intended to be read aloud. All other phrases and sentences are intended to be read aloud verbatim. Whenever asking a guided reading support question, explicitly encourage students to refer to the text and reread prior to offering an answer.

[page 213]

Stop and Jot: Before students read, have them write the answer to the following question: *What do you think the purpose of an epilogue is?* Students can look for the answer to see if their answer is correct as they read the epilogue.

Literal When Temple Grandin was growing up, what did people think about autism?

- o They thought autism was psychological and not biological.

SUPPORT: Explain to students that the term *psychological* means having to do with the mind. *Biological* means having to do with the body or life. Psychologists are people who study the mind and human behaviors. Biologists are people who study the physical body.

CHALLENGE: Point out the word *physician*, which means people qualified to practice medicine. Have students think about what physicians do. Ask students if they know any physicians (their family doctor, for example).

Evaluative Grandin writes, "My mother saw this as weird behavior." Is Grandin's mother's point of view a fact or an opinion? Explain your answer.

- o It is an opinion because it cannot be proven to be true or false. It is what Grandin's mother believed.

SUPPORT: Remind students that they learned about fact and opinion in Lesson 8. A fact is a statement that can be proven to be true. An opinion is a statement that is a belief and cannot be proven to be true.

Literal Why did Grandin dream of a machine that could hold her tightly?

- o Because of her autism, Grandin craved the pressure of being held, but like many autistic people, she found hugs from other people too jarring for her nervous system.

[page 214]

Evaluative Grandin says that the pressure of the squeeze chute calmed her anxiety for about one hour. What do you think she means when she says, "It was the first time I truly felt like myself"?

- o Answers will vary but may state that she means that her anxiety momentarily disappeared after she used the squeeze chute; she could think about other things, not just about feeling anxious. When she was anxious, all she could think about was being afraid. Before this point, Grandin had never known that feeling. This was the first time she was able to feel that way.

Literal What motivated Grandin to build her own squeeze machine?

- When she returned to school, she had an anxiety attack.

SUPPORT: To help students understand how the squeeze machine worked, have them look at the image. Explain that pressure on the box would in turn put pressure on whoever was inside the box. That pressure would feel similar to a hug but without the human factor that causes hugs to be so stressful for autistic individuals.

Evaluative In the previous lesson, you learned that blueprints communicate visual information. Here, Grandin says that she did not need a blueprint to build her first squeeze machine. Why didn't she need a blueprint?

- She said, "If [I] could see it in my mind, I could build it."

Inferential Grandin writes, "Unfortunately, the headmaster and psychologist at the school thought [the squeeze machine] was weird and maybe dangerous. They called my mother, and they wanted me to get rid of it." Which sentence is the cause, and which is the effect?

- Cause: The headmaster and psychologist thought it was dangerous. Effect: They called Grandin's mother, wanting her to get rid of it.

[page 215]

Literal What does Grandin say we need in both science and life?

- She says we need mentors, guides, and teachers.

SUPPORT: Prompt students to think about times they have learned something new. Ask students to think about who taught them what they learned or who helped them to learn it better. Point out that mentors, guides, and teachers can be parents, grandparents, friends, schoolteachers, religious leaders, and so on. If time permits, have student volunteers discuss people who have mentored them.

Evaluative Grandin compares writing articles to an "intellectual patent." What do you think this means, and why might she make this comparison?

- A patent is a legal process that protects the rights of an inventor after the patent has been filed. By writing and publishing articles of her ideas, she is making her ideas known publicly and permanently. The ideas are no longer just in Grandin's mind.

Inferential Why does Grandin advise students to first read the magazines to which they want to submit their writing?

- Being familiar with a magazine will help prevent a writer from submitting work to a magazine that might not publish that kind of work.

CHALLENGE: Some students in the class may enjoy writing. Have these students write a short paragraph about what they like to write about. Then have them think about what type of media might publish the kind of work they want to write. For example, a student who wants to write about their favorite music may be interested in submitting an article to a music magazine or blog. Guide students to consider the right media for the subjects in which they are interested. Links

to submission guidelines for magazines that publish student writings are available in the Digital Components at https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

[page 216]

Literal/Inferential What are the steps Grandin recommends for getting an article published? Why might it be important to follow these steps?

- Before you even write your article, you should be familiar with magazines that publish the kinds of topics in which you are interested. This will help you clarify what type of article you'd like to write. Then, you should develop ideas for the article and organize your ideas into an introduction, body, and conclusion.

SUPPORT: Remind students that they learned about sequencing text structure in Lesson 4. Point out that sequencing helps readers understand the order in which an event happened or how something is put together.

Evaluative Grandin notes that she built many "three-dimensional steel and concrete structures" in her imagination. How did she solve the problem of making it possible for other people to build them?

- She transferred her ideas into drawings that other people could use to build them.

Literal Why couldn't Grandin get a patent for her squeeze machine?

- At the time, the U.S. Patent Office would only allow patents for new inventions, not for new uses of previous inventions.

SUPPORT: Explain to students that there have been various types of inventions to help soothe animals, including pets. For example, there are calming jackets for animals such as dogs and cats. These jackets apply pressure to an anxious animal's body, helping to calm it in the same way that the Squeeze Machine helped Temple Grandin.

[page 217]

Evaluative Why do you think Grandin concludes her book by discussing her autism?

- Answers will vary but may include that she began the book by talking about her autism. By discussing it in the epilogue, she is linking the conclusion of the book to the beginning.

Inferential What do you think the purpose of an epilogue is?

- An epilogue is a way for the author to conclude a text or tell readers what happened to the people discussed in the text or how events in the text ended.

Discuss the Epilogue and Wrap Up the Lesson — 5 minutes

Remind students of the purpose for reading, and then use the question below to wrap up the lesson.

> Determine how the epilogue sums up the central ideas in the book and provides a conclusion.

1. ***Evaluative*** How does Grandin conclude her book?

   o She returns to the subject of her autism and how it helped her to become an inventor and learn more about science. This is how she began the book. It reminds readers of the theme that thinking differently and respecting people who think differently can spark creativity and new ideas.

Word Work: *Component* — 5 minutes

1. In the epilogue, you read, "Physicians had no idea that there were biological components at work, including sensory sensitivities."
2. Say the word *components* with me.
3. *Components* are parts of a larger body, object, or system.
4. Most inventions have many *components.*
5. What are some other examples of things in your life that have components? [Ask two or three students to use the target word in a sentence. If necessary, guide and/or rephrase students' responses to make complete sentences: "The device won't work because it's missing a couple of _____."]
6. What part of speech is the word *components*?

   o noun

Making Choices

[Use a *Making Choices* activity for follow-up.] I am going to read several sentences. If the sentence I read is about *components,* say that is *components*. If the sentence I read is *not* about *components,* say that is *not components*.

1. There are many parts in a car engine.

   o components

2. My family only has one car.

   o not components

3. We took a tour of the whole factory.

   o not components

4. The stomach is part of the digestive system.

   o components

DAY 2

SPELLING 15 minutes

Assessment 15 minutes

- Have students turn to Activity Page 10.2 for the spelling assessment.
- Using the following list, read the words one at a time in the following manner: Say the word, use it in a sentence, and then repeat the word.
- Tell students that at the end you will review the list once more.
- Remind students to pronounce and spell each word syllable by syllable.

1. amateur	The amateur astronomer discovered a new asteroid passing Earth.
2. analyze	The computer technician needed to analyze all the data before beginning work.
3. answer	The teacher asked students to give a written answer to the question
4. December	The young couple set their wedding date for late December.
5. develop	The toy company wanted to develop new dinosaur figures.
6. inventor	The inventor still needed to patent her device.
7. philosopher	The philosopher thought deeply on the subject of human history.
8. similar	The three designs were too similar.
9. sophomore	This was the young woman's sophomore year in high school.
10. teacher	Every student loved the teacher for his kindness and generosity.
11. triangle	The strange disappearances of ships and boats formed a triangle on a map around Bermuda.
12. universe	The universe was much bigger than she had ever imagined.

- After reading all the words, review the list slowly, reading each word once more.
- Have students write the following sentence as dictated.

> The amateur inventor studied the universe with her new telescope.

- Repeat the sentence slowly several times, reminding students to check their work for appropriate capitalization and punctuation.
- Collect all spelling assessments to grade later. Use of the template provided below is highly recommended to identify and analyze students' errors.

Spelling Assessment Analysis chart

Student	1. amateur	2. analyze	3. answer	4. December	5. develop	6. inventor	7. philosopher	8. similar	9. sophomore	10. teacher	11. triangle	12. universe

- It may be helpful to refer back to the Pronunciation/Syllabication Chart in analyzing student errors.

Word	CK Code	Syllable Type
amateur	/am*ə *cher/	closed*schwa*r-controlled
analyze	/an*ə *liez/	closed*schwa*open
answer	/an*ser/	closed*r-controlled
December	/dee*sem*ber/	open*closed*r-controlled
develop	/də *vel*ə p/	schwa*closed*schwa
inventor	/in*ven*ter/	closed*closed*r-controlled
philosopher	/fə *los*ə *fer/	schwa*closed*schwa*r-controlled
similar	/sim*ə *ler/	closed*schwa*r-controlled
sophomore	/sof*mor/	closed*r-controlled
teacher	/tee*cher/	open*r-controlled
triangle	/trie*aeng*ə l/	open*closed*schwa
universe	/ue*nə *vers/	open*schwa*r-controlled

- Students might make the following errors:
  - amateur: using “chure” for /tuer/
  - December: using “sem” for /sem/
  - inventor: using “er” for /or/
  - similar: using “e” for /ə/
- Also, examine the dictated sentence for errors in capitalization and punctuation.
- Although any of the above student-error scenarios may occur, misspellings may be due to many other factors. For example:
  - Is the student consistently making errors on specific vowels? Which ones
  - Is the student consistently making errors at the ends of the words?
  - Is the student consistently making errors in multisyllable words but not single-syllable words?

WRITING 15 minutes

Write an Explanatory Text: Publish

Publish 5 minutes

- Direct students' attention to the Writing Process Chart on Activity Page SR.2. Remind students they have planned, drafted, shared, revised, and edited their writing. Now it is time for the final step in the writing p ocess: publishing their writing.
- Explain that publishing can take several different forms. For example, writing can be published by printing and distributing the written copies to an audience. It can also be published by reading it aloud to a group of people. It can also be published by reading it to a single individual. Explain that students will publish their writing by reading it to a small group of classmates.
- As time allows, have students share their writing with a partner or a small group. If time does not allow for all students to publish their stories during this lesson, have students share their writing during a Pausing Point or at a later date.

Note to Teacher: Refer to page 153 of this Teacher Guide and corresponding Activity Page E.1 for a recommended publishing activity to take place during the Pausing Point at the end of this unit.

Take-Home Material

Fluency (Optional)

- Have students take home a text selection from the Online Fluency Supplement if you are choosing to provide additional fluency practice

Lesson 11

AT A GLANCE CHART			
Lesson	**Time**	**Activity**	**Materials**
DAY 1: **Unit Assessment**	35 min	Assessment	Activity Page 11.1
Unit Feedback Survey	10 min	Survey	Activity Page 11.2

UNIT ASSESSMENT 35 minutes

- Make sure each student has a copy of Activity Page 11.1. You may have collected this Activity Page from students at the beginning of the unit.
- Tell students they will read two selections, answer questions about each, and respond to a writing prompt. In the next sections, students will answer grammar and morphology questions evaluating the skills they have practiced in this unit.
- Encourage students to do their best.
- Once students have finished the assessment, encourage them to eview their papers quietly, rereading and checking their answers carefully.
- Circulate around the room as students complete the assessment to ensure everyone is working individually. Assist students as needed, but do not provide them with answers.
- This is a good opportunity to use the Tens scoring system to gather formative assessment data.

Reading Comprehension

The reading comprehension section of the Unit Assessment contains two selections and accompanying questions. The first selection is an informational text describing a famous inventor. The second selection is an informational text describing an invention.

These texts were created using guidance from the Common Core State Standards (CCSS) and recommendations from Student Achievement Partners (AchieveTheCore.org). These texts are considered worthy of students' time to read and meet the expectations for text complexity at Grade 6. The texts feature core content and domain vocabulary from *Calling All Minds: How to Think and Create Like an Inventor* that students can draw on in service of comprehending the text.

The questions pertaining to these texts are aligned to the CCSS and are worthy of students' time to answer. Questions have been designed so they do not focus on minor points in the text, but rather, they require deep analysis. Thus, each item might address multiple standards.

In general, the selected-response items address Reading standards, and the constructed-response item addresses Writing standards. To prepare students for CCSS-aligned assessments, such as those developed by the Partnership for Assessment of Readiness for College and Careers (PARCC) and SmarterBalanced, some items replicate how technology may be incorporated in those assessments, using a paper-and-pencil format.

UNIT ASSESSMENT ANALYSIS

Quantitative and Qualitative Analysis of Text

The texts used in the reading comprehension assessment, "Hedy Lamar: Inventor" (science biography) and "The Modern Traffic Signal" (informational text), have been profiled for text complexity using the quantitative measures described in the Common Core State Standards for English Language Arts, Supplement to Appendix A, "New Research on Text Complexity," (CoreStandards.org/resources). Both selections fall within the Common Core Grades 5–6 Band.

Reading Comprehension Item Annotations and Correct Answer and Distractor Rationales

* To receive a point for a two-part question, students must correctly answer both parts of the question.

Item	Correct Answer(s)	Standards
1 Part A ***Literal***	sequence	RI.6.5; RST.6–8.5
1 Part B ***Literal***	B	RI.6.1; RST.6–8.1
2 Part A Inferential	A	RI.6.2; RST.6–8.2
2 Part B ***Literal***	Answers will vary. Students should reference details about both Lamarr's acting and inventing.	RI.6.1, RI.6.2; RST.6–8.1
3 ***Literal***	Opinion. The word *exceptional* is a personal judgment that cannot be proved true or false.	RI.6.6; RI.6–8.6
4 ***Literal***	Frequency hopping is a technology that allows a missile to avoid radio interference from the enemy as it makes its way to the target.	RI.6.4; RI.6–8.4; L.6.4.a
5 *Inferential*	Frequency hopping was a technology that led to Wi-Fi.	RI.6.3
6 *Inferential*	D	RI.6.2
7 ***Literal***	B	RI.6.4; RST.6.4

8 ***Literal***	problem and solution; cause and effect; sequence	RL.6.5; RST.6.5
9 ***Inferential***	Coal mines were often flooded with groundwater.	RI.6.3
10 Part A ***Literal***	It shows an early steam engine used to pull water from a mine.	RL.6.1
10 Part B ***Evaluative***	Answers will vary but should state that the image shows what an early steam engine looked like, which adds to its description in the text.	RL.6.5

Writing Prompt Scoring

The writing prompt addresses CCSS W.6.2.a–e, WHST.6.2; L.6.1, L.6.2.a–b, L.6.3.a.

Score	**4**	**3**	**2**	**1**
Criteria	Student writes a clear, easy-to-follow procedure. Response includes all of the following: materials needed, logical steps, effective text structure, and conclusion. Response maintains a formal style, effectively varies use of two or more sentence types, and has no errors in grammar, spelling, and punctuation.	Student writes a mostly clear procedure. Response includes most of the following: materials needed, logical steps, effective text structure, and conclusion. Response mostly maintains a formal style, includes two sentence types, and has minimal errors in grammar, spelling, and punctuation.	Student writes a procedure that may have some omissions in materials, steps, or sequence. Response is lacking some of the following: materials needed, logical steps, effective text structure, and conclusion. Response may not maintain a consistent formal style or vary sentence types effectively and has a number of errors in grammar, spelling, and punctuation.	Student writes a procedure with many omissions in materials, steps, and sequence that make the text difficult to follow. Response lacks many of the following: materials needed, logical steps, effective text structure, and conclusion. Response does not use a consistent formal style or vary sentence types and has many errors in grammar, spelling, and punctuation.

Grammar Answer Key

The grammar assessment addresses CCSS L.6.3.a.

1. simple
2. complex
3. compound

4. compound-complex
5. fewer
6. less
7. fewer
8. effect
9. affect
10. affect

Morphology Answer Key

The morphology assessment addresses CCSS L.6.4.b.

1. F
2. D
3. G
4. E
5. B
6. C
7. A
8. Complete sentence should demonstrate the underlined word means “someone who organizes.”
9. Complete sentence should demonstrate the underlined word means “more bright.”
10. Complete sentence should demonstrate the underlined word means “someone who operates (a tow truck).”

UNIT FEEDBACK SURVEY — 10 minutes

At the conclusion of the unit, have students complete the Unit Feedback Survey on Activity Page 11.2.

Pausing Point

Culminating Activities

The following activities are offered should you choose to pause at one or two points during the teaching of this unit. During that time we recommend that you use one or more of the Culminating Activities described below or an activity you create.

End-of-Unit Comprehension Check

Use the first day of the Pausing Point to administer the assessment of general comprehension and content knowledge read in Lessons 6–10. Make sure each student has a copy of Activity Page PP.2. You may have collected this Activity Page from students at the beginning of the unit.

- Allow students as much time as they need to complete the assessment during the first Pausing Point da . In most cases, this assessment will take approximately 30 to 45 minutes.
- Tell students to read and answer the questions about what they have learned in their reading of *Calling All Minds: How to Think and Create Like an Inventor*. Encourage students to do their best and review their work once they have finished
- Circulate around the room as students complete the assessment to ensure that everyone is working individually.
- Use the Activity Book Answer Key on pages 194–195 of this guide to score the End-of-Unit Comprehension Check.

Use the following Remediation and Enrichment suggestions to plan activities for the remainder of the first Pausing Point day.

Pausing Point for Differentiation of Instruction

Please use the final four days of this unit to address results of the Unit Assessment (for reading comprehension; fluency, if applicable; grammar; and morphology) and spelling assessments. Use each student's scores on the Unit Assessment to determine which remediation and/or enrichment opportunities will benefit particular students. In assigning these remediation and/or enrichment activities, you may choose to have students work individually, in small groups, or as a whole class.

Remediation

Reading Comprehension

It is important to understand that poor performance on the Reading Comprehension section of the Unit Assessment may be attributable to any number of factors. To ascertain which remediation efforts will be most worthwhile, it is highly recommended that you ask

any student who performed poorly on this section to read at least one of the assessment passages aloud to you orally, one on one. As the student reads, make note of any words the student struggles with or reads incorrectly. If the student occasionally misreads words in the text, analyze the types of errors in code knowledge, and consult the CKLA *Decoding and Encoding Remediation Supplement*. This online publication provides further guidance in assessing, analyzing, and remediating specific decoding skills so targeted remediation can be provided. If the student frequently misreads words in the text, this is indication of a more global decoding problem that may require further assessment and remediation by a reading specialist. The *Decoding and Encoding Remediation Supplement* can be accessed online in the Grade 6 Ancillary Materials at: https:// www.coreknowledge.org/free-resource/ckla-ancillary-materials-sixth-grade/.

If the student does not misread words but reads haltingly, a lack of fluency may impede comprehension. Administer the optional fluency assessment to verify whether the student's reading rate is below the norm. If so, remediation efforts should be targeted at building fluency.

Once the student finishes reading the passage(s) aloud, ask the comprehension questions orally. Analyze whether the student makes errors on the same questions answered incorrectly on the written assessment, as well as the type of questions answered incorrectly. Does the student have difficulty answering particular types of questions? If so, guided rereading of specific chapters in a small-group setting with other students who are struggling may be helpful. Choose selections that were not already used for small-group instruction, and provide specific guidance as to how to use clues in the text to arrive at the correct answer.

Also analyze whether there was a marked difference between the student's comprehension of the informational and literary passages. Good performance on the informational passage requires that students make use of the domain-specific vocabulary and knowledge presented throughout the unit. Students who performed poorly on the informational passage may benefit from rereading chapters from the unit, with more intensive focus on the domain vocabulary.

Good performance on the literary passage of this assessment requires some knowledge of domain-specific vocabulary from this unit (though not to the extent of the informative passage), as well as general knowledge of Tier 2 and academic vocabulary. Students who performed poorly on the literary passage but did well on the informative passage may benefit from specific practice with Tier 2 and academic vocabulary.

Fluency

Students who struggle with fluency will benefit from having multiple opportunities to reread a particular text. If students demonstrate a need for remediation related to fluency, you may either have them reread selections from *Calling All Minds: How to Think and Create Like an Inventor* or choose an excerpt from the *Online Fluency Supplement*.

Grammar and Morphology

For additional practice with the grammar and morphology skills taught in this unit, you may wish to have students complete the Grammar and Morphology Pausing Point Activity Pages provided in the Activity Book (PP.3–PP.6).

If students demonstrate a need for remediation in the foundational grammar and morphology skills required for the lessons in Grade 6, consult the CKLA Grade 5 Skills Strand materials for additional grammar and morphology lessons and activities. Alternatively, for students who demonstrate a general proficiency in grammar and morphology but who demonstrate a need for remediation in connection with specific skills covered in this unit, you may provide a more targeted remediation by reteaching only the lessons for those skills.

Spelling

If students demonstrate a need for remediation in spelling but they exhibit general proficiency in code knowledge, have them use the Individual Code Chart to assist in spelling unfamiliar words, syllable by syllable.

If students exhibit specific code knowledge problems, as revealed by the spelling assessment analyses, they may benefit from remediation to target specific letter-sound correspondences. See the *Decoding and Encoding Remediation Supplement* online in the Grade 6 Ancillary Materials at: https://www.coreknowledge.org/free- resource/ckla-ancillary-materials-sixth-grade/.

Writing

Redirect students to Activity Page 8.4 (Explanatory Text Rubric), Activity Page 9.4 (Explanatory Text Editing Checklist), and their completed explanatory text. Provide time during the Pausing Point for students to revise and rewrite their essay using all of the above tools. The Explanatory Text Rubric and Explanatory Text Editing Checklist are included in the Teacher Resources section of this Teacher Guide for your reference.

If possible, meet briefly with each student to review their plans for revision and provide additional guidance.

Evaluate students' work after revisions are complete using the Explanatory Text Rubric and Explanatory Text Editing Checklist. Meet briefly with each student to provide feedback.

Enrichment

If students have mastered the skills in Unit 2, their experience with the unit concepts may be enriched by the following activities. Please preview in advance any third-party resources such as links to websites other than the Core Knowledge Foundation, to determine suitability for the students with whom you work.

Exploring and Discussing Films About Exceptional Individuals

Show students one or more films about other exceptional individuals, and compare the film to *Calling All Minds: How to Create and Think Like an Inventor.* Consider one of the following films:

- ***Wonder*** – the story of a boy born with facial deformities who attends school for the first time in fifth grad
- ***The Peanut Butter Falcon*** – the adventures of a young man with Down syndrome who runs away from an assisted living facility

- ***The King's Speech*** – the true story of George VI, who must learn to overcome stuttering

Links to trailers and viewing options for the preceding films are available in the Digital Components for Unit 2: https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Publishing Activity

- Students can use Activity Page E.1 (Publish: Create a How-To Video) to publish their writing by creating a how-to video.

Invention Activities

- Invite students to design their own invention. They should map out what problem their invention solves and describe how it works. Then, using the diagrams in *Calling All Minds: How to Think and Create Like an Inventor* for reference, students can make a labeled diagram of their invention that demonstrates how their invention works.
- Once students have designed an invention, they can visit the United States Patent and Trademark Office online to find out what they need to do to get a patent for their invention The link is available in the Digital Components for Unit 2: https://www.coreknowledge.org/free-resource/ckla-unit-2-calling-all-minds/digital-components/.

Writing

- To demonstrate the importance of writing good directions and following them properly, partners can write directions for how to do or make something, such as tie a special kind of knot or make something out of folded paper. Students trade and then try to follow their partners' directions. Students should follow the steps exactly, without adding or changing anything. When students are done, have them discuss whether or not they were successful and examine why. (Did the direction-writer leave out a step? Were directions clear? Did the direction-follower follow the directions properly?) Students should improve their directions by incorporating their partners' feedback.
- Students may choose to write a personal essay about a time they learned from failure or a time when they failed at something and then later improved or succeeded.

Research

- Students can use Activity Page E.2 (Research an Exceptional Person) to learn more about a famous or exceptional individual from the present or the past who is or may have been on the autism spectrum, who is a "different" kind of thinker, or who has a disability or exceptional ability.

Teacher Resources

In this section you will find:

Glossary for *Calling All Minds: How to Think and Create Like an Inventor*

A

abstract, *adj*. existing as a thought or idea without having a physical form

aerodynamic, *adj.* relating to the branch of mechanics that deals with flying and moving through air

aeronautical, *adj.* having to do with the science of building or flying aircraft

airplane simulator, *n.* a training device that replicates an airplane's flight mechanisms; also known as a flight simulator (**airplane simulators**)

alloy, ***n.*** a mixture made of two or more different kinds of metal

apprentice, ***n.*** a person who is learning a skill or craft by working with an expert

atmosphere, *n.* the layer of gases surrounding a planet

automated, *adj.* carried out by machines

aviator, *n.* a person who flies aircraft; a pilot (**aviators**)

B

balsa wood, ***n.*** a lightweight wood used for making models

biographer, *n*. a person who writes about someone else's life

biological, *adj.* physical; having to do with the body or life

blueprint, *n*. a plan for where things go; a technical drawing or model of a structure

C

carbon, *n.* a chemical element used for fuel or to help build things

chemist, *n.* a scientist who studies characteristics of and changes in substances (**chemists**)

cinch, *v.* to secure

clockwise, *adj.* the direction in which the hands of a clock move

cockpit, ***n.*** the part of the plane that houses the flight instruments and pilot(s)

colleague, *n.* a person who is a coworker

commercial, *adj.* used for business as opposed to private or personal use

companion, ***n***. a person or thing often in the company of another person or thing

component, *n.* a part of a larger body, object, or system (**components**)

contestant, *n.* a person who takes part in a contest or competition (**contestants**)

continuous, *adj.* unbroken; without interruption

crease, *n.* the line that is created when something is folded

D

diagnose, *v.* to recognize as having a disease or medical condition (**diagnosed**)

diorama, *n.* a model representing something in three dimensions (**dioramas**)

dirigible, *n.* an aircraft with a rigid structure that is filled with lighter-than-air gas or hot air to make it float

dispense, *v.* to distribute or provide (**dispenses**)

draftsman, *n.* a person who makes detailed drawings or plans that are technical in nature

drag, *n.* the force that resists the movement of air

E

efficient, *adj.* productive

engineer, *n*. a person who designs or builds complicated machines, structures, or other systems

evacuate, *v.* to remove a person or group of people from a dangerous place or situation

evolve, *v.* to change over time (**evolved**)

F

facility, ***n.*** a structure or building used for a specific purpose (**facilities**)

fiber-optic cable, *n.* a cable that uses light to transmit high-speed data (**fiber-optic cables**)

filament, *n.* a thin wire or thread that conducts heat or electricity

file, *v*. to make something a part of the official record

fishtail, *v.* (of the rear end of a moving vehicle) to move back and forth from one side to another (**fishtailing**)

flex, *v*. to bend or move

fungus, *n.* a spore-producing organism such as mushrooms and mold that feeds on organic matter

fuselage, *n.* the part of the plane that houses the flight attendants and passengers

G

genetic link, *n*. traits caused by genes that were likely inherited from an ancestor

glider, *n.* a light aircraft or toy that glides on air

H

headmaster, *n.* the person in charge of a private school; the principal

hygienic, *adj.* clean and/or healthy

I

illuminate, *v*. to make something bright or visible; to make something clear or understandable

impact, *n.* the effect of one person or thing on another

indebted, ***adj.*** owing thanks or gratitude

ingenuity, *n.* inventiveness, originality

innovation, *n*. the act or process of making something new

insignia, *n.* a mark of membership or rank in an organization

installation, *n.* the process of putting something in place

J

journal, *n.* magazine or newspaper that focuses on a particular subject or profession

L

lead, *n.* a metal that is denser than most but also malleable

lift, *n.* an upward force acting on a wing in relation to the movement of air

M

malleable, *adj.* able to be pressed into a different shape

mascot, *n*. a person or thing that acts as a symbol for an event, organization, or team

mathematician, *n.* a specialist or expert in the field of mathematics (**mathematicians**)

menial, *adj.* requiring little skill

metallic, ***adj.*** made of metal

microscope, *n.* an instrument used for viewing objects too small to see with the human eye

millwright, *n.* a person who designs, builds, or maintains a mill or mill machinery (**millwrights**)

modification, *n.* a change in something, usually to improve it

mold, *n.* a hollow into which liquid metal is poured to give it shape when it hardens (**molds**)

molecular structure, *n.* the location of atoms and groups of ions and how they relate to each other in a molecule

molten, ***adj*.** melted by heat

monotone, *adj*. having a sound without a change in pitch or tone

musical notation, *n*. a system of written symbols that represent sounds (**musical notations**)

N

navigate, *v.* to plan, direct, or sail a route or course, usually in a form of transportation such as a car, ship, or airplane (**navigating**)

Nobel Prize, *n.* any one of six prizes awarded for outstanding achievement in a scientific, literary, or economic field

O

originator, *n.* a person who starts, or originates, something new

oversensitivity, *n.* a condition related to having more than the usual awareness of one's environment and surroundings; a tendency to become easily upset by something in the external environment

P

patent, ***n.*** an official paper that gives the creator of an invention the right to be the only person to make and sell that invention for a certain period of time

penicillin, *n.* a group of antibiotics made from mold

perception, *n.* the process of becoming aware of something using the senses

perpendicular, *adj.* having two lines that intersect at a right angle, such as the lines that make the uppercase letters T and L

perseverance, *n.* steady persistence to achieve a goal

petri dish, *n*. a small, clear dish with a lid, used to grow microorganisms such as viruses and bacteria

phenomenon, *n.* an observable event or fact

physician, *n.* a person qualified to practice medicine; a doctor (**physicians**)

piston, *n.* a piece of metal within a cylinder that moves up and down (**pistons**)

prodigious, *adj.* impressive or remarkable

property, *n.* a quality or characteristic belonging to a person or thing (**properties**)

propulsion, *n.* the action of being pushed forward

psychological, *adj*. having to do with the mind

psychologist, *n.* a person who studies the way humans think and behave and why

R

retractable, *adj.* able to be pulled back in

revolution, *n.* one turn around a fixed course

rudder, *n.* a mechanism used to steer a ship, boat, submarine, or aircraft

S

secretion, ***n***. a discharge such as tears or sweat produced by a cell, gland, or organ in the body (**secretions**)

sensory sensitivity, *n.* an awareness of the information being received through one's senses; a characteristic of autism (**sensory sensitivities**)

serendipity, *n.* achieving a positive result by accident; good luck

slab, ***n.*** a thick, flat piece of metal, stone, or concrete

sleekness, *n*. the quality of being straight and smooth in design, without any parts sticking out

Smithsonian, *n.* a national collection of museums

social skills, *n.* verbal and nonverbal ways that someone uses to communicate and get along with other people

stabilizer, *n.* a device used to keep something steady, or stable

steerable, ***adj.*** able to be mechanically controlled or guided

stereotype, *n.* **1.** a metal plate used in printing; **2.** an oversimplified idea that a person or group has certain common characteristics

stimulate, *v*. to encourage an interest or activity in something (**stimulated**)

sulfur, *n.* a nonmetallic chemical

survivable, *adj*. not fatal; able to be survived

T

taper, *v.* to make narrower toward one end (**tapering**)

technology, *n.* the study and use of scientific knowledge, tools, and machines

tenacity, *n.* determination

tinker, *v.* to change something by trying out different things or ways to do something

trade, *n.* a kind of work or craft

transatlantic, *adj.* crossing the Atlantic ocean

trial, *n.* a test of the performance, qualities, or suitability of something; an experiment

T square, *n.* a technical drawing instrument used for horizontal lines or right angles (**T squares**)

type, ***n.*** metal letters used in printing

type, ***v.*** to write by pressing letters on a keyboard (**typed**)

V

vaccine, *n.* a substance used to protect people or animals against diseases (**vaccines**)

W

welder, *n*. a person who molds or fuses metal (**welders**)

Classroom Safety for Hands-On Activities

CKLA Unit 2 uses the book *Calling All Minds: How to Think and Create Like an Inventor*, which contains a number of hands-on activities that enable students to explore inventing and the scientific concepts discussed in the book. Depending on your class and available resources, you will need to decide which activities are possible and appropriate for your classroom. Safety should be a priority when engaged in science activities. With that in mind, observe the following safety procedures when the class is engaged in activities and demonstrations:

- Report and treat any injuries immediately.
- Check equipment prior to usage, and make sure everything is clean and ready for use.
- Clean up spills or broken equipment immediately using the appropriate tools.
- Monitor student behavior to ensure they are following proper classroom and activity procedures.
- Do not touch your eyes, ears, face, or mouth while engaging in an activity or demonstration.
- Review each step of the lesson to determine if there are any safety measures or materials necessary in advance.
- Wear personal protective equipment (e.g., safety goggles, aprons, etc.) as appropriate.
- Model safe and appropriate use of any tools and materials used in the activity.
- Check for student allergies to any materials, and take appropriate measures.
- Secure loose clothing, hair, or jewelry.
- Establish storage and disposal procedures for all materials used in hands-on activities.

Have students take home and sign the Student Safety Contract. This is located on the following page of this guide as well as on Activity Page 1.2 of the Activity Book. Students should read and agree to the contract prior to the start of the first lesson so students are aware of the expectations when engaged in hands-on science activities.

For additional support for safety in the science classroom, follow the following link:

www.coreknowledge.org/cksci-online-resources

Student Safety Contract

When doing science activities, I will do the following:

- Report accidents, spills, breakages, or injuries to the teacher right away.
- Listen to the teacher for special instructions and safety directions. If I have questions, I will ask the teacher.
- Avoid eating or drinking anything during the activity unless told to by my teacher.
- Review the activity directions before I begin. If I have questions, I will ask the teacher.
- Always use safety equipment as directed by my teacher.
- Wear safety goggles when working with anything that can fly into my eyes.
- Be careful when working with scissors and other sharp tools; never point the sharp end toward another person.
- Be careful around electric appliances or tools, and unplug them when a teacher is supervising.
- Keep my hands dry when using tools and devices that use electricity.
- Roll or push up long sleeves, keep my hair tied back, and secure any jewelry.
- Clean up my area after the activity, wash my hands and return unused materials.
- Treat all living things and the environment with respect.

I have read and agree to the safety rules in this contract.

_____ _____ / _____ / _____

(student signature and date)

List any allergies that your child has:

_____

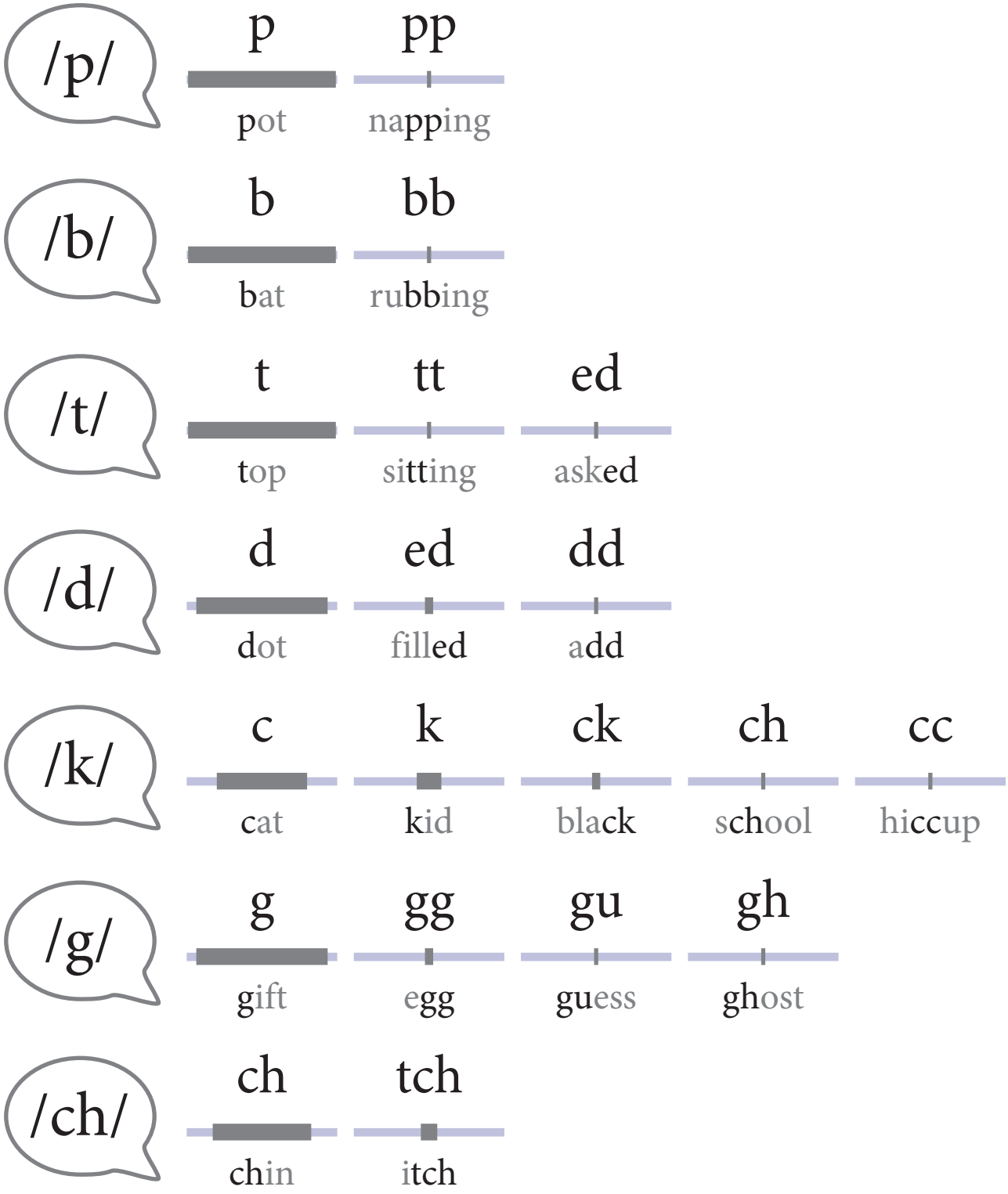
_____

I have reviewed these safety rules with my child:

_____ _____ / _____ / _____

(parent signature and date)

Individual Code Chart



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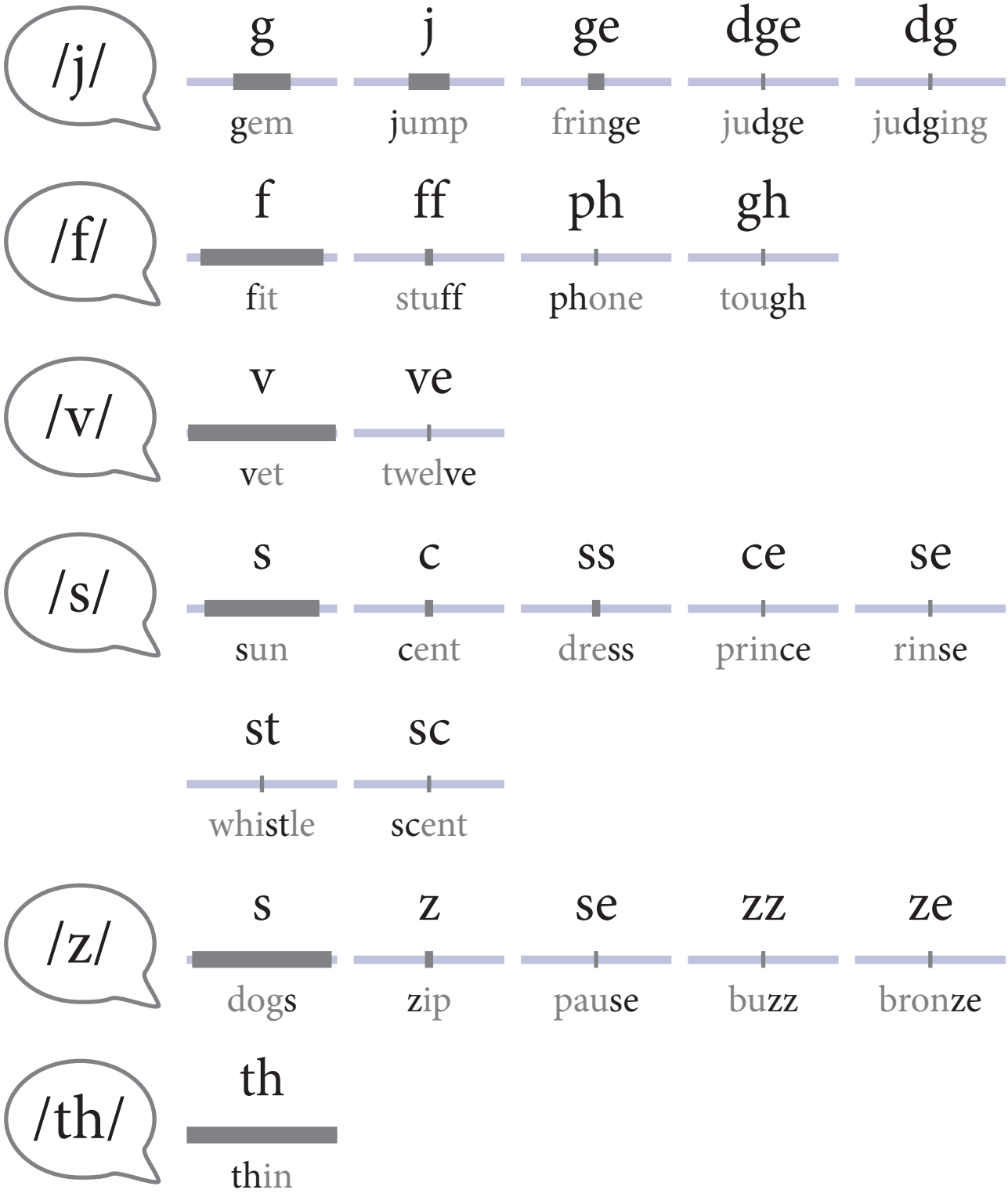

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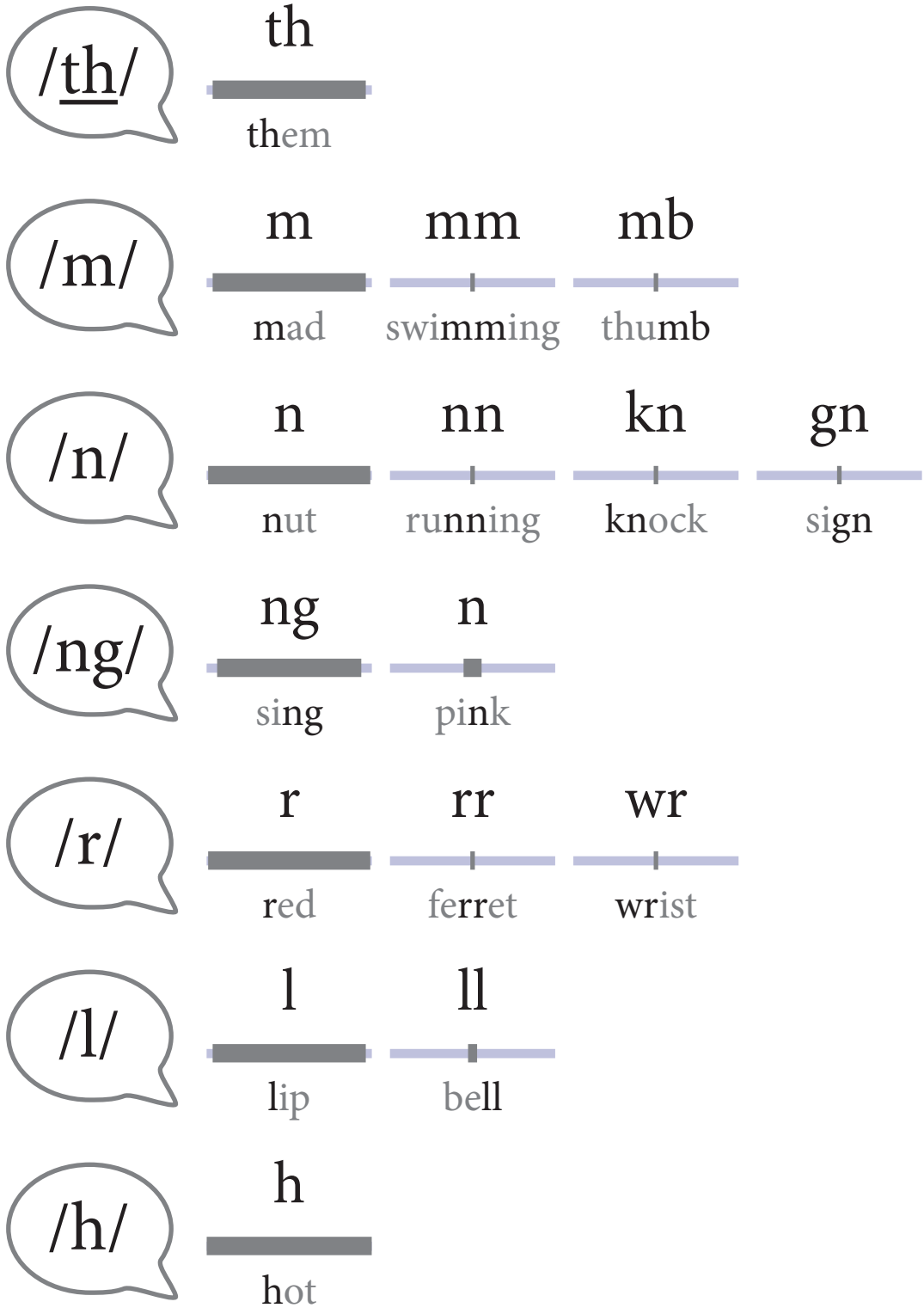

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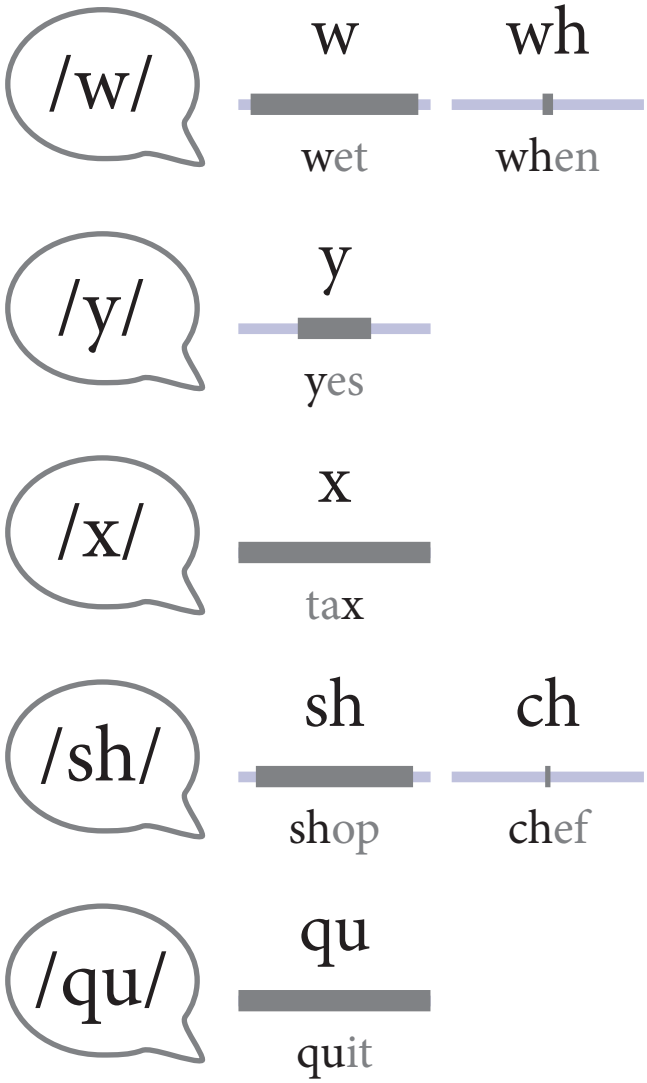

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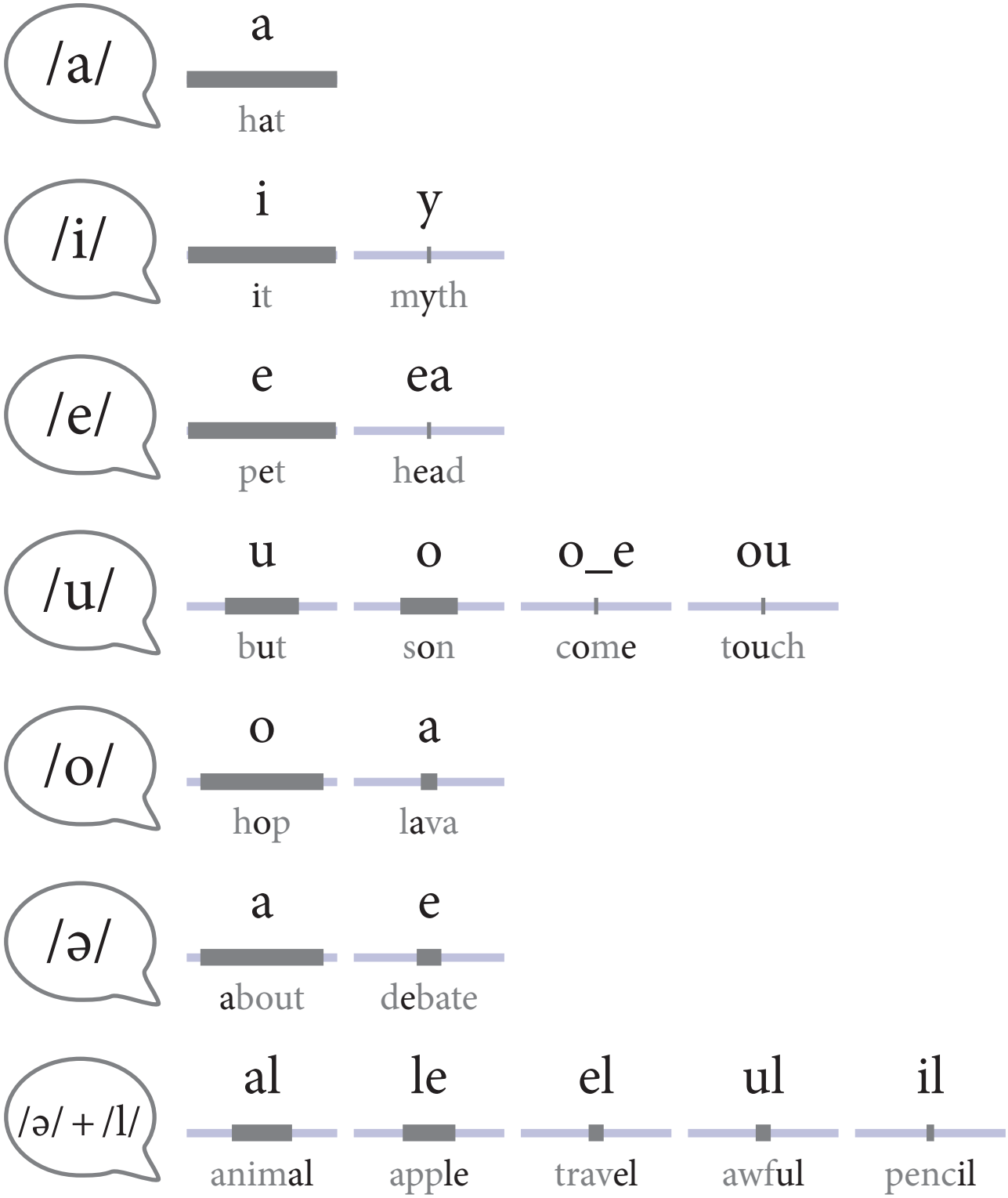

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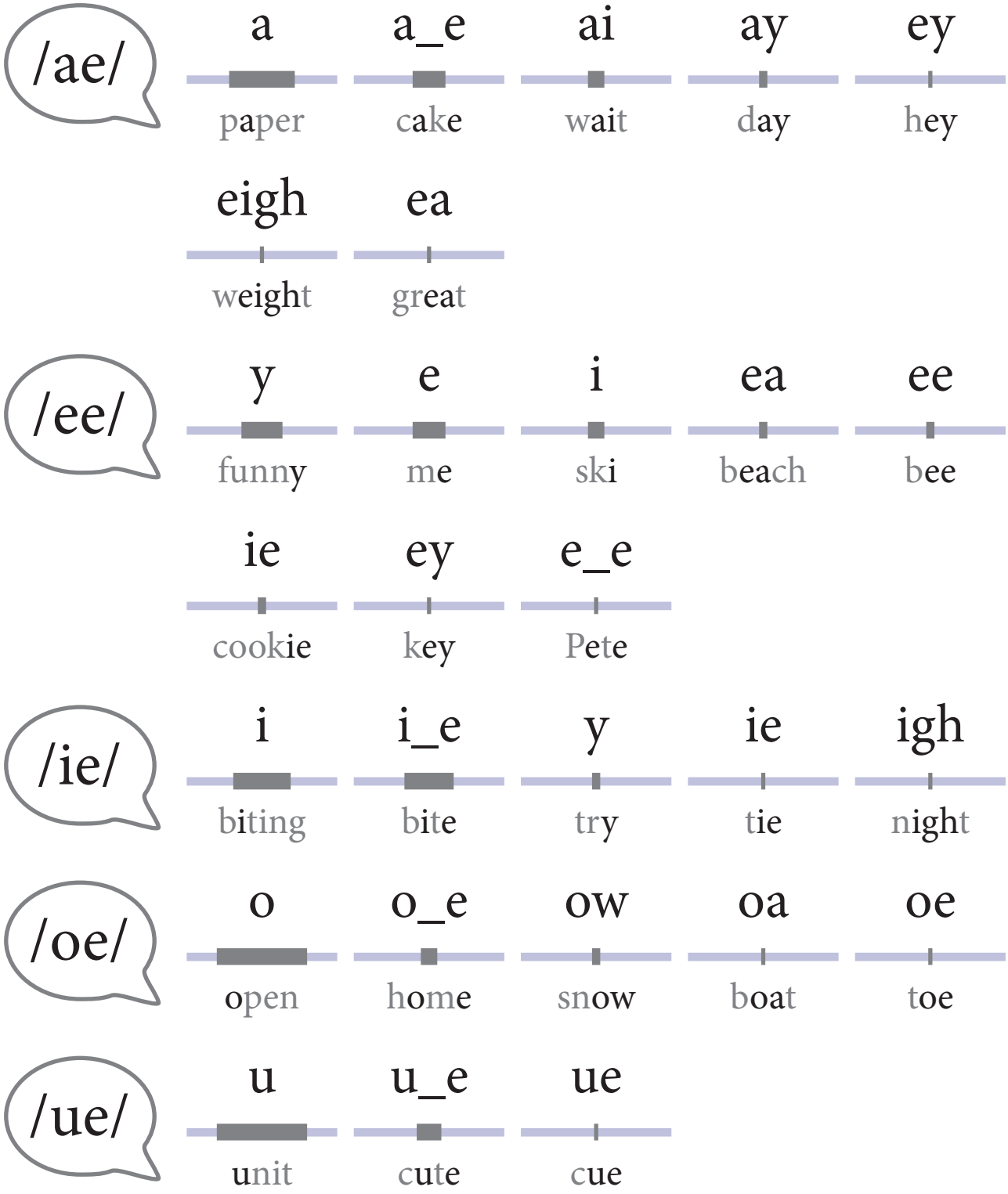

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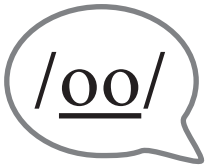
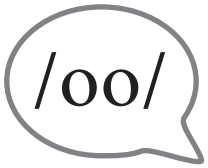


oo	u	u_e	ew	ue
soon	student	tune	new	blue

ou	ui	o	o_e
soup	fruit	do	move



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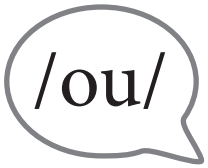
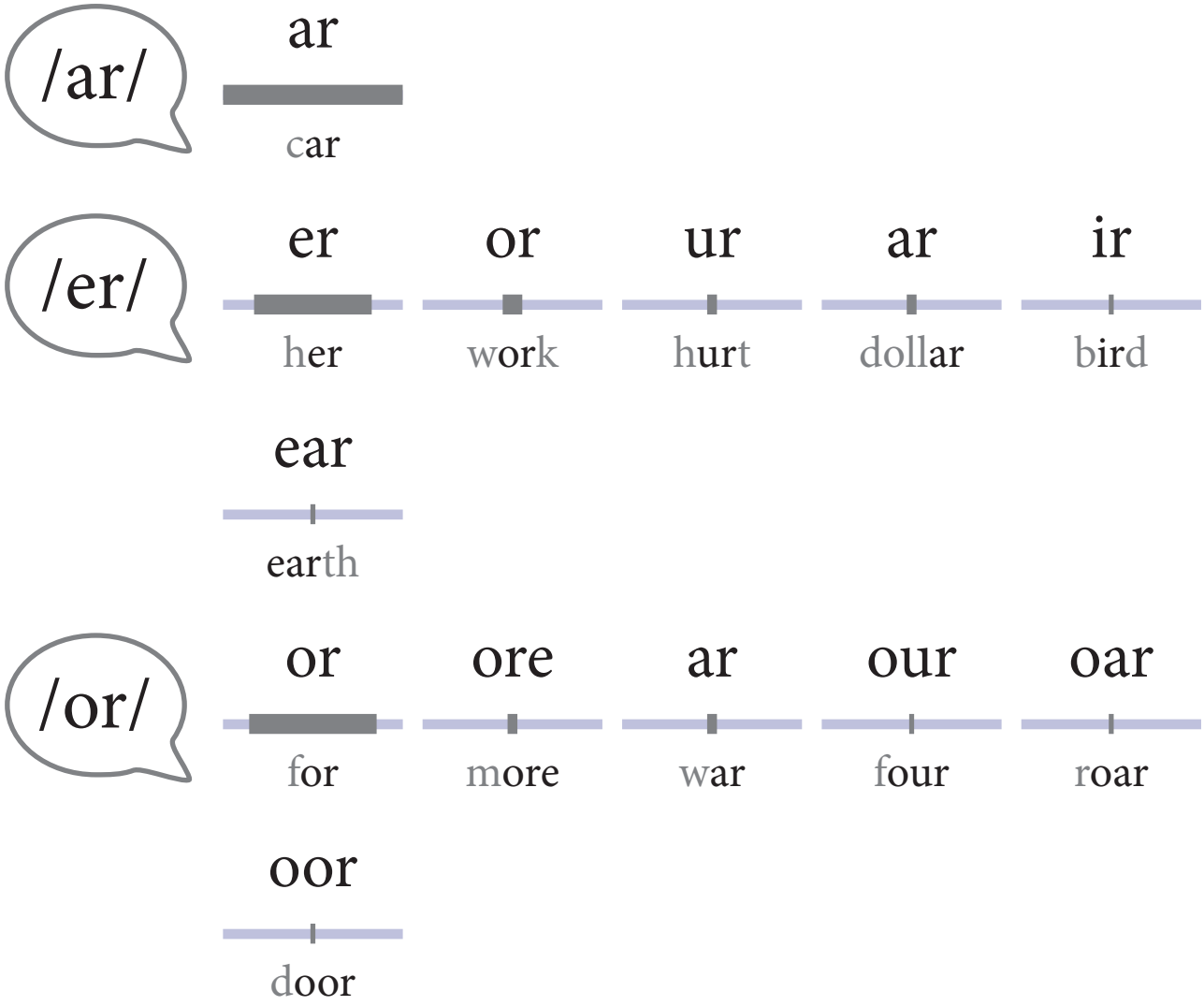


ou	ow
shout	now

oi	oy
oil	toy

au	aw	al	ough	augh
Paul	paw	wall	bought	caught

Individual Code Chart



Anecdotal Reading Records

Week of: _____

This template is for recording anecdotal notes about students' reading abilities. You can record things such as (1) repeated trouble with specific sound-spelling correspondences, (2) difficulty with certain digraphs/letter teams, (3) inability to segment isolated words, and (4) progress with specific skills.

Name:	Name:	Name:	Name:
Name:	Name:	Name:	Name:
Name:	Name:	Name:	Name:
Name:	Name:	Name:	Name:
Name:	Name:	Name:	Name:
Name:	Name:	Name:	Name:

Scoring Using a Tens Chart

Tens Recording Chart

Use this grid to record Tens scores. Refer to the Tens Conversion Chart that follows.

Name							

Tens Conversion Chart

Number Correct	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
1	0	10																													
2	0	5	10																												
3	0	3	7	10																											
4	0	3	5	8	10																										
5	0	2	4	6	8	10																									
6	0	2	3	5	7	8	10																								
7	0	1	3	4	6	7	9	10																							
8	0	1	3	4	5	6	8	9	10																						
9	0	1	2	3	4	6	7	8	9	10																					
10	0	1	2	3	4	5	6	7	8	9	10																				
11	0	1	2	3	4	5	5	6	7	8	9	10																			
12	0	1	2	3	3	4	5	6	7	8	8	9	10																		
13	0	1	2	2	3	4	5	5	6	7	8	8	9	10																	
14	0	1	1	2	3	4	4	5	6	6	7	8	9	9	10																
15	0	1	1	2	3	3	4	5	5	6	7	7	8	9	9	10															
16	0	1	1	2	3	3	4	4	5	6	6	7	8	8	9	9	10														
17	0	1	1	2	2	3	4	4	5	5	6	6	7	8	8	9	9	10													
18	0	1	1	2	2	3	3	4	4	5	6	6	7	7	8	8	9	9	10												
19	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10											
20	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10										
21	0	0	1	1	2	2	3	3	4	4	5	5	6	6	7	7	8	8	9	9	10	10									
22	0	0	1	1	2	2	3	3	4	4	5	5	5	6	6	7	7	8	8	9	9	10	10								
23	0	0	1	1	2	2	3	3	3	4	4	5	5	6	6	7	7	7	8	8	9	9	10	10							
24	0	0	1	1	2	2	3	3	3	4	4	5	5	5	6	6	7	7	8	8	8	9	9	10	10						
25	0	0	1	1	2	2	2	3	3	4	4	4	5	5	6	6	6	7	7	8	8	8	9	9	10	10					
26	0	0	1	1	2	2	2	3	3	3	4	4	5	5	5	6	6	7	7	7	8	8	8	9	9	10	10				
27	0	0	1	1	1	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	7	8	8	9	9	9	10	10			
28	0	0	1	1	1	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	8	8	8	9	9	9	10	10		
29	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10	
30	0	0	1	1	1	2	2	2	3	3	3	4	4	4	5	5	5	6	6	6	7	7	7	8	8	8	9	9	9	10	10

Locate the number of correct answers the student produced in the top row and the number of items in the activity in the leftmost column. The cell where the column and the row converge indicates the Tens score. Using the Tens Conversion Chart, you can easily convert any raw score, from 0 to 30, into a Tens score.

The Tens Conversion Chart was created to be used with activities that have a defined number of items (such as written assessments, end-of-unit assessments, and activity pages). However, you may use the Tens system to record informal observations, such as an end-of-lesson check-in, as well. You may want to use the following rubric to interpret observational Tens scores.

Tens Score	Result
8–10	Student likely has a strong understanding of content/skills.
5–7	Student may benefit from additional support.
0–4	Student may benefit from intensive support or remediation.

Using Chunking to Decode Multisyllable Words

Mastering the various letter-sound correspondences taught in CKLA will enable students to read one-syllable words with ease. However, knowing these individual letter-sound correspondences is no guarantee that students will be able to apply this knowledge in reading multisyllable words. To this end, most students will benefit from additional instruction in learning to recognize, chunk, and read parts of words—syllables—as a way to decode longer words.

When students first encounter two-syllable words in Grade 1 materials, a small dot is inserted as a visual prompt or cue between the syllables (e.g., *sun·set*). This is done in both the Workbooks and Readers. The dot is intended to visually break the word into two chunks, each of which can then be sounded out separately. As Grade 1 progresses, the dot is eliminated, and students are expected to begin visually chunking parts of longer words on their own.

Starting in Grade 1, CKLA introduces the decoding of two-syllable words by having students work first with two-syllable compound words (e.g., *cat·fish*, *cup·cake*, *pea·nut*, *drive·way*). For compound words, the dot is placed between the two component words. These are among the easiest two-syllable words to chunk and decode because each syllable of a compound word is already a familiar spelling pattern students have encountered in reading one-syllable words. In addition, each syllable or chunk is also frequently recognizable as a word part that has semantic familiarity.

In addition to learning to decode two-syllable compound words, Grade 1 students also tackle two-syllable words that consist of a root word with a simple suffix (e.g., *yawn·ing*, *hunt·er*, *punt·ed*). Typically, the dot is placed immediately before the suffix. In CKLA, words that contain double-letter spellings for consonants are divided after the double-letter spelling rather than between the two consonants (e.g., *batt·ed*, *bigg·er*, *bunn·y*). Teachers familiar with other ways to chunk or divide syllables may initially find this odd. This is done, however, because the double-letter spellings have been taught as single spelling units in CKLA since Kindergarten (*nn* > /n/, *mm* > /m/, *tt* > /t/, etc.) and it is preferable to be consistent in representing these spellings in the way students have been taught to process them (i.e., as whole entities for a sound). (Ultimately as students become more proficient at decoding and chunking syllables through subsequent grade levels, it really does not matter whether they visually chunk and decode these words as *batt·ed* or *bat·ted*.) Most students find chunking and decoding two-syllable words consisting of root words and suffixes relatively easy.

A greater challenge is encountered when chunking and decoding other types of multisyllable words. To be successful in decoding these longer words, it is helpful if teachers and students recognize certain syllable types. Most reading specialists identify five different syllable types:

Note: Syllables exemplifying each type are underlined.

- ***Closed Syllables (CVC, VC, CCVCC, etc.)—always associated with a "short" vowel sound* (e.g., /a/, /e/, /i/, /o/, /u/:** *pad, let, tin, rod, pic·nic, fun***)**
- ***Vowel Digraph Syllables—***always associated with two vowel letters that represent a unique vowel sound: *joint*, *speak*, *proud*, *play*, *coun·sel*, *be·low*. [**The Magic 'E' Syllable (VCE)** can be considered a subtype of the Vowel Digraph Syllable. In this case, the letter *e* at the end of a syllable affects the pronunciation of the vowel letter that precedes it, even though it is separated from the *e* by a consonant letter; always associated with a "long" vowel sound (/ae/, /ee/, /ie/, /oe/, /ue/): *cake*, *mis·take*, *Pete*, *stam·pede*, *like*, *home*, *mule*.]
- ***R-Controlled Syllables*:** *art, ar·tist, fe·ver, clerk, girl, fort, curb, tur·nip*

- ***Open Syllables (V or CV)—always associated with a "long" vowel sound (e.g., /ae/, /ee/, /ie/, /oe/, /ue/:*** *a·pron, me, com·pre·hend, hi, fi·nal, go, fu·ture****)***

- ***Consonant –LE Syllables (C –LE):*** *sim·ple, puz·zle, raf·fle, ca·ble, ri·fle*

In CKLA, one additional syllable type is designated:

- ***Schwa Syllables:*** *a·bout, hos·pit·al, ben·e·fit, app·e·tite, e·mo·tion*

  Note: The consonant –LE syllable is also a schwa syllable, but in CKLA it is distinguished separately because of the way this spelling is chunked when dividing words into syllables.

To be clear, in order to decode words, students do not need to identify syllables by these names. The names of the syllable types are provided here only to establish a common vocabulary for you as you use the CKLA materials. It is necessary, however, for students to become fluent readers of longer words in increasingly complex text. If they are able to visually parse certain spelling patterns as syllable chunks, they can quickly and easily decode each syllable.

The first type of two-syllable word pattern to which students are introduced is the closed syllable pattern in two-syllable words. These two-syllable words are also relatively easy for students to chunk and recognize as an example of the familiar CVC, VC, CCVCC, etc. spelling pattern they encountered in one-syllable words in Kindergarten.

Two closed syllables in a word are divided as follows:

- When two different consonants stand between two vowels, we divide the syllables between the consonants, creating one or more closed syllables.

ad · mit	nap · kin	trum · pet

- For words that contain double-letter spellings for consonants, the divider is typically placed after the double-letter spelling rather than between the consonants. As noted earlier, this is done because the double-letter spellings have been taught as single spelling units in CKLA since Kindergarten (*nn* > /n/, *mm* > /m/, *tt* > /t/, etc.).

traff · ic	muff · in	happ · en

- When there are three consonants between two vowels, in general, they are divided so that the first consonant goes with the first vowel and the other two consonants go with the second vowel.

mon · ster	con · tract	pil · grim

When students have difficulty reading a two-syllable word, you may find it useful to use your finger to cover the second syllable, revealing only the first syllable for them to read. Once students read the first syllable, the second syllable can be uncovered and read. If necessary, you can then model for students how to blend the two syllables aloud:

magnet	
mag	
	net
magnet	

In Grade 1, students encountered other two-syllable words with various combinations of the magic 'E' syllable, the vowel digraph syllable, the r-controlled vowel syllable, and the closed syllable.

- Chunking these syllable types follows the same patterns for division as noted above for closed syllables:

tar · get	for · get	es · cape	ig · loo	scoun · drel	char · coal

- In Grade 2, students were introduced to more challenging multisyllable words.

Two-syllable words with only one consonant between the vowels are especially difficult to chunk because they may be divided either before or after the single consonant. Students are taught to use a flexible approach in chunking syllables with a single consonant between the vowels, trying each possibility when they encounter an unfamiliar word.

- When only one consonant stands between two vowels, first divide the word in front of the consonant, and sound it out as an open syllable:

pu · pil	vi · rus	mo · ment

unit	
u	
	nit

However, sometimes the word may divide after the consonant, creating a closed syllable. There is no definitive rule for when to divide before or after the consonant. Students will need to be flexible and try dividing and sounding the word each way—before and after the consonant—to determine whether they recognize a familiar word as they sound out each possibility. In order to recognize whether a word is familiar when sounded either way, the word must be one that the student has heard before (i.e., the word must be in the student's oral vocabulary). Obviously, this will represent an additional challenge for students who have a limited vocabulary and/or for whom English is a second language.

- If the word divides after the consonant, a closed syllable is created:

lemon	
lem	
	on

In Grade 2, students were also introduced to consonant –LE syllables. Chunking these words into syllables is fairly straightforward.

- When a word ends in consonant –LE, it is divided in front of the consonant, creating a first syllable that may be open, closed, or even r-controlled, depending on the other spellings in the words:

ban · gle	twin · kle	sta · ble	cra · dle	tur · tle

simple	
sim	
	ple

In the latter part of Grade 2, students were introduced to syllables in which various spellings represent the schwa sound. English words with more than one syllable usually include a combination of stressed and unstressed syllables. When a syllable in a spoken word is unstressed or weakly stressed, its vowel sound is often reduced to a flat, rather nondescript vowel sound that linguists call a schwa. This happens in many English words. Spellings for the schwa sound include *a*, *e*, *al*, *il*, *el*, and *tion*. Chunking and decoding words that include the schwa sound can be quite challenging for many students.

- Syllables with a schwa sound are divided in different ways, recognizing that the syllable with the schwa sound has a particular spelling:

a · bout	de · pos · it	med · al	e · vil	nick · el	lo · tion

As noted earlier, the consonant –LE syllable is actually a schwa syllable, but it is identified separately because of the way this spelling is chunked when dividing words into syllables.

- Finally, while students encountered some simple root words and affixes in Grade 1, throughout the entire year of Grade 3 instruction they study prefixes, suffixes, and root words in much greater depth and are taught to chunk syllables accordingly.

pre · tend	non · sense	tri · cy · cle	re · peat	self · ish	sad · ness	help · less

By combining the specific code knowledge of letter-sound spellings taught in Kindergarten–Grade 3, with the ability to chunk multisyllable words into smaller decodable parts, students will have the tools they need to independently decode just about any word they encounter.

Sound and Spelling of Schwa

In order to teach the concept of /ə/ well, you will need to first understand it yourself.

English words with more than one syllable usually include a combination of stressed and unstressed syllables. When a syllable in a spoken word is unstressed or weakly stressed, its vowel sound is often reduced to a flat, rather nondescript vowel sound linguists call schwa (*/ə/*). This happens in many English words. More than 3,000 of the 25,000 words in the CKLA database (about 13%) have at least one syllable in which the vowel sound is reduced to */ə/*.

The exact pronunciation of /ə/ varies somewhat from word to word and also from region to region. In many words, and in many parts of the United States, /ə/ sounds very much like the sound /u/. For example, in the word *about*, the unstressed /ə/ sound in the first syllable sounds a great deal like /u/. In the word *America*, both the first and the last vowel sounds are unstressed, and both sound a great deal like /u/. In some regions of the United States, many speakers use an /u/-like /ə/ sound in words such as *along*, *balloon*, *debate*, *benefit*, and *telephone*.

However, for certain words and/or for speakers in certain parts of the country, /ə/ may sound a little more like /i/. How do people in your region pronounce the word *benefit*? Do they pronounce the second vowel sound more like /u/ or /i/? What about *telephone*? Do people where you live say /t/ /e/ /l/ /u/ /f/ /oe/ /n/? Or does the spoken word sound more like /t/ /e/ /l/ /i/ /f/ /oe/ /n/? What about *debate*? Does the local pronunciation sound more like /d/ /u/ /b/ /ae/ /t/ or /d/ /i/ /b/ /ae/ /t/? Neither pronunciation is more correct than the other. These are all examples of natural variation or dialect. All of these examples contain a reduction to /ə/.

Spelling the Schwa Sound

Words that contain the schwa sound represent a significant spelling challenge since there are so many possible spellings for this sound. Some of the most frequent spellings are listed below with sample words:

a *about*, *China*, *around*, *aloud*, *acquire*

e *benefit*, *decay*, *appetite*, *severe*, *Tennessee*

al *final*, *normal*, *hospital*

le *apple*, *fable*, *crackle*

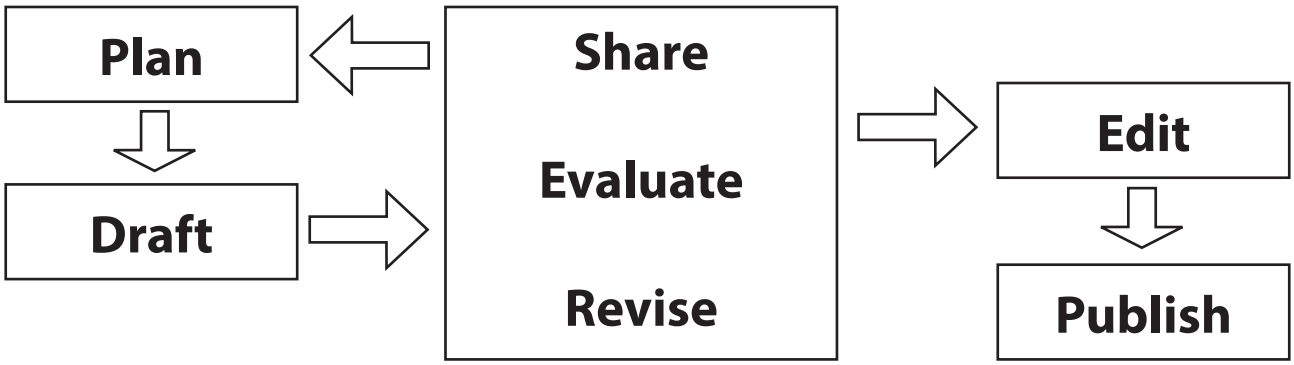
el *angel*, *chapel*, *nickel*

ul *awful*, *consul*

il *pencil*, *stencil*, *evil*

ion *emotion*, *determination*, *tension*, *revision*

The Writing Process



Explanatory Text Rubric

	Exemplary	Strong	Developing	Beginning
Introduction	Topic is introduced with clear focus.	Topic is introduced with some focus.	Topic is introduced with little focus.	Topic is not introduced.
Style	A formal style is maintained consistently throughout the text.	A formal style is mostly maintained throughout the text.	A formal style is inconsistently used throughout the text.	A formal style is not used throughout the text.
Body	All sentences/ information/ words and phrases are clearly and effectively presented.	Most sentences/ information/ words and phrases are clearly and effectively presented.	Some sentences/ information/ words and phrases are clearly and effectively presented.	Few or no sentences/ information/ words and phrases are clearly and effectively presented.
Structure	Text structure is effective and presents content clearly.	Text structure is mostly effective and presents content in an understandable way.	Text structure is poorly applied and presents content mostly ineffectively.	There is little or no discernable text structure, and content is not effectively presented.
Conclusion	Conclusion effectively summarizes content.	Conclusion acceptably summarizes content.	Conclusion insufficiently summarizes content.	Conclusion fails to summarize content.

You may correct capitalization, punctuation, and grammar errors while you are revising. However, if you create a final copy of your writing to publish, you will use an editing checklist to address those types of mistakes after you revise.

Explanatory Text Peer Review Checklist

Complete this checklist as you read the draft of the explanatory text written by a classmate. Y = *yes* N = *no* SW = *somewhat*

Author: _____ Reviewer: _____

_____ The explanatory text includes an introduction that clearly states the topic/subject of the text.

_____ The explanatory text includes three or four detail sentences that clearly explain the topic.

_____ The explanatory text is well-organized and uses an effective text structure.

_____ The explanatory text uses appropriate content-area vocabulary and clearly explains new terms as needed.

_____ The explanatory text ends with a conclusion that restates the main points in the text.

Ways in Which Your Essay Meets the Requirements of the Assignment	Ways in Which You Can Better Meet the Requirements of the Assignment

Explanatory Text Editing Checklist

Explanatory Text Editing Checklist	After reviewing for each type of edit, place a check mark here.
Vocabulary	
• I have used academic and domain-specific vocabulary correctly. • I have provided my readers with context clues to help them understand the meaning of potentially unfamiliar language.	
Format	
• I have used text features correctly and as needed. • I have used the text structure to effectively present my information. • I have titled my writing. • I have included the proper heading, including my name, my teacher's name, the class title, and the date.	
Grammar	
• I have used simple, compound, complex, and compound-complex sentences correctly and effectively. • I have correctly used frequently confused words such as *affect/effect* and *fewer/less*.	
Spelling	
• I have correctly spelled academic and domain-specific vocabulary. • I have correctly spelled words with the roots *unus, bi, duo, tri, decem, centum*. • I have correctly spelled words with the prefixes *uni–* and *di–*. • I have correctly spelled words with the suffixes *–er* and *–or*.	
Punctuation	
• I have punctuated simple, compound, complex, and compound-complex sentences correctly. • I have correctly used semicolons/commas with *and, but, so,* or other coordinating conjunctions in compound sentences. • I have used commas, parentheses, or dashes to set off nonrestrictive/ parenthetical elements.	

Proofreading Symbols

 Insert

 Insert period

 Insert comma

 Insert apostrophe

 Insert space

 New paragraph

 No new paragraph

 Close up the space

 Capitalize

 Make lowercase (small letter)

 Delete

 Reword

 Move according to arrow direction

 Transpose

 Move to the left

 Move to the right

 Add a letter

Optional Fluency Assessment Guide

If you wish to assess a student's fluency at any time during the year, you may select a reading passage from the Fluency Supplement provided online at https:/www.coreknowledge.org/free-resource/ckla-ancillary-materials-sixth-grade/fluency-supplement/.

Administration Instructions

- Print out the student copy of your selected fluency passage. Students will read from this copy.
- Print out the Recording Copy of your selected fluency passage for each student you wish to assess. You will create a running record as you listen to each student read orally.
- Explain that the student will read a selection aloud while you take some notes. Encourage the student not to rush and to read at their regular pace.
- Read the title of the selection aloud for the student, as the title is not part of the assessment.
- Begin timing when the student reads the first word of the selection. As the student reads aloud, make a running record on the Recording Copy of the text using the following guidelines:

Words read correctly	No mark is required.
Omissions	Draw a long dash above the word omitted.
Insertions	Write a caret (^) at the point where the insertion was made. If you have time, write down the word that was inserted.
Words read incorrectly	Write an "X" above the word.
Substitutions	Write the substitution above the word.
Self-corrected errors	Replace original error mark with an "SC."
Teacher-supplied words	Write a "T" above the word (counts as an error).

- When one minute has elapsed, draw a vertical line on the Recording Copy to mark the student's place in the text at that point. Allow the student to finish reading the selection aloud.
- Assess the student's comprehension of the selection by asking them to respond orally to the questions provided in the Fluency Supplement.

Scoring Instructions

- Use one Fluency Assessment Scoring Sheet for each student taking the assessment.
- To calculate a student's W.C.P.M. (Words Correct per Minute) score, use the information you recorded on the Recording Copy, and follow these steps. You may wish to have a calculator available.

1. Count Words Read in One Minute. This is the total number of words that the student read or attempted to read in one minute. It includes words that the student read correctly as well as words that the student read incorrectly. Write the total in the box labeled Words Read in One Minute.

2. Count the Uncorrected Mistakes in One Minute. You noted these in the running record. They include words read incorrectly, omissions, substitutions, and words that you had to supply. Write the total in the box labeled Uncorrected Mistakes in One Minute on the scoring sheet. (A mistake that the student self-corrects is not counted as a mistake.)

3. Subtract Uncorrected Mistakes in One Minute from Words Read in One Minute to get Words Correct. Write the number in the box labeled W.C.P.M. Although the analysis does not include any words the student read correctly (or incorrectly) after one minute, you may use this information from the Recording Copy for anecdotal purposes.

As you evaluate W.C.P.M. scores, here are some factors to consider.

It is normal for students to show a wide range in fluency and in W.C.P.M. scores. A student's W.C.P.M. score can be compared with the score of other students in the class (or grade level) and also with the national fluency norms for Grade 6 obtained by Hasbrouck and Tindal (2006). Hasbrouck and Tindal suggest that a score falling within 10 words above or below the 50th percentile should be interpreted as within the normal, expected, and appropriate range for a student at that grade level at that time of year.

Oral Reading Fluency Norms for Grade 6

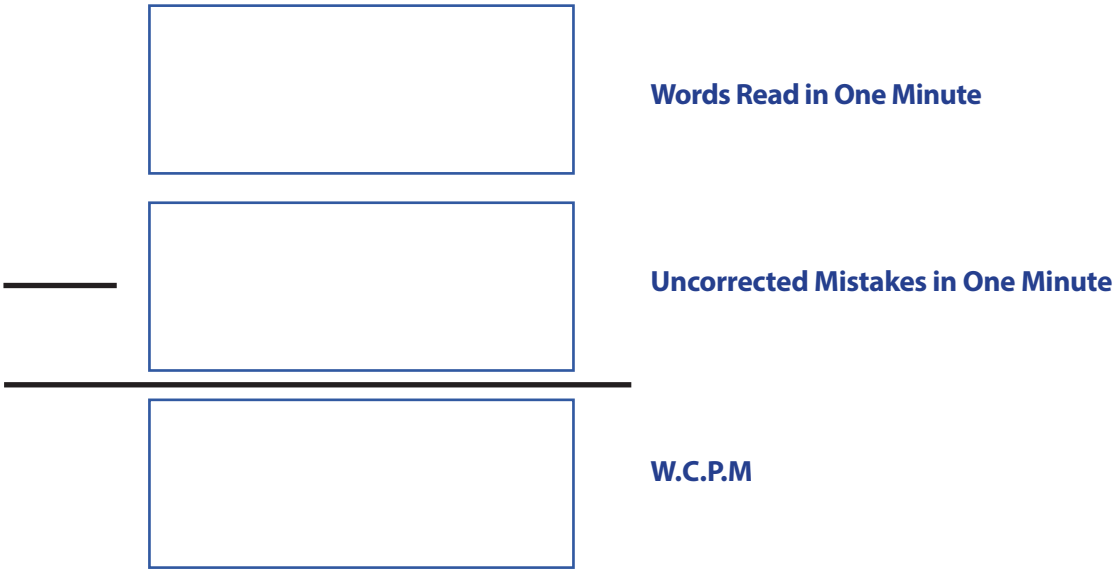
Percentile	Fall W.C.P.M.	Winter W.C.P.M.	Spring W.C.P.M.
90	177	195	204
75	153	167	177
50	127	140	150
25	98	111	122
10	68	82	93

Reference

Hasbrouck, Jan and Tindal, Gerald A. "Oral reading fluency norms: A valuable assessment tool for reading teachers." *The Reading Teacher* 59 (2006): 636–644.

Student Name _____ Date _____

Fluency Assessment Scoring Sheet



Words Read in One Minute

Uncorrected Mistakes in One Minute

W.C.P.M

Percentile	Winter W.C.P.M.
90th	195
75th	167
50th	140
25th	111
10th	82
Comprehension Questions Total Correct	_____/4

Activity Book Answer Key

NAME: _____

DATE: _____

1.3 ACTIVITY PAGE

Envisioning an Invention

Name a problem that needs to be solved. Answers will vary but should adequately describe a problem and an invention that could solve it.
Describe an invention that could solve that problem.
Draw a picture of what that invention might look like.

NAME: _____

DATE: _____

1.5 ACTIVITY PAGE

Central Ideas

Write the main details from each page of the introduction. Then use the details to determine the central ideas of the introduction.

Page	Main Details
page 1	Grandin's interest in animals and the influence of her grandfather, an inventor, led her to become an inventor and animal scientist.
page 2	Grandin is a visual thinker and on the autism spectrum.
page 3	People with autism think differently; they can do incredible things if allowed to pursue their interests.
page 4	Grandin loves making things with her hands and has learned that sometimes you have to experiment to make things work.
page 5	Grandin says the message of her book is: Make things. You have to take things apart to understand how they work.
page 6	There's no substitute for real-world experience and working with your hands.
page 7	A patent protects inventors' work by preventing others from stealing it. Women and people of color were once not allowed to own patents, and so their work was lost, but their stories are often the most interesting.
page 8	New inventions are a result of "connecting the dots," hard work, patience, and luck. We need people with new ideas and inventions to solve the problems of the future. Making things can give your life meaning.

Central Ideas
• People who think differently can do great things. • There is value and satisfaction to working with your hands and making things. • The work of women and people of color is valuable and should be remembered. • New ideas and inventions are a result of a lot of hard work, patience, and luck.
Summary of Central Ideas
Being different from others does not mean that a person cannot achieve great things. Thinking about the world around you and your place in it, as well as working hard, can lead to new ideas and inventions.

NAME: _____

DATE: _____

2.2 TAKE-HOME

Introduce Sentence Types

Identify each sentence. Write simple, compound, complex, or compound-complex on the line.

1. I really want to go to the movie, but I'm too busy.
   compound
2. The network cancelled Mason's favorite television show.
   simple
3. Although Mitch was not in the mood for company, his friend dropped by, and they had a good time.
   compound-complex
4. Indigo forgot that it was Sunday, but she remembered when she got halfway to the library.
   compound
5. Although the fishermen went out early, they caught no fish.
   complex
6. Alisha and her cousin went hiking.
   simple
7. As soon as he had the chance, John called Lindsay, and he told her the news.
   compound-complex
8. I was out of orange juice, so I made some tea.
   compound

Activity Book Answer Key

9. Once she had done her homework, she took a nap.
complex

10. We got to the store early, and the bargains were still in effect.
compound

11. Last winter was unusually mild.
simple

12. After the circus left town, the kids started complaining.
complex

NAME: _____

DATE: _____

3.2 TAKE-HOME

Introduce Greek and Latin Roots in Number Words

Fill in this chart with the origin and meaning of each root.

Root	Meaning
unus	one
bi	two
duo	two
tri	three
decem	ten
centum	one hundred

Write a definition for each word. Use the meaning of the root to help you. You can check the meaning in a dictionary.

Word	Definition
united	joined as one
tricycle	a vehicle with three wheels
centipede	a bug with a hundred legs
decimal	based on the number ten
unit	one item or thing
triathlon	a race with three parts
duplex	a house for two families to live in
centennial	a hundred-year period
decade	a period of ten years
biweekly	every two weeks

NAME: _____

DATE: _____

4.2 ACTIVITY PAGE

"Accidents Waiting to Happen"

As you read "Accidents Waiting to Happen," answer these questions.

1. By what name do we know Alexander Fleming's "mold juice" today? (page 79)
penicillin

2. How did Fleming describe his most famous discovery? (page 80)
He said that Nature created penicillin, and he only found it.

3. What job did Stephanie Kwolek find that combined her curiosity about nature with her love of fabric and sewing? (page 80)
She was one of the first women to work at the chemical company DuPont.

4. What is Kwolek remembered for discovering, and what is remarkable about that discovery? (page 81)
She is known for discovering Kevlar, a fire-resistant, synthetic fiber that is five times stronger than steel.

5. What gave George de Mestral the idea for Velcro? (page 81)
He got the idea by examining the burrs he picked off of his dog.

6. What do the illustrations on page 82 represent? (page 82)
They are meant to illustrate the structure of Velcro hooks.

7. What kinds of specialists does Temple Grandin think are most needed for scientific progress? (page 83)
She believes that "we need all kinds of minds."

Activity Book Answer Key

NAME: _____

DATE: _____

4.3 TAKE-HOME

Practice Different Sentence Types

First, identify each type of sentence: simple; compound; complex; compound-complex. Then, rewrite the sentence to change it into the specified sentence type. You can add, take away, or change parts of the sentence in order to change it.

Example: John walked his dog. (This is a simple sentence.)

Rewrite as a compound sentence: John walked his dog, and then he went home.

1. Even when she caught up on her sleep, Darlene dozed off at the movies, so she didn't go very often.

   (This is a compound-complex sentence.)

   Rewrite as a compound sentence.

   Darlene dozed off at the movies, so she didn't go very often.

2. The crowd cheered, and the band played two more songs.

   (This is a compound sentence.)

   Rewrite as a complex sentence.

   When the crowd cheered, the band played two more songs.

3. The neighbor's dog came running because he smelled the cookout.

   (This is a complex sentence.)

   Rewrite as a simple sentence.

   The neighbor's dog came running to the cookout.

4. Cynthia was the tallest girl on the squad.

   (This is a simple sentence.)

   Rewrite as a compound-complex sentence.

   Although Cynthia was the tallest girl on the squad, she wasn't the best athlete, so she wasn't always asked to play.

5. We didn't find a gas station, and we'll be walking.

   (This is a compound sentence.)

   Rewrite as a complex sentence.

   If we don't find a gas station soon, we'll be walking.

NAME: _____

DATE: _____

5.2 TAKE-HOME

Practice Greek and Latin Roots in Number Words

Use your knowledge of the roots you've learned to match each term with its definition by writing the letter of the correct definition next to each word. If you are unsure, you can check the meaning in a dictionary.

1. united	G	**A.** one one hundredth of a meter
2. tricycle	E	**B.** one item or thing
3. centimeter	A	**C.** a race with three parts
4. decimal	J	**D.** a hundred-year period
5. unit	B	**E.** a vehicle with three wheels
6. triathlon	C	**F.** a period of ten years
7. duplex	I	**G.** joined as one
8. centennial	D	**H.** every two weeks
9. decade	F	**I.** a house for two families to live in
10. biweekly	H	**J.** based on the number ten

NAME: _____

DATE: _____

5.3 ACTIVITY PAGE

Domain-Specific Vocabulary

The table below shows examples of domain-specific vocabulary in different subject areas. For the last row, add some domain-specific vocabulary for Construction and Engineering. You can use the Unit 2 Glossary or a print or online dictionary provided by your teacher for reference. Then, write down the field related to your invention in the third box on that row, along with three domain-specific vocabulary words for that field.

Literature	History	Economics
characters plot symbols	chronology timeline era	goods services supply
Environment	**Space**	**Government**
precipitation conservation habitat	planet galaxy black hole	executive legislative judicial
Construction	**Engineering**	**Your Invention**
Answers will vary but may include architecture, structure, toolkit, and so on.	Answers will vary but may include technology, blueprint, design, and so on.	Answers will vary.

Activity Book Answer Key

NAME: _____

DATE: _____

6.2 ACTIVITY PAGE

"A Short History of Glue"

Read "A Short History of Glue" on pages 89–93, and answer the following questions about text structure.

1. Read the following events about the invention of glue. Write the numbers 1–4 on the lines to indicate the **sequence of events**, with 1 being the first event.

   3 Borden first made glue in 1932 from a by-product of milk called casein.

   4 Later, researchers found a formula for synthetic resins used in glue today.

   1 The Borden Company was originally a milk delivery company.

   2 Gail Borden invented a new process in 1856 to make condensed milk.

2. Complete the sentence to show the **cause-and-effect** relationships.

   When cyanoacrylate is exposed to air, it hardens.

   Because Harry Coover and Fred Joyner realized the supersticky qualities of cyanoacrylate, Super Glue is widely used today.

NAME: _____

DATE: _____

6.3 ACTIVITY PAGE

"Paper Chase"

Read "Paper Chase" on pages 119–122, and answer the following questions about text structure.

1. Fill in the **causes and effects** to complete the chart.

Cause	Effect
Paper was invented.	The stapler was invented as a result.
Humans invent something new.	Many more new inventions are created as a result.

2. Fill in the **problems and solutions** to complete the chart.

Problem	Solution
King Louis XV needed to secure his court documents.	The French came up with the first staple.
Jack Linsky couldn't find a stapler that worked well.	Jack Linsky improved how staples were loaded into a stapler.

3. Number the events below from "Paper Chase" 1 through 4 in the order in which they actually happened.

   4 Jack Linsky made a stapler that loaded staples top-down.

   1 George McGill made the first commercially successful stapler.

   3 Eli Hotchkiss introduced the strip of staples wired together.

   2 Henry R. Heyl improved the stapler so that it could bend the staple.

NAME: _____

DATE: _____

6.4 TAKE-HOME

Introduce Spelling Words

Write the correct word to complete each sentence. Words will not be used more than once; some words will not be used.

amateur	analyze	answer	teacher
December	develop	inventor	triangle
philosopher	similar	sophomore	universe

1. Alexander Graham Bell is famed as the inventor of the telephone.
2. December is the twelfth month of the year.
3. Madeline plays chess as a(n) amateur but hopes to become a professional when she gets better at the game.
4. Not even the best astronomers know how many stars are in the universe.
5. The sophomore year of high school is the one between the freshman and junior years.
6. Cameron worked on the algebra problem for several minutes before finding the answer.
7. Socrates was an ancient Greek philosopher who thought deeply about how people should behave.
8. Janice felt that she learned more from her history teacher than any of her others.
9. Frogs and toads are similar, but they are easy to tell apart.
10. An equilateral triangle has three sides of equal length.

NAME: _____

DATE: _____

6.5 ACTIVITY PAGE

Informal and Formal Language

Write a formal expression for each informal expression.

Informal	Formal
down in the dumps	feeling sad
went to bat for	supported
called it a night	went to bed
pulled it off	succeeded at something difficult
slim chance	a slight possibility
had their hands full	were very busy
gave them a hand	helped them
ended up with	(a situation) concluded with
kept an eye out for	was cautious and alert
crunched the numbers	did mathematical calculations

Activity Book Answer Key

NAME: _____

DATE: _____

7.2 TAKE-HOME

Introduce Prefixes *uni–, di–*; Suffixes *–er, –or*

Review the information on these two charts.

PREFIX	MEANING	EXAMPLE	MEANING
uni–	one	unicycle	a vehicle with one wheel
di–	two	dichotomy	a division into two categories

SUFFIX	MEANING	EXAMPLE	MEANING
(adjective) + er	more	warm + er warmer	more warm
(verb) + er	one who	teach + er teacher	one who teaches
(verb) + or	one who	invent + or inventor	one who invents

Research the words below. Write a definition for each based on a meaning from the chart above.

WORD	DEFINITION
unique	one of a kind
unicorn	a horselike animal with one horn
diverge	to move in two or more different directions
divide	to separate into two or more parts
calmer	more calm
later	more late
illustrator	one who illustrates
aviator	one who flies aircraft

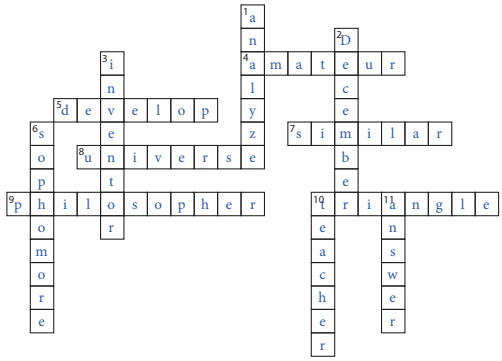
NAME: _____

DATE: _____

7.3 ACTIVITY PAGE

Practice Spelling Words

Complete the crossword puzzle by writing the correct spelling word on each line.



Down:

1. to study or examine something
2. the twelfth month of the year
3. a person who comes up with a new device or process
6. a person in their second year of high school
10. a person who instructs others
11. the solution to a problem

Across:

4. a nonprofessional who pursues a hobby or sport as a pastime
5. to create or make something more advanced
7. having many of the same or closely related traits
8. all of space and the matter it contains
9. a person who thinks deeply about ideas
10. a geometrical shape having three sides

NAME: _____

DATE: _____

8.2 ACTIVITY PAGE

Questions for Small Groups

Complete the following sentences.

1. A(n) ___fact___ is a statement that can be proven or disproven.
2. A(n) ___opinion___ is a statement about one's thoughts or feelings that cannot be proved.

Examine each excerpt from the text, and determine whether it is a fact or an opinion.

Text Excerpt	Fact or Opinion?
They are often credited for inventing the first airplane, but that's not entirely accurate. *(page 152)*	fact
The Wright brothers were helped by Cayley's ideas. *(page 154)*	fact
Pitch is when the nose of the plane moves up and down. Roll is when the wings move left to right. And yaw is when the plane moves like the second hand of a clock to the right or left. *(page 156)*	fact
I think the main ways we might be similar are in terms of intensity, drive and focus about work, and perhaps a preference for work over socializing. *(page 157)*	opinion
I attribute it to bottom-up thinking. *(page 157)*	opinion

NAME: _____

DATE: _____

8.3 TAKE-HOME

Introduce Frequently Confused Words: *fewer/less; affect/effect*

Fill in each definition with a word from the box. Use each word once.

fewer	less	affect	effect

1. A(n) ___effect___ is something that results from an action.
2. The word ___less___ means "not as much."
3. The word ___fewer___ means "not as many."
4. To ___affect___ something means to change it.

Complete each sentence with one of these words: fewer, less, affect, effect.

1. Michael has ___fewer___ comic books in his collection than Alexandra does.
2. Lack of sleep seems to have little ___effect___ on Leo's ability to concentrate.
3. The best way to ___affect___ a bad situation is to work to improve it.
4. The farmer worried about how the heavy rain would ___affect___ his wheat crop.
5. Sebastian has ___less___ than an hour to finish his report.
6. What is the ___effect___ of hot water on a sheet of ice?
7. It takes ___less___ time to buy a bicycle than to build one.
8. Dewayne has ___fewer___ baseball caps than he used to have.

Activity Book Answer Key

NAME: _____
DATE: _____

8.4 ACTIVITY PAGE

Practice Spelling Words

Arrange the words in alphabetical order.

universe	analyze	develop
triangle	similar	inventor
amateur	teacher	sophomore
December	answer	philosopher

1. amateur
2. analyze
3. answer
4. December
5. develop
6. inventor
7. philosopher
8. similar
9. sophomore
10. teacher
11. triangle
12. universe

NAME: _____
DATE: _____

9.2 TAKE-HOME

Practice Frequently Confused Words: *fewer/less; affect/effect*

*Read each sentence. If the **bold** word is used correctly, write "correct" on the line. If not, cross it out, and write the correct word on the line that follows the sentence*

1. The music had a soothing ~~**affect**~~ on the children.
   effect
2. Janine has **less** detail in her painting than Jamal does.
   correct
3. There are ~~**less**~~ people attending the Saturday night dances.
   fewer
4. The **effect** of drinking too much water is not widely understood.
   correct
5. John told his little sister that she should eat **fewer** jelly beans.
   correct
6. Exercise is known to **affect** one's general health in a positive way.
   correct
7. He hoped that their disagreement wouldn't ~~**effect**~~ their relationship.
   affect
8. The cook was advised to put ~~**fewer**~~ salt in his beef stew.
   less

NAME: _____
DATE: _____

9.3 TAKE-HOME

Practice Prefixes: *uni–*, *di–*; Suffixes: *–er*, *–or*

Use your knowledge of the prefixes and suffixes you've learned to match each term with its definition by writing the letter of the correct definition next to each word. You can check your definitions in a dictionary.

1. unify	H	**A.** people doing the same thing at once
2. sicker	F	**B.** a difficult choice between two options
3. calmer	D	**C.** having two colors
4. dilemma	B	**D.** more peaceful
5. supervisor	I	**E.** more ill
6. fresher	F	**F.** more fresh
7. unilateral	G	**G.** an action taken by one person or party
8. dichromatic	C	**H.** bring together as one
9. in unison	A	**I.** someone who manages others

NAME: _____
DATE: _____

10.2 ACTIVITY PAGE

Spelling Assessment

Write the spelling words as your teacher calls them out.

1. amateur
2. analyze
3. answer
4. December
5. develop
6. inventor
7. philosopher
8. similar
9. sophomore
10. teacher
11. triangle
12. universe

The amateur inventor studied the universe with her new kind of telescope.

Activity Book Answer Key

NAME: _____

DATE: _____

11.1 CONTINUED ASSESSMENT

Questions

1. PART A: Circle the main text structure in "Hedy Lamarr: Mother of Wi-Fi."

   problem and solution cause and effect (sequence)

   PART B: Which sentence from the passage is an example of the text structure you chose in Part A?

   A. "She could also play piano, dance ballet, and act."
   (B.) "Between the years 1938 and 1948, she appeared in almost thirty films."
   C. "Lamarr said, 'Improving things comes naturally to me.'"
   D. "The two inventors got a patent for their system, but the U.S. military rejected their work."

2. PART A: Which choice best describes the central idea in the passage?

   (A.) Hedy Lamarr was both a movie star and an inventor.
   B. Hedy Lamarr was married to Fritz Mandl in 1933.
   C. Hedy Lamarr developed a new type of airplane with Howard Hughes.
   D. Hedy Lamarr is a member of the National Inventors Hall of Fame.

   PART B: What are some details that support the central idea you chose in Part A?

   Answers will vary. Students should reference details about both Lamarr's acting and inventing.

3. Is the statement "Lamarr proved to be an exceptional inventor" a fact or the author's opinion? Explain your answer.

   Opinion. The word *exceptional* is a personal judgment that can't be proved.

4. Using information from the text, explain "frequency hopping."

   Frequency hopping is a technology that allows a missile to avoid radio interference from the enemy as it makes its way to the target.

5. How does the author's inclusion of frequency hopping help to support the idea that Lamarr became known as "the mother of Wi-Fi"?

   Frequency hopping was a technology that led to Wi-Fi.

NAME: _____

DATE: _____

11.1 CONTINUED ASSESSMENT

Questions

6. What is the central idea in "New Ways of Mining"?

   A. Coal became a main source of energy by 1700 when timber grew scarce.
   B. Working in underground mines was extremely dangerous in the 1700s.
   C. James Watt made innovative improvements to steam engine technology.
   (D.) Challenges in the mining industry led to new steam engine technology .

7. What is another word that means almost the same as *shafts* in paragraph 2?

   A. mines
   (B.) tunnels
   C. minerals
   D. miners

8. Read each sentence from the text. Circle the text structure that the sentence uses.

   "Something needed to be done to pump out the water."

   (problem and solution) cause and effect sequence

   "If, however, the steam was allowed to escape through a hole or a small tube, it produced a great force."

   problem and solution (cause and effect) sequence

   "By the early 1700s, several people began to devise steam pumps powered by coal fires."

   problem and solution cause and effect (sequence)

9. What main problem led to the development of the steam engine?

   Coal mines were often flooded with groundwater.

10. PART A: Look at the image, and read the caption. What part of the text does the image illustrate?

    It shows an early steam engine used to pull water from a mine.

    PART B: How do the image and caption add to your understanding of the text?

    Answers will vary but should state that the image shows what an early steam engine looked like, which adds to its description in the text.

Reading Comprehension Score: _____ of 10 points

Activity Book Answer Key

NAME: _____

DATE: _____

11.1 ASSESSMENT CONTINUED

Grammar

Read each sentence. Circle the sentence type.

1. Temple Grandin is a well-known inventor.

   (simple) compound complex compound-complex

2. Although Grandin struggled with communication as a child, her skill at visualizing how things worked was excellent.

   simple compound (complex) compound-complex

3. Grandin first visualizes what she wants to make, and then she tries to build it.

   simple (compound) complex compound-complex

4. Grandin believes hands-on experience is important because it helps people learn how things work, and she thinks building things can teach valuable skills.

   simple compound complex (compound-complex)

Circle fewer *or* less *to complete each sentence correctly.*

5. I suspected my brother had been snacking when I noticed (fewer) / less crackers in the box.

6. Because winter days are shorter, there is fewer / (less) daylight time for outdoor activities than in the summer.

7. There are (fewer) / less cars on the road after rush hour is over.

Circle affect *or* effect *to complete each sentence correctly.*

8. Scientists have studied the affect / (effect) of sunlight on people's moods.

9. More sunlight exposure can (affect) / effect people by causing them to be happier.

10. There are other environmental factors that (affect) / effect mood as well.

Grammar Score: _____ of 10 points.

NAME: _____

DATE: _____

11.1 ASSESSMENT CONTINUED

Morphology

Match each word with its meaning. Use what you know about roots, prefixes, and suffixes in number words.

1. F	*united*	A. a molecule containing two oxygen atoms
2. D	*biped*	B. a period of ten years
3. G	*duo*	C. a period of one hundred years
4. E	*trident*	D. an animal that walks on two legs
5. B	*decade*	E. a spear with three points
6. C	*century*	F. having one common purpose
7. A	*dioxide*	G. a two-person musical group

Complete each sentence to show the meaning of the underlined word. Use what you know about the meaning of the suffixes –er *and* –or *to help you.*

8. My sister is a great organizer because Complete sentence should demonstrate that the underlined word means "someone who organizes." .

9. I prefer the brighter lamp because Complete sentence should demonstrate that the underlined word means "more bright." .

10. The tow truck operator Complete sentence should demonstrate that the underlined word means "someone who operates a tow truck." .

Morphology Score: _____ of 10 points.

Total Score for Unit Assessment: _____ of 40 points.

NAME: _____

DATE: _____

PP.1 ASSESSMENT

Mid-Unit Comprehension Check—*Calling All Minds: How to Think and Create Like an Inventor*

1. Describe two ways in which Temple Grandin was influenced to become an inventor.

   Answers may vary but may include: Her mother and headmaster encouraged her to learn everything she could about animal science. Her teachers allowed it as long as she was on time for classes, did her work, and took care of the horses. Her grandfather was an inventor who also supported her interest in science.

2. What is a visual thinker?
   - A. a person who organizes the world through words
   - B. a person who organizes the world through numbers
   - C. a person who organizes the world through books
   - (D.) a person who organizes the world through pictures

3. According to Grandin, what is the *autism spectrum*?
   - (A.) the range of abilities and challenges an autistic person may have
   - B. a way of describing successful careers in the arts or tech industry
   - C. the ability to make things by first visualizing them
   - D. the different ways in which humans' brains work

4. What word is most similar in meaning to the word *instructions*? Circle the correct answer.

   (guidelines) patents activities

Activity Book Answer Key

5. According to Grandin, what is something a person needs to be able to do before they can become an inventor?

Answers will vary but should include the idea that inventors need hands-on experience. They need to take devices apart and put them back together again in order to understand them before they can build better devices.

6. How does filing a patent protect your invention?

It keeps others from copying it and profiting from it.

7. Before the invention of the printing press, how were books published? Circle two correct answers.

(A.) They were made by woodblock.
(B.) They were made by hand.
C. They were made by computers.
D. They were made by machines.

8. Who was Johannes Gutenberg, and how did he change printing?

Johannes Gutenberg was a German printer. He invented moveable type. This made it possible to print many books at a time.

NAME: _____
DATE: _____

PP.1 CONTINUED ASSESSMENT

9. Which came first, the stereotype or the typewriter? Write the correct answer on the line.

The stereotype came first.

10. Which of the following best describes the way Temple Grandin learned?

A. She learned in words first, then expressed her ideas in images.
(B.) She learned in images first, then expressed her ideas in words.
C. She learned in patterns and sequences, then expressed her ideas in words.
D. She learned in words, then expressed her ideas in patterns and sequences.

11. What did the nation's Founding Fathers do to help protect inventors' work?

A. They made patents illegal for everyone.
B. They made patents legal for only some people.
C. They refused to pass any kind of patent act.
(D.) They passed the nation's first patent act.

12. Why was it rare for women to be recognized as inventors in the 1800s?

Answers will vary but may include: Women were often discouraged from working with their hands or taking out a patents for their inventions.

13. How did Margaret Knight defeat Charles F. Annan's attempt to steal her invention?

Answers will vary but may include: Knight brought detailed notes and drawings to court showing that she had invented the paper bag machine.

14. Which statement is associated with Alexander Fleming's discovery of penicillin?

(A.) Some kinds of mold can have healing properties.
B. Burdock burrs have threads with tiny hooks on them.
C. Kevlar is both fire-resistant and stronger than steel.
D. A milky solution led to the discovery of a new fiber.

15. Which of the following can Kevlar be used for? Circle the correct answers.

(body armor) (suspension bridges) (rope) paper bags
(fiber-optic cables) medicine (safety helmets) food

16. Why might more than one kind of thinker be needed to design and build a structure?

Accept reasonable answers. Sample answer: One kind of thinker, such as a visual thinker, is needed to design the structure. Other kinds of thinkers are needed to build different parts of the structure. Other thinkers may be needed to build things related to the structure, such as boilers, pipes, electrical systems, waste management systems, and so on.

17. Describe a way a person can get over their fear of flying.

Answers will vary but may include: A person may get over his or her fear of flying by studying the science behind how airplanes work and learning how safe they are.

NAME: _____
DATE: _____

PP.1 CONTINUED ASSESSMENT

18. What is aerodynamics the study of?

A. things that float
B. things that go fast
(C.) things that fly
D. things that make noise

19. Does drag cause a plane to move more quickly or more slowly?

It causes the plane to move more slowly.

20. What role do wingtips play in airplanes? Circle two correct answers.

A. They cause drag on the plane.
(B.) They generate lift for the plane.
(C.) They make planes faster.
D. They make planes slower.

Mid-Unit Comprehension Check Score: _____ of 20 points.

Activity Book Answer Key

NAME: _____

DATE: _____

PP.2 ASSESSMENT

End-of-Unit Comprehension Check—*Calling All Minds: How to Think and Create Like an Inventor*

1. How is milk related to the invention of glue?

   A by-product of milk, casein, was used to produce an early version of glue.

2. How might the invention of Super Glue be considered an accident?

   Answers will vary but may include: The men who invented Super Glue were originally looking for a temperature-resistant coating for jet cockpits. They came across a substance originally invented to replace stitching for wounds during World War II. This substance became the basis for Super Glue.

3. How is the invention of paper related to the invention of the staple?

   Paper was invented first. When the king of France needed a way to hold his documents together, the staple was invented.

4. One problem with the stapler was that each staple had to be loaded one at a time. How did Eli Hotchkiss solve this problem?

   He wired together a strip of staples, which enabled continuous stapling.

5. How was Jack Linsky's Swingline stapler an improvement on earlier staplers?
   - A. It could punch an individual staple through paper.
   - B. It could automatically bend the wire staple to cinch it.
   - C. It used connected staples to enable continuous stapling.
   - (D.) It allowed for an easier way to load the staples.

6. What is trial and error, and how does it apply to science inventions?

   Answers will vary but may include: Trial and error describes the process of inventing a product, testing it, seeing what is wrong with it, changing it, and testing it again. Scientists do this again and again until they work out all the errors in their invention.

7. How did the discovery of rubber change the industrial world?

   Answers will vary but may include: It led to other inventions and improvements, including changes in the way roofs, tires, floors, assembly lines, and shock absorbers were made.

8. What is bottom-up planning? Circle the correct answers.
   - A. start with a hypothesis
   - (B.) gather data first
   - C. gather data second
   - (D.) arrive at a hypothesis

NAME: _____

DATE: _____

PP.2 CONTINUED ASSESSMENT

9. Which flying inventions led to the invention of the airplane?

   (hot-air balloons) rockets (dirigibles) helicopters

10. Who invented the first airplane with a gasoline engine and propeller?
    - A. Sir George Cayley
    - B. Joseph-Michel Montgolfier
    - (C.) the Wright brothers
    - D. Count Ferdinand

11. Why did the Wright brothers make so many flights before patenting their "flying machine"?

    Answers will vary but may include: They went through the process of trial and error many times to work out any problems the machine might have. That way, when they finally patented it, it could fly safely when tested.

12. According to Grandin, what are three key traits of what Grandin refers to as the Asperger's spectrum? Circle the correct answers.

    lack of interest (obsessive interest) (awkward social skills)

    strong social skills good communication (communication challenges)

13. What does Grandin believe will happen to autistic people as they age if they are able to get out and experience the world?

    Answers will vary but may include: Grandin believes that autistic people will continue to learn and as a result lose or diminish some of their autistic traits.

14. What two inventions was Lewis Latimer instrumental in developing? Circle two correct answers.
    - A. the airplane
    - (B.) the telephone
    - C. the typewriter
    - D. the stapler
    - (E.) the light bulb

15. What is a blueprint? Circle two correct answers.
    - A. a diagram showing how something works
    - B. a drawing completed for a patent
    - (C.) a plan for where things go
    - (D.) a technical drawing or model of a structure

Activity Book Answer Key

NAME: _____

DATE: _____

PP.2 ASSESSMENT CONTINUED

16. Why are schematics an important part of building a structure?

Answers will vary but may include: They show where electrical connections and outlets should go or where they already are.

17. In Grandin's view, what is the best way to become good at drafting?

Answers will vary but may include: Watch a talented draftsman work. Learn to read their drawings. Study those drawings. Make your own drawings.

18. What did Grandin invent to help lessen anxiety in people with autism?

a bird kite (a squeeze machine) a pulley

19. Why does Grandin encourage her students to write and publish papers on their work?

(A.) It is a way to store their knowledge.
B. It is a way to patent their knowledge.
C. It is a way to protect their knowledge.
D. It is a way to improve their knowledge.

20. How does Grandin demonstrate that being on the autism spectrum is both a challenge and a gift? Provide examples to support your answer.

Accept reasonable responses that include supporting evidence.

End-of-Unit Comprehension Check Score: _____ of 20 points.

NAME: _____

DATE: _____

PP.3 ACTIVITY PAGE

Grammar: Sentence Types

Identify each sentence as simple, compound, complex, *or* compound-complex.

1. The house was cold.
simple

2. Graham went home, but Gina stayed late.
compound

3. When Jamie heard the phone ring, she rushed to answer it.
complex

4. The dinosaur ate the plant.
simple

5. On the way home, Gina went to meet Phil, but Phil wasn't there.
compound-complex

6. The girl liked fruit but did not like vegetables.
complex

7. The mail carrier rang the doorbell.
simple

8. The alarm went off at 7 a.m., but Michele did not wake up.
compound

9. The cat ran, and the dog followed.
compound

NAME: _____

DATE: _____

PP.4 ASSESSMENT

Morphology: Greek and Latin Roots in Number Words

Complete the sentences to identify each root word's meaning. Then write one word that uses that root. Column 2 answers may vary. Sample answers shown.

1. The root word *unus* means one.
universe

2. The root word *bi* means two.
bilateral

3. The root word *duo* means two.
duotone

4. The root word *tri* means three.
triangle

5. The root word *decem* means ten.
December

6. The root word *centum* means one hundred.
centimeter

Activity Book Answer Key

NAME: _____

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PP.5 ACTIVITY PAGE

Grammar: Frequently Confused Words *fewer/less* and *affect/effect*

Circle the word that correctly completes each sentence.

1. There were (fewer/less) people in the auditorium after the band left.
2. The concussion (affected/effected) Dominic's memory.
3. The new rules went into (affect/effect) the following week.
4. After we ate the leftovers, there was (fewer/less) food in the fridge.
5. (Fewer/Less) animals lived in the area after the wildfire.
6. What (affect/effect) does diet have on kids' health?
7. Do you want more or (fewer/less) milk for your cereal?
8. The temperature outside (affected/effected) the temperature inside.
9. Did the sad movie (affect/effect) your feelings?
10. There were (fewer/less) cars on the road today than yesterday.

NAME: _____

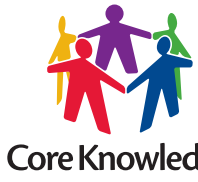
DATE: _____

PP.6 ACTIVITY PAGE

Morphology: Prefixes *uni–, di–*; Suffixes *–er, –or*

Complete each sentence to identify a prefix or suffix's function and meaning. Then write a sentence with a word containing that prefix or suffix.

1. The prefix *uni–* means one.
   Sample sentence: The *universe* is large.
2. The prefix *di–* means two.
   Sample sentence: The teacher is in a *dilemma*.
3. The suffix *–or* means one who.
   Sample sentence: The *inventor* was now forgotten.
4. One meaning of the suffix *–er* is more.
   Sample sentence: It was getting *hotter* outside.
5. A second meaning of the suffix *–er* is one who.
   Sample sentence: The *teacher* assigned homework.



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Unit 2

Calling All Minds: How to Think and Create Like an Inventor

By Temple Grandin

Teacher Guide

GRADE 6

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