12.3.1 Lesson 6

Introduction

In this lesson, students continue to read and analyze *Guns*, *Germs*, *and Steel*, pages 229-237 (from "On July 3, 1908, archaeologists excavating the ancient Minoan palace" to "yet another invention in search of a use?"). In this excerpt, Diamond challenges the ideas of "[n]ecessity is the mother of invention" (p. 232) and "heroic theory of invention" (p. 231). Instead, Diamond claims that innovation often precedes the necessity for an invention.

Students begin their exploration of argument by learning how to delineate the author's supporting claims and evidence. Students complete a reading and discussion in small groups, analyzing how the author supports a claim in the focus excerpt. Students identify specific evidence and explain its relationship to the claim. Student learning is assessed via a Quick Write at the end of the lesson: Identify at least two pieces of evidence and explain how each piece supports one of the author's claims.

For homework, students read and annotate pages 237-243 of *Guns, Germs, and Steel*, boxing any unfamiliar words and looking up their definitions. Additionally, students continue to surface possible research issues from the text and pose inquiry questions as they read and analyze the text.



Standards

Assessed Standard(s)					
CCRA.R.8	Delineate and evaluate the argument and specific claims in a text, including the validity of the reasoning as well as the relevance and sufficiency of the evidence.				
Addressed	Addressed Standard(s)				
W. 11-12.9.b	 Draw evidence from literary or informational texts to support analysis, reflection, and research. b. Apply grades 11-12 Reading standards to literary nonfiction (e.g., "Delineate and evaluate the reasoning in seminal U.S. texts, including the application of constitutional principles and use of legal reasoning [e.g., in U.S. Supreme Court Case majority opinions and dissents] and the premises, purposes, and arguments in works of public advocacy [e.g., <i>The Federalist</i>, presidential addresses]"). 				
SL. 11-12.1.a	 Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively. a. Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas. 				
L. 11-12.4.c	 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11-12 reading and content, choosing flexibly from a range of strategies. c. Consult general and specialized 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, its part of speech, its etymology, or its standard usage. 				

Assessment



Assessment(s)

Student learning is assessed via a Quick Write at the end of the lesson. Students respond to the following prompt, citing textual evidence to support analysis and inferences drawn from the text.

• Identify at least two pieces of evidence and explain how each piece supports one of the author's claims.

High Performance Response(s)

A High Performance Response should:

- Identify one of the author's claims (e.g., necessity is not the mother of invention).
- Identify at least two pieces of evidence and explain how they support the claim (e.g., Diamond states, "When Edison built his first phonograph in 1877, he ... propose[d] ten uses" (p. 233) for it, including recording books for blind people, announcing clock time, and even teaching spelling. This evidence supports the claim that necessity is not the mother of invention because it shows that Edison created the phonograph before there was a need for it. The example of the phonograph also illustrates that society found new purposes for the phonograph once it was invented. Additionally, the evidence that Nikolaus Otto built a gas engine when "[t]here was no crisis in the availability of horses, no dissatisfaction with the railroads" (p. 233) also supports the claim. The example of Otto supports the idea that need is not what initially drives innovation, because the ultimate use of the engine caused more changes and refinements in the original prototype that made it more useful for emerging needs, such as transportation and mechanized labor.).

Vocabulary



Vocabulary to provide directly (will not include extended instruction)

- unprepossessing (adj.) not creating a favorable impression; unattractive
- syllabary (n.) a set of written symbols, each of which represents a syllable, used to write a given language
- precocious (adj.) unusually advanced or mature in development
- idiosyncratic (adj.) displaying an individualizing characteristic or quality
- debasement (n.) a reduction in quality or value
- prototype (n.) the original or model on which something is based or formed
- incentive (n.) something that incites or tends to incite to action or greater effort, as a reward offered for increased productivity
- denigrate (v.) to treat or represent as lacking in value or importance; belittle; disparage
- precursors (n.) people or things that precede, as in a job, a method, etc.; predecessors
- serendipitous (adj.) good; beneficial; favorable
- distillation (n.) a process of vaporization and subsequent condensation, as for purification or concentration

Vocabulary to teach (may include direct word work and/or questions)

• None.

Additional vocabulary to support English Language Learners (to provide directly)

- excavating (v.) uncovering (something) by digging away and removing the earth that covers it
- chanced upon (v.) found (something) by chance
- generalize (v.) to make a general statement or form a general opinion
- laypeople (n.) people who are not members of a particular profession
- phonograph (n.) a record player; a device used for playing musical records
- concede (v.) to admit that you have been defeated and stop trying to win
- lobbying (v.) trying to influence government officials to make decisions for or against something
- tinkering (v.) repairing or improving something (such as a machine) by making small changes or adjustments to it
- inaugurated (v.) was the beginning of (something, such as a period of time)
- cumulatively (adv.) including or adding together all the things that came before



Lesson Agenda/Overview

Student-Facing Agenda	% of Lesson
Standards & Text:	
• Standards: CCRA.R.8, W.11-12.9.b, SL.11-12.1.a, L.11-12.4.c	
• Text: Guns, Germs, and Steel by Jared Diamond, pages 229-237	
Learning Sequence:	
1. Introduction of Lesson Agenda	1. 5%
2. Homework Accountability	2. 20%
3. Introduction of Argument Terms	3. 15%
4. Claims and Evidence Small Group Discussion	4. 45%
5. Quick Write	5. 10%
6. Closing	6. 5%

Materials

- Student copies of the Surfacing Issues Tool (refer to 12.3.1 Lesson 2) (optional)—students may need additional blank copies
- Copies of the Argument Visual Handout for each student (optional)
- Student copies of the Short Response Rubric and Checklist (refer to 12.3.1 Lesson 1) (optional)



Learning Sequence

How to Use the Learning Sequence			
Symbol	Type of Text & Interpretation of the Symbol		
10%	Percentage indicates the percentage of lesson time each activity should take.		
	Plain text indicates teacher action.		
no symbol	Bold text indicates questions for the teacher to ask students.		
	Italicized text indicates a vocabulary word.		
•	Indicates student action(s).		
•	Indicates possible student response(s) to teacher questions.		
(j)	Indicates instructional notes for the teacher.		

Activity 1: Introduction of Lesson Agenda

Begin by reviewing the agenda and the assessed standard for this lesson: CCRA.R.8. In this lesson, students explore the nature of innovation throughout history. Students also identify claims and supporting evidence in the text.

• Students look at the agenda.

Activity 2: Homework Accountability

Instruct students to take out their responses to the first part of the previous lesson's homework assignment. (Read and annotate pages 229-237 of *Guns, Germs, and Steel* (from "On July 3, 1908, archaeologists excavating the ancient Minoan palace" to "yet another invention in search of a use?") (W.11-12.9.b).) Instruct students to form pairs to discuss their responses.

- Student annotation may include:
 - Star next to "That makes it the leading cause of history's broadest pattern" (p. 231), because this statement suggests that technology makes the biggest difference between wealthy and impoverished societies.
 - Star next to the phrase "Quite a few inventions do conform" (p. 232), because this explanation describes why people tend to believe that innovation and inventions are driven by consumer needs.

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20%

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- Question mark next to "The first cameras, typewriters, and television sets were as awful as Otto's seven-foot-tall gas engine" (p. 233) what made these prototypes so "awful"?
- Star next to "overstates the importance of rare geniuses" (p. 234), because the author explains why people, despite evidence to the contrary, persist in believing that only a few great people create the inventions that fulfill humanity's needs.
- Exclamation point near "Who today remembers that gasoline ... originated as yet another invention in search of a use?" (p. 237). This information is surprising because gasoline has changed modern life in so many ways including making transportation easier and powering all kinds of modern machinery.

Instruct student pairs to share and discuss the vocabulary words they identified and defined in the previous lesson's homework (L.11-12.4.c).

- Students may identify the following words: unprepossessing, syllabary, precocious, idiosyncratic, debasement, prototype, incentive, denigrate, precursors, serendipitous, and distillation.
- **Differentiation Consideration:** Students may also identify the following words: *excavating, chanced upon, generalize, laypeople, phonograph, concede, lobbying, tinkering, inaugurated, and cumulatively.*
- Definitions are provided in the Vocabulary box in this lesson.

Instruct students to take out their responses to the second part of the previous lesson's homework assignment. (Continue to surface issues and generate inquiry questions as part of the research process. Come to the next lesson prepared to discuss 1-2 issues and 1-2 inquiry questions.) Instruct student pairs to discuss their surfaced issues and potential inquiry questions.

- Student responses may include:
 - **Surfaced issues:** Eurocentrism; heroic theory of invention; necessity is the mother of invention; the nature of innovation; patent law.
 - **Potential inquiry questions:** What is the impact of Eurocentric bias on global trade?; How does the heroic theory of invention affect entrepreneurship in the United States?; What inventions were created to fulfill a need?; How can a society stimulate innovation?; How do patent laws affect rates of innovation?



• See the Model Surfacing Issues Tool at the end of this lesson for more details regarding surfaced issues.

Instruct students to take out their responses to the third part of the previous lesson's homework assignment. (Respond briefly in writing to the following questions.) Instruct student pairs to share and discuss their responses to the questions posed in the previous lesson's homework.

How does Diamond's explanation of technology on page 231 relate to his research purpose as established in earlier excerpts?

- Student responses may include:
 - Diamond claims that, "Technology, in the form of weapons and transport, provides the direct means by which certain peoples have expanded their realms and conquered other peoples" (p. 231). In the Prologue, Diamond explains that "some peoples developed guns, germs, steel, and other factors conferring political and economic power before others did" but these "factors" are only "proximate explanations" (p. 24). These proximate factors lead to questions of "ultimate causation" (p. 78) and do not fully explain how inequality came to be across various societies. Diamond's research purpose of finding out "ultimate explanations" (p. 24) is exemplified in his focus for this excerpt, "why technology did evolve at such different rates on different continents" (p. 232).
 - Diamond asks, "Why were Eurasians, rather than Native Americans or sub-Saharan Africans, the ones to invent firearms, oceangoing ships, and steel equipment?" (p. 231). This question connects directly to Diamond's original inquiry about inequality in the modern world: "Why did wealth and power become distributed as they now are, rather than in some other way?" (p. 15). Diamond's research purpose is to discover the "ultimate explanations" (p. 24) for why societies differ in present-day technological advancement.

How does Diamond dismiss the claim "necessity is the mother of invention" (p. 232) and the "heroic theory of invention" (p. 231)?

- Student responses may include:
 - Diamond dismisses the claim that "[n]ecessity is the mother of invention" (p. 232) and suggests that "[i]n fact, many or most inventions were developed by people driven by curiosity or by a love of tinkering in the absence of any initial demand for the product they had in mind" (p. 232). Diamond provides the example of Edison's phonograph, which was invented for "ten uses" (p. 233), none of which was its ultimate purpose of playing records. Another example Diamond provides is



Nikolaus Otto's gas engine, which was invented during a time when there was "no crisis in the availability of horses, no dissatisfaction with railroads" (p. 233).

Diamond dismisses the "heroic theory of invention" (p. 231) and instead claims that "there has never been any such person" (p. 235) as a genius inventor. He supports this claim by suggesting all "famous inventors had capable predecessors" (p. 235). He explores "precursors" (p. 234) to the famous invention of the steam engine and provides examples of lesser-known precursors to more famous inventions that catapulted their inventors to fame, including "Edison's famous 'invention' of the incandescent light bulb" (p. 234); "the Wright brothers' manned powered airplane" (p. 235); "Samuel Morse's telegraph" (p. 235), which had three precursors; and "Eli Whitney's 'cotton gin' (p. 232)"

Lead a brief whole-class discussion of student responses.

Activity 3: Introduction of Argument Terms

Explain to students they read and discuss components of argument as part of their analysis of *Guns, Germs, and Steel* in 12.3.1. Post or project the following terms for students. Define the terms for students and explain how they relate to one another.

- Students follow along.
- Argument: The composition of precise claims about an issue, including relevant and sufficient evidence and valid reasoning. Explain to students that they do not address Diamond's argument because 12.3.1 includes only excerpts of Diamond's text, not the text in its entirety. However, students will develop a complete argument when they begin writing their own research-based arguments in 12.3.2.
- **Central Claim:** An author or speaker's main point about an issue in an *argument*. "The factors that resulted in Pizarro's seizing Atahuallpa were essentially the same ones that determined the outcome of many similar collisions between colonizers and native peoples" (p. 66) and thus provides "a broad window onto world history" (p. 66).
- Explain to students that arguments like the one discussed in *Guns, Germs, and Steel* can include multiple central claims.
- **Supporting Claim:** A smaller, related point that reinforces or advances the central claim. An example of a *supporting claim* from page 66 of *Guns, Germs, and Steel* is as follows: "Atahuallpa's capture was decisive for the European conquest of the Inca Empire."
- Evidence: The topical and textual facts, events, and ideas from which the claims of an argument arise, and which are cited to support those claims. An example of *evidence* from page 66 of *Guns, Germs, and Steel* is as follows:

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With Atahuallpa out of the way, the Spaniards were able to "dispatch exploring parties" to other Inca villages and "send for reinforcements from Panama."

• **Reasoning:** The logical relationships among ideas, including relationships among claims and relationships across evidence. An example of *reasoning* from page 66 of *Guns, Germs, and Steel* is as follows:

"Although the Spaniards' superior weapons would have assured an ultimate Spanish victory in any case, the capture made the conquest quicker and infinitely easier."

Explain to students that an *argument* includes all claims including the central claim(s) and supporting claims, as well as evidence and reasoning. Explain to students that *supporting claims* support the overarching central claim for a particular issue and that *evidence* and *reasoning* are used to support all claims.

- **Differentiation Consideration:** Consider distributing the Argument Visual Handout to aid student understanding in how the components of an *argument* are related. Explain to students that this handout shows the relationship among the components of an argument, and includes the terms and definitions used to describe its components.
- Students will be introduced to and work with counterclaims in 12.3.1 Lesson 13.

Explain to students that their work in this lesson focuses on identifying *supporting claims* and *evidence* that supports those claims. Explain to students that they now practice identifying another claim and supporting evidence from pp. 65-78.

Instruct students to form pairs and identify another supporting claim from pages 65-78.

- Student responses may include:
 - The story of Atahuallpa's capture is instructive in identifying the factors that determine victory in "collisions between colonizers and native peoples" (p. 66) throughout history.
 - Imbalances in weaponry "were decisive in innumerable other confrontations of Europeans with Native Americans and other peoples" (p. 72).
 - Disease played a "decisive" (p. 75) role in the conquest of the Inca Empire.

Instruct student pairs to identify evidence that supports one or more of the claims they identified.

- Student responses may include:
 - Claim: The story of Atahuallpa's capture is instructive for identifying the factors that determine victory in "collisions between colonizers and native peoples" (p. 66) throughout history.

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Evidence: The use of horses at Cajamarca "exemplifies a military weapon that remained potent for 6,000 years, until the early 20th century, and that was eventually applied on all the continents" (p. 74).

• **Claim:** Imbalances in weaponry "were decisive in innumerable other confrontations of Europeans with Native Americans and other peoples" (p. 72).

Evidence: The Europeans defeated the Incas with "steel swords, lances, and daggers, strong, sharp weapons that slaughtered thinly armored Indians" (p. 73) as well as "steel or chain mail armor" and "above all ... steel helmets" (p. 74).

• Claim: Disease played a "decisive" (p. 75) role in the conquest of the Inca Empire.

Evidence: Smallpox, which had been introduced by the Europeans, was the "reason for the civil war" (p. 74) between Atahuallpa and his half-brother, Huascar, "that left the Incas divided and vulnerable" (p. 74).

Lead a brief whole-class discussion about claims and evidence.

Explain to students that, in addition to determining the claims in an argument, another part of delineating an argument is evaluating the evidence used to support those claims. It is important that the evidence used is both *relevant*, which means "related to the issue in an appropriate way," and *sufficient*, which means "adequate for the purpose, or enough." *Relevant* evidence is connected to the claim and *sufficient* evidence thoroughly reinforces the claims in an argument (central and/or supporting claims). One piece of powerful evidence may be sufficient to support a claim, or several pieces of evidence may be collectively sufficient to support a claim. For the purposes of this lesson, students focus on identifying claims and supporting evidence.

• Students listen.

Activity 4: Claims and Evidence Small Group Discussion

45%

Instruct students to form groups of 4-5 for this activity. Explain to students that they are to identify supporting claims and relevant evidence from pages 229-237 of *Guns, Germs, and Steel*. Next, they analyze the evidence Diamond uses to support his claims. Instruct students to identify a claim and evidence in the excerpt, cite the page number(s), and determine the relevance of the evidence by analyzing whether the evidence supports Diamond's claim.

- Students form heterogeneous groups and identify claims and supporting evidence.
- Remind students to continue to surface issues from the text as they engage in this text analysis activity.



- **Differentiation Consideration:** If necessary, consider providing time for students to reread the lesson's excerpt before engaging in this activity.
- **Differentiation Consideration:** Consider posting or projecting the following guiding question to support students in their analysis in this activity:

What claims does Diamond make in this excerpt about inventions?

- Students do not evaluate the extent to which Diamond's evidence is relevant or sufficient or the validity of his reasoning in this lesson, as the focus of this activity is to support students' understanding of the ways in which claims and evidence work together in an argument.
 - Student responses may include:
 - Claim: Necessity is not the mother of invention.

Evidence: Diamond provides specific examples of Thomas Edison's phonograph and Nikolaus Otto's gas engine. Diamond states, "When Edison built his first phonograph in 1877, he published an article proposing ten uses to which his invention might be put. They included preserving the last words of dying people, recording books for blind people to hear, announcing clock time, and teaching spelling" (p. 233). Nikolaus Otto built a gas engine when "[t]here was no crisis in the availability of horses, no dissatisfaction with the railroads" (p. 233).

How the evidence supports the claim: The examples of the phonograph and the gas engine illustrate high-profile inventions that were not created with specific needs in mind. Edison created an invention that did not have an immediate need, and the purposes for which it was intended were not society's best use of the invention. The example of Otto illustrates another inventor who created a prototype to fulfill a need that was not yet identified, supporting the claim that necessity is not the mother of invention.

• **Claim:** Diamond claims that "technology develops cumulatively rather than in isolated heroic acts" (p. 235).

Evidence: Diamond provides evidence of the precursors of James Watt's steam engine, contradicting the "splendid fiction" (p. 234) of the story of Watt's inspiration. Similarly, "Edison's famous 'invention' of the incandescent light bulb" (p. 234) was a refinement of several other successful existing inventions that had already earned patents. Diamond then concludes, "[a]ll recognized famous inventors had capable predecessors and successors and made their improvements at a time when society was capable of using their product" (p. 235).



How the evidence supports the claim: James Watt happened to be working on Newcomen's functional steam engine when he had an idea for his own, based on the machine he was fixing. Edison, too, simply refined an idea that had functional precursors. Thus, the stories of Watt and Edison both provide examples to support the claim that technology develops cumulatively and is not dependent on isolated genius.

Inform students that explaining how evidence supports the claim is *reasoning*. Remind students that *reasoning* is the logical relationships among ideas, including relationships among claims and relationships across evidence.

- Students listen.
- Students will have more opportunities to work with the concept of *reasoning* in 12.3.1 Lessons 8, 11, and 12.
- Consider reminding students of their previous work with SL.11-12.1.a, since this discussion requires that students come to class having read the material and asks them to explicitly draw on evidence from the text to support their discussion.

Activity 5: Quick Write

10%

Instruct students to respond briefly in writing to the following prompt.

Identify at least two pieces of evidence and explain how each piece supports one of the author's claims.

Instruct students to look at their annotations to find evidence. Ask students to use this lesson's vocabulary wherever possible in their written responses.

- Students listen and read the Quick Write prompt.
- Display the prompt for students to see, or provide the prompt in hard copy.

Transition to the independent Quick Write.

- Students independently answer the prompt using evidence from the text.
- See the High Performance Response at the beginning of this lesson.
- Consider using the Short Response Rubric to assess students' writing. Students may use the Short Response Rubric and Checklist to guide their written responses.

Activity 6: Closing

5%



Display and distribute the homework assignment. For homework, instruct students to read and annotate pages 237-243 of *Guns, Germs, and Steel* (from "Once an inventor has discovered a use for a new technology" to "some proportion of societies is likely to be innovative") (W. 11-12.9.b). Direct students to box any unfamiliar words and look up their definitions. Instruct students to choose the definition that makes the most sense in context, and write a brief definition above or near the word in the text (L.11-12.4.c).

Also, instruct students to continue to surface possible research issues and pose inquiry questions as they read and analyze the text.

• Students follow along.

Homework

Read and annotate pages 237-243 of *Guns, Germs, and Steel* (from "Once an inventor has discovered a use for a new technology" to "some proportion of societies is likely to be innovative"). Box any unfamiliar words and look up their definitions. Choose the definition that makes the most sense in context, and write a brief definition above or near the word in the text.

Also, continue to surface possible research issues and pose inquiry questions as you read and analyze the text.



Model Surfacing Issues Tool

Name:	Class	[Date	
	:	:		

Directions: As you read, look for issues that are suggested in the text. Remember that an issue is an important aspect of human society for which there are many different opinions about what to think or do. Summarize the issue succinctly, and note the page number and what the text says about the issue in the correct columns.

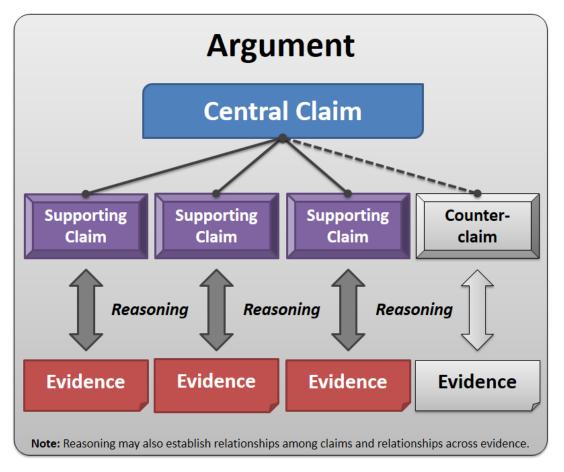
Issue	Page(s)	Key information about the issue from the text
Eurocentrism	231	Based on their adaptation of technology, many people "assume that Eurasians are superior to other peoples in inventiveness and intelligence" (p. 231).
Heroic theory of invention	231, 234	In this excerpt, Diamond suggests that the "heroic theory of invention" (p. 231), which states that a few geniuses are to be given credit for innovation, is flawed.
Necessity is the mother of invention	232	The Manhattan Project was specifically created during World War II "to build an atomic bomb before Nazi Germany could do so" (p. 232).
The nature of innovation	232	Diamond argues against the idea that "[n]ecessity is the mother of invention" and that inventions arise by "curiosity" and "tinkering" and find their usefulness later (p. 232).



Patent law	233-234	Diamond states that inventors in the US must determine a potential use for their technologies to earn a patent. This may discourage some people from pursuing patents or discovering materials that do not fit an immediate need.
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Argument Visual Handout



- Argument: The composition of precise claims about an issue, including relevant and sufficient evidence and valid reasoning
- Central Claim: An author or speaker's main point about an issue in an argument
- Supporting Claim: Smaller, related points that reinforce or advance the central claim
- Counterclaim: A claim that is opposed to an author's central claim
- **Evidence:** The topical and textual facts, events, and ideas from which the claims of an argument arise, and which are cited to support those claims
- **Reasoning:** The logical relationships among ideas, including relationships among claims and relationships across evidence

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