

New Perspectives



Essential Question

How can curiosity and observation help you make sense of the world around you?



Note It!

List five things you are curious about. Write questions with *How?* and *Why?* Think about things you have observed in nature or in your community.



Engage with the Theme

Watch some friends talk about curiosity and observation.



What You Bring

Talk about some interesting or surprising things you've noticed in the world around you.

For example, have you ever wondered:

- how a device or piece of technology works?
- why animals behave the way they do?
- what causes changes you see in nature?
- how people learn, grow, and change?



From Your Perspective

Talk about how curiosity and observation can help people learn something new. Think about:

- learning how to do something by watching someone else
- asking people about their perspectives or experiences
- looking for clues to solve a mystery or puzzle

In This Chapter

Anchor Reading

from *Storm in a Teacup* by Helen Czerski

Listening and Speaking

Debate: "Should we spend millions to explore space?"

Media

Why the Moon?

Grammar

- independent clauses
- dependent clauses

Texts

"Speech at the National Book Awards"
by Isabel Allende

"What Is True?" by Isabel Allende

Mathematics Reading

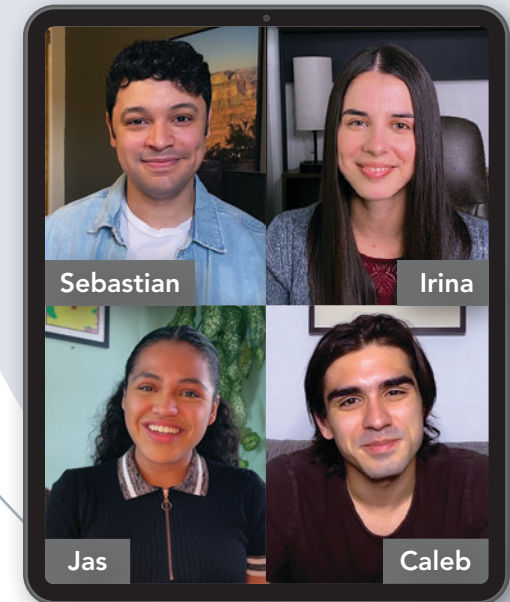
from *Leonardo da Vinci* by Walter Isaacson

Careers Reading

"Revolutionizing American Manufacturing"
by Katie Rapp

Writing

Argument Essay



Use Prior Knowledge

Noticing and Asking Questions

You will read an excerpt from the book *Storm in a Teacup*. In the book, the author asks questions about things she notices in the world around her.

Think of something you notice in nature or technology. Discuss these questions: How does it work? Why does it happen? If you don't know, how could you find out?

Build Background

Physics

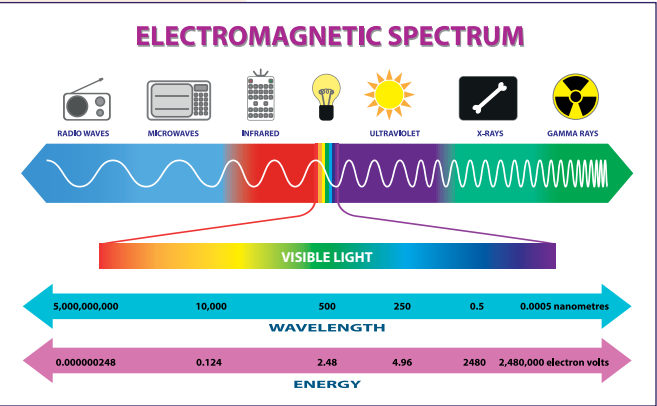
Physics is the science of how objects move and what they are made of. It also includes forms of energy, such as heat, light, electricity, and sound. The basic principles (rules) of physics are called laws. They are different from the laws that citizens in a country obey, such as paying taxes. The laws of physics describe what happens under certain conditions. Physicists (scientists who study physics) ask questions like these:

- What causes an object to change direction or stop?
- How does electricity travel to a light bulb?
- Why does ice melt on a hot day?

Discuss the questions physicists ask. Do you know any of the answers? Which would you most like to find out about?

Energy and Light

The diagram shows forms of energy that travel in waves. Look at the diagram and answer the questions.



1. What do you notice about visible light (light humans can see)?
2. People use ultraviolet light in "black light" flashlights. Can people see this light? How do you know?
3. How do people use other forms of energy shown in the diagram?

Scientific Method

Scientists everywhere use the same process to learn about the world around them. It is called the scientific method.

- First, they notice or observe something and ask a question, such as "Why does it happen?" or "What causes it?"
- Second, they form a hypothesis, or prediction, about what the answer will be, using what they already know.
- Third, they test the hypothesis. They might collect data in nature, do an experiment in a lab, or make a model.
- Fourth, they analyze the data using tables or graphs. They look for patterns or make connections.
- Fifth, they draw conclusions from their data. They confirm if their hypothesis was correct. Then, they share the results.

Summarize the steps in the scientific method. Use the Words to Use. Then discuss the questions.

1. Why do you think all scientists follow the same process?
2. How do curiosity and observation help scientists in this process?

Cyclones

A tropical cyclone, also known as a hurricane or typhoon, is a strong storm. Clouds, rain, and thunderstorms gather over warm ocean water. They begin to spin around a central area of low air pressure, called the "eye" of the storm. This gives the storm a spiral shape. As the storm spins, it picks up more moisture (water droplets), and the winds grow stronger—74 miles per hour or more. The storm moves across the water until it hits land. There, the rains and wind cause flooding and damage buildings. On land, the storm grows weaker as it loses moisture.

Look at the photos and discuss the questions.

1. What shape is the storm? Trace the direction of the winds. Point to the eye.
2. What causes storms like this one? What effects can they have?



Words to Use

analyze
conclusions
confirm
data
experiment
hypothesis
observe
patterns

Note It!

Choose a science topic from these pages that you are curious about. Make notes about other information you want to learn about this topic.

Build Vocabulary TUTORIAL

 **A** The nonfiction argument *Storm in a Teacup* includes these words. Which words do you already know? Can you explain their meanings and use them in a sentence?

B Read the Words to Use. Complete each sentence with one of the words.

1. The internet makes facts and information _____ to everyone.
2. Use exact key words to find _____ details about a topic.
3. The scientists began a _____ study of their new discovery.
4. We created a new product by _____ two different ideas.
5. You are responsible for the _____ of your actions.

C Read the paragraph. Match the Key Vocabulary with the definitions.

Hiram Bingham used a compass to orient himself and stay on the path. Suddenly, he saw old stone walls—physical evidence of an ancient culture. They were not random, but were laid out in a pattern. At first, he thought it was a coincidence. Soon, he realized that they were the buildings of a great civilization.

1. (n) an accident, a situation that is not planned
2. (n) a well-organized and developed society
3. (adj) existing in a form that you can touch or see
4. (adj) without any order or plan
5. (v) place in a position or direction

 **D** Choose two Key Vocabulary words and use them in two sentences about observing the world around you.

The stars might seem **random** at first. But when you use the North Star to **orient** yourself, you can see groups of stars that form shapes in the sky.

Key Vocabulary	
accessible	orient
civilization	particular
coincidence	physical
consequences	random
merging	rigorous



▲ Hiram Bingham found the ruins of an Inca site called Machu Picchu.

 Video Chat

Watch the video. Answer the student’s questions.

Expand Vocabulary Morphemic Analysis: Etymology

The dictionary entry for a word includes its **etymology**, or the origin of the word. Readers can use the etymology to help them understand a word’s history and meaning. The etymology includes:

- the **root**, or basic part of the word, in its original form
- the language the word came from, such as Old French or Medieval Latin
- the meaning of the root

The root may not have exactly the same definition as the English word, but it can help you better understand the word’s meaning.

Root	Origin	Meaning
arach-	Greek: arakhne	spider
civ-	Latin: civis	relating to a city, citizen
cycl-	Greek: kyklon	circular
gyr-	Greek: gyre	circle
merg-	Latin: mergere	dip or plunge
nov-	Latin: novos	new
part-	Latin: partis	part
phob-	Greek: phobos	fear
phys-	Greek: phusis	nature
scop-	Greek: skopos	look at, observe
tel-	Greek: tele	far

A Match each word from *Storm in a Teacup* with its definition. Use the etymology chart to help you.

- | | |
|-----------------|---|
| 1. arachnophobe | a. device used to view things that are far away |
| 2. civilization | b. relating to natural science, the body, or material things |
| 3. telescope | c. person who fears spiders |
| 4. novelty | d. system of winds that rotates around a low center of pressure |
| 5. physical | e. a highly developed society |
| 6. cyclone | f. something new or unusual |

 **B** Make a list of other words you know that contain roots from the chart. Discuss with a partner what you know about the words and how you could use knowledge of etymology to define each word.

READING STRATEGY
Determine
Importance

Review **Determine Importance** in the Intro Chapter Part II.

Academic Vocabulary

convincing (adj)	
definition	
example	
synonyms	
antonyms	
forms	

Academic Vocabulary

relevant (adj)	
definition	
example	
synonyms	
antonyms	
forms	

Genre Nonfiction Argument

You will read an excerpt from the book *Storm in a Teacup*. The text is a nonfiction argument. The author uses facts, examples, and other evidence to persuade her audience to agree with her point of view (opinion).

Reading Strategy Determine Importance

When you read an argument, it is important to evaluate the information you learn. Some information is key to understanding the text, while other information may be interesting but not crucial for deeper understanding. To determine importance, distinguish the **crucial information** from the **interesting details**. The crucial information provides key support for the author’s claim or reasons. The interesting details are included to get the reader’s attention or make the argument more persuasive to the reader.



Map It! Claims, Reasons, and Evidence

Authors organize their argument to be clear and **convincing**. They state a claim and then present reasons why readers should agree with it. They provide evidence to support each reason.

- The **claim** states a belief or point of view about an issue or topic. It is usually at the beginning of the argument. The author may also restate the claim at the end.
- **Reasons** explain why readers should agree with the claim. Strong reasons are directly related to the claim and clearly support it. Transitional words and phrases, such as *first of all*, *second*, and *finally*, help organize the reasons.
- Effective **evidence** includes **relevant** facts, examples, quotes from experts, and data from reliable sources. There should be sufficient (enough) evidence to support each reason. Words and phrases such as *from* and *according to* cite (credit) sources of evidence.

A graphic organizer can help you organize the claim, reasons, and evidence in a nonfiction argument.

Claim:		
Reason:	Reason:	Reason:
Evidence:	Evidence:	Evidence:



A Read this nonfiction argument. The blue highlights show transition words that show order and introduce reasons. The green highlights show words that cite (credit) sources of evidence. The beige highlight shows transition words that introduce examples.

The Arts in Education

- 1 From painting to music to theater, the arts inspire students to be creative and express themselves. However, the arts are more than just fun activities. They help students succeed in academics and in life. Arts classes are essential to students’ education.
- 2 **First of all**, the arts are a motivation for students to stay in school. **According to** the National Endowment for the Arts, students with a high rate of participation in the arts are five times less likely to drop out, or leave school without graduating. A different study showed that students involved in the arts are twice as likely to graduate from college.
- 3 **Second**, the arts improve students’ academic performance. Data **from** the College Board show that taking more arts and music classes helped students score more than 150 points higher on the SAT. Secretary of Education Miguel Cardona agrees: “Music probably does more to develop critical thinking skills . . . than many of the other topics we spend time on in school.”
- 4 **Finally**, the arts teach students important lessons for school and life. **For example**, by practicing music, students learn the value of hard work and patience. By acting in a play or helping behind the scenes, they learn the importance of working together.
- 5 Some people may argue that the arts cost too much money for schools with already small budgets. However, by investing in the arts, schools can support students’ education in other areas as well.



B Reread the nonfiction argument. Complete the graphic organizer with the claim, reasons, and evidence.

- Arts classes are an essential part of education.
- The arts help students do better in school.
- Taking arts classes improved students’ SAT and other assessment scores.
- The arts teach students valuable lessons.
- Practicing music helps students learn patience.

Claim:		
Reason:	Reason:	Reason:
Evidence:	Evidence:	Evidence:

Annotation:
Transitions: Order

Words and phrases that show order introduce and organize reasons that support the claim.

Annotation:
Citing Sources

Words and phrases that credit sources tell where information is from.

Annotation:
Transitions: Examples

Words and phrases such as “for example” or “for instance” introduce examples.

Tip!

Logical Order

An author can use different ways to order reasons logically. Three ways to organize reasons are:

- most important reason first
- strongest reason first
- most convincing reason first

Academic Vocabulary

appeal (v)

definition	
example	
synonyms	
forms	

Academic Vocabulary

rebuttal (n)

definition	
example	
synonyms	
antonyms	
forms	



Text Structure Argument

A strong argument has a clear structure that helps persuade readers to agree with the author’s point of view.

- It begins with a **claim** that states an opinion or viewpoint.
- A rationale, usually made up of several **reasons**, persuades readers to agree with the claim. The author presents the reasons in a logical order.
- A convincing **conclusion** restates the claim and often gives a **call to action** that tells the audience how to respond.

The author provides support to make each reason convincing and keep the reader’s interest. The author may:

- use **evidence** to support each reason
- **appeal** to the reader’s emotions (feelings)
- address a **counterclaim**, or opposing point of view



Argument Claim and Counterclaim

The **claim** is what the author believes and hopes to persuade the reader to agree with. It is not a fact that everyone accepts as true. It is a statement that people can reasonably disagree about.

To strengthen the argument, the author may also address an opposing point of view, or a **counterclaim**, and give evidence to persuade the reader against this idea. Evidence that explains why the counterclaim is incorrect is called a **rebuttal**. A part of the counterclaim the author agrees with is called a **concession**.



Read this paragraph by the author of “The Arts in Education.” Notice how it gives a rebuttal to the counterclaim in the first sentence. It also includes a concession.

There is ongoing debate about whether college students should focus more on areas like math and English rather than arts courses. Math and English are widely recognized as important for many academic and professional paths. However, the arts also contribute to a well-rounded college experience, encouraging creativity, critical thinking, and personal expression.

Meet the Author Helen Czerski

Helen Czerski (cherz KEY) is a physicist and oceanographer at University College London. While earning her PhD, she used high-speed photography to study the physics of explosives. She then began studying breaking waves and bubbles at the ocean’s surface. In addition to her research, she writes about physics for the *Wall Street Journal* newspaper. She also presents documentaries about everyday physics and atmospheric (weather) and ocean science for the British Broadcasting Corporation (BBC).



Author’s Craft Persuasion and Rhetorical Appeals

Authors use several types of **rhetorical appeals** to make their writing persuasive. They may use words or ideas that create strong feelings in readers (appeal to emotions). They may suggest that the author is an expert on the topic (appeal to **credibility**).

Often, the strongest arguments use an **appeal to logic**. The author gives valid reasons and supports them with relevant facts or statistics from reliable sources. The argument guides readers to make logical connections between ideas to reach a conclusion.

Authors also use vivid **persuasive language** to make their point of view clear and convince readers to agree with it. For example, notice how these phrases from *Storm in a Teacup* help convince readers that the world around us is exciting and interesting:

bursting with novelty . . . full of startling variety, . . .
a rich bounty of outcomes

Academic Vocabulary

credibility (n)

definition	
example	
synonyms	
antonyms	
forms	



Note It!

Think about an issue in your community or on your campus. Describe it using vivid persuasive language that shows your point of view.

Book Trailer

Watch the book trailer for *Storm in a Teacup*.



React to the Trailer

Watch the video. Answer the questions.

“ I’ve never thought about how tea is like a storm—or a toaster is like the Sun! I wonder how these everyday things relate to science. How about you? What everyday things are you curious about? ”

 Preview

- 1. Read the title. What ideas does it give you about the content and topic of the reading selection?
- 2. **Scan** Look quickly through the excerpt for unfamiliar words and make a list. Look up the words.
- 3. **Predict** Having previewed the selection, do you expect to find it interesting? Why or why not?

PURPOSE FOR READING The laws of physics operate all around us. Mix two colors of paint to create a third color—that illustrates one law. Watch a slice of bread turn crisp, hot, and brown in the toaster—that demonstrates another law. As you read this excerpt from *Storm in a Teacup*, think about the way curiosity and observation help us recognize and understand the laws of physics.

  from

Storm in a Teacup:

The Physics of Everyday Life

by Helen Czerski

Analyze Genre

¶ 1 How do the last two sentences in this paragraph help you know this text presents an argument?

Expand Vocabulary

¶ 1 The root *civ*, *civis* means “city.” The affix *-ize* indicates *making* or *building*. The suffix *-tion* indicates a noun. Use this information plus context clues to define *civilization*.

1 We live on the edge, **perched** on the boundary between planet Earth and the rest of the universe. On a clear night, anyone can admire the vast legions of bright stars, familiar and permanent, landmarks unique to our place in the **cosmos**. Every human **civilization** has seen the stars, but no one has touched them. Our home here on Earth is the opposite: messy, changeable, bursting with novelty and full of things that we touch and **tweak** every day. This is the place to look if you’re interested in what **makes** the universe **tick**. The **physical** world is full of startling variety, caused by the same principles and the same atoms combining in different ways to produce a rich **bounty** of outcomes. But this diversity isn’t **random**. Our world is full of patterns.

GLOSSARY

perched (*v*) seated on the edge of
cosmos (*n*) universe
tweak (*v*) adjust
IDIOM **makes (something) tick** keeps (something) going
bounty (*n*) richness

2 If you pour milk into your tea and give it a quick stir, you’ll see a swirl, a spiral of two fluids circling each other while barely touching. In your teacup, the spiral lasts just a few seconds before the two liquids mix completely. But it was there for long enough to be seen, a brief reminder that liquids mix in beautiful swirling patterns and not by **merging instantaneously**. The same pattern can be seen in other places too, for the same reason. If you look down on the Earth from space, you will often see very similar swirls in the clouds, made where warm air and cold air **waltz** around each other instead of mixing directly. In Britain, these swirls come rolling across the Atlantic from the west on a regular basis, causing our notoriously changeable weather. They form at the boundary between cold polar air to the north and warm tropical air to the south. The cool and warm air chase each other around in circles, and you can see the pattern clearly on satellite images. We know these swirls as depressions or **cyclones**, and we experience rapid changes between wind, rain, and sunshine as the arms of the spiral spin past.



▲ Swirling hurricane clouds



▲ Swirling liquids in a teacup

3 A rotating storm might seem to have very little in common with a stirred mug of tea, but the similarity in the patterns is more than **coincidence**. It’s a clue that hints at something more fundamental. Hidden beneath both is a systematic basis for all such formations, one discovered and explored and tested by **rigorous** experiments carried out by generations of humans. This process of discovery is science: the continual **refinement** and testing of our understanding, alongside the digging that reveals even more to be understood.

GLOSSARY

instantaneously (*adv*) immediately
waltz (*v*) dance
cyclones (*n*) twisting wind storms
refinement (*n*) honing, polishing, making more perfect

Grammar in Context

¶ 2 Choose either of the first two sentences. Identify a dependent and an independent clause in the sentence and explain how you identified each one.

READING STRATEGY
Determine Importance

¶ 2–3 Identify the most important point Czerski makes about the liquids in the teacup and the warm and cold air masses. Explain your answer.

 Inspect the Text

- 1. **Comprehension** **¶ 2** What happens if you pour milk into your tea?
- 2. **Analyze text structure: argument** How is the pattern of the swirling liquid and air relevant to the argument Czerski made in the final sentence of **¶ 3**?
- 3. **Analyze claims, reasons, and evidence** What evidence does Czerski provide in **¶ 2** to support the claim she made at the end of **¶ 1**?

Analyze Text
Structure: Argument

¶ 4 Describe the structure Czerski is building in the opening sections of her article.

Grammar in Context

¶ 5 Identify the independent clause in the sentence beginning *Finding anything out here*. What is the subject, and what is the verb?

READING STRATEGY
Determine Importance

¶ 6 What is the most important detail Czerski provides about the scorpions? What evidence supports your answer?

4 Sometimes a pattern is easy to spot in new places. But sometimes the connection goes a little bit deeper and so it’s all the more satisfying when it finally emerges. For example, you might not think that scorpions and cyclists have much in common. But they both use the same scientific trick to survive, although in opposite ways.

5 A moonless night in the North American desert is cold and quiet. Finding anything out here seems close to impossible, since the ground is lit only by dim starlight. But to find one particular treasure, you equip yourself with a special flashlight and set out into the darkness. The flashlight needs to be one that produces light that is invisible to our species: ultraviolet light, or “black light.” As the beam roams across the ground, it’s impossible to tell exactly where it’s pointing because it’s invisible. Then there’s a flash, and the darkness of the desert is punctured by a surprised scuttling patch of eerie bright blue-green. It’s a scorpion.

6 This is how enthusiasts find scorpions. These black arachnids have pigments in their exoskeleton that take in ultraviolet light that we can’t see and give back visible light that we can see. It’s a really clever technique, although if you’re scared of scorpions to start with, your appreciation might be a little muted. The name for this trick of the light is fluorescence. The blue-green scorpion glow is thought to be an adaptation to help the scorpions find the best hiding places at dusk.



▲ Scorpion under ultraviolet light

GLOSSARY

- punctured (v) pierced
- scuttling (adj) low, rapid crawling
- eerie (adj) ghostly, spooky, creepy
- enthusiasts (n) fans
- arachnids (n) 8-legged invertebrates
- exoskeleton (n) outer frame of an invertebrate’s body
- muted (adj) dimmed, stifled, reduced

Ultraviolet light is around all the time, but at dusk, when the sun has just slipped below the horizon, most of the visible light has gone and only the ultraviolet is left. So if the scorpion is out in the open, it will glow and be easy to spot because there isn’t much other blue or green light around. If the scorpion is even slightly exposed, it can detect its own glow and so it knows it needs to do a better job of hiding. It’s an elegant and effective signaling system—or was until the humans bearing ultraviolet torches turned up.

7 Fortunately for the arachnophobes, you don’t need to be in a scorpion-populated desert at night to see fluorescence—it’s pretty common on a dull morning in the city as well. Look again at those safety-conscious cyclists: their high-visibility jackets seem oddly bright compared with the surroundings. It looks as though they’re glowing, and that’s because they are. On cloudy days, the clouds block the visible light, but lots of ultraviolet still gets through. The pigments in the high-visibility jackets are taking in the ultraviolet and giving back visible light. It’s exactly the same trick the scorpions are playing, but for the opposite reason. The cyclists want to glow; if they’re emitting that extra light, they’re easier to see and so safer. This sort of fluorescence is pretty much a free lunch for humans; we’re not aware of the ultraviolet light in the first place, so we don’t lose anything when it gets turned into something we can use.

8 It’s fascinating that it happens at all, but the real joy for me is that a nugget of physics like that isn’t just an interesting fact: It’s a tool that you carry with you. It can be useful anywhere. In this case, the same bit of physics helps both scorpions and cyclists survive. It also makes tonic water glow under ultraviolet light, because the quinine in it is fluorescent. And it’s how laundry brighteners and highlighter pens work their magic. Next time you look at a highlighted paragraph, bear in mind that the highlighter ink is also acting as an ultraviolet detector; even though you can’t see the ultraviolet directly, you know it’s there because of this glow.

GLOSSARY

- arachnophobes (n) people who are afraid of spiders and scorpions
- high-visibility (adj) characterized by being easy to see
- nugget (n) small piece of valuable rock, such as gold
- quinine (n) bitter-tasting alkaloid



Expand Vocabulary

¶ 7 You know that the root *arachn-* refers to spiders and scorpions. The root *phob-* means fear. Use this information to explain what an *arachnophobe* is.

Analyze Text
Structure: Argument

¶ 8 What is the central argument of this paragraph? How does this paragraph support Czerski’s overall message?

Inspect the Text

- 1. Comprehension ¶ 7–8 How is ultraviolet light used in the dyes of cyclists’ jackets?
- 2. Analyze figurative language: metaphor ¶ 8 Why does Czerski compare a physics fact to a tool?
- 3. Expand vocabulary Note the idiom *a free lunch* in ¶ 7. Use context to define this expression.

READING STRATEGY
Determine Importance

¶ 9 Explain the relevance and importance of this paragraph to Czerski’s overall argument.

Grammar in Context

¶ 9 Read the sentence that begins *Even though* . . . Which part of the sentence is the dependent clause?

Analyze Argument:
Claim and Counterclaim

¶ 10 Read the beginning of this paragraph. What claim do some people make about everyday science? Does Czerski offer a convincing counterclaim? Explain.

Analyze Claims, Reasons, and Evidence

¶ 10 Find the statement *The same physics applies everywhere*. What evidence has Czerski supplied that supports this claim?

- 9 I studied physics because it explained things that I was interested in. It allowed me to look around and see the mechanisms making our everyday world tick. Best of all, it let me work some of them out for myself. Even though I’m a professional physicist now, lots of the things I’ve worked out for myself haven’t involved laboratories or complicated computer software or expensive experiments. The most satisfying discoveries have come from random things I was playing with when I wasn’t meant to be doing science at all. Knowing about some basic bits of physics turns the world into a toybox.
- 10 There is sometimes a bit of **snobbery** about the science found in kitchens and gardens and city streets. It’s seen as something to occupy children with, a **trivial distraction** which is important for the young, but of no real use to adults. An adult might buy a book about how the universe works, and that’s seen as being a proper adult topic. But that attitude misses something very important: The same physics applies everywhere. A toaster can teach you about some of the most fundamental laws of physics, and the benefit of a toaster is that you’ve probably got one, and you can see it working for yourself. Physics is awesome **precisely** because the same patterns are universal: They exist both in the kitchen and in the farthest reaches of the universe. The advantage of looking at the toaster first is that even if you never get to worry about the temperature of the universe, you still know why your toast is hot. But once you’re familiar with the pattern, you will recognize it in many other places, and some of those other places will be the most impressive achievements of human society. Learning the science of the everyday is a direct route to the background knowledge about the world that every citizen needs in order to participate fully in society.



► Physics is found even in the kitchen toaster.

GLOSSARY

snobbery (*n*) rejection of whatever one perceives as inferior in quality
trivial (*adj*) unimportant
distraction (*n*) diversion
precisely (*adv*) exactly

- 11 Have you ever had to tell apart a raw egg and a boiled egg without taking their shells off? There’s an easy way to do it. Put the egg down on a smooth, hard surface and set it spinning. After a few seconds, briefly touch the outside of the shell with one finger, just enough to stop the egg’s rotation. The egg might just sit there, **stationary**. But after a second or two, it might slowly start to spin again. Raw and boiled eggs look the same on the outside, but their insides are different, and that gives the secret away. When you touched the cooked egg, you stopped a whole solid object. But when you stopped the raw egg, you only stopped the shell. The liquid inside never stopped swirling around, and so after a second or so, the shell started to rotate again, because it was being dragged around by its insides. If you don’t believe me, go find an egg and try it. It is a principle of physics that objects tend to continue the same sort of movement unless you push or pull on them. In this case, the total amount of spin of the egg white stays the same because it had no reason to change. This is known as **conservation** of angular **momentum**. And it doesn’t just work in eggs.



GLOSSARY

stationary (*adj*) still, not moving
conservation (*n*) preservation or protection
momentum (*n*) force that keeps an object in motion



Analyze Text
Structure: Argument

¶ 11 Note the sentence *And it doesn’t just work in eggs* at the end of this paragraph. What role does this sentence play in the structure of Czerski’s argument? Explain.

Inspect the Text

1. **Comprehension** ¶ 11 Why does a raw egg start to spin again when a hard-boiled egg doesn’t?
2. **Analyze craft and structure: rhetorical appeals** ¶ 11 Note the sentence beginning *If you don’t believe me*. What kind of appeal is Czerski making, and what makes it effective?
3. **Analyze claims, reasons, and evidence** ¶ 11 What makes the egg experiment relevant to the arguments Czerski has been building throughout the text?

Analyze Text
Structure: Argument

¶ 11–12 What role do these paragraphs play in the larger structure of Czerski’s argument? Explain.

Grammar in Context

¶ 12 Find the sentence that begins *It has sent back . . .* Does this sentence have a dependent clause? Explain.

12 The Hubble Space Telescope, an orbiting eye that has been **whooshing** around our planet since 1990, has produced many thousands of **spectacular** images of the cosmos. It has sent back pictures of Mars, the rings of Uranus, the oldest stars in the Milky Way, the wonderfully named **Sombrero** Galaxy, and the giant Crab **Nebula**. But when you’re floating freely in space, how do you hold your position as you gaze on such tiny pinpoints of light? How do you know precisely which way you’re facing? Hubble has six **gyroscopes**, each of which is a wheel spinning at 19,200 revolutions per second. Conservation of angular momentum means that those wheels will keep spinning at that rate because there is nothing to slow them down. And the spin axis will stay pointed in precisely the same direction, because it has no reason to move. The gyroscopes give Hubble a reference direction, so that its **optics** can stay locked on a distant object for as long as necessary. The physical principle used to **orient** one of the most advanced technologies our civilization can produce can be demonstrated with an egg in your kitchen.



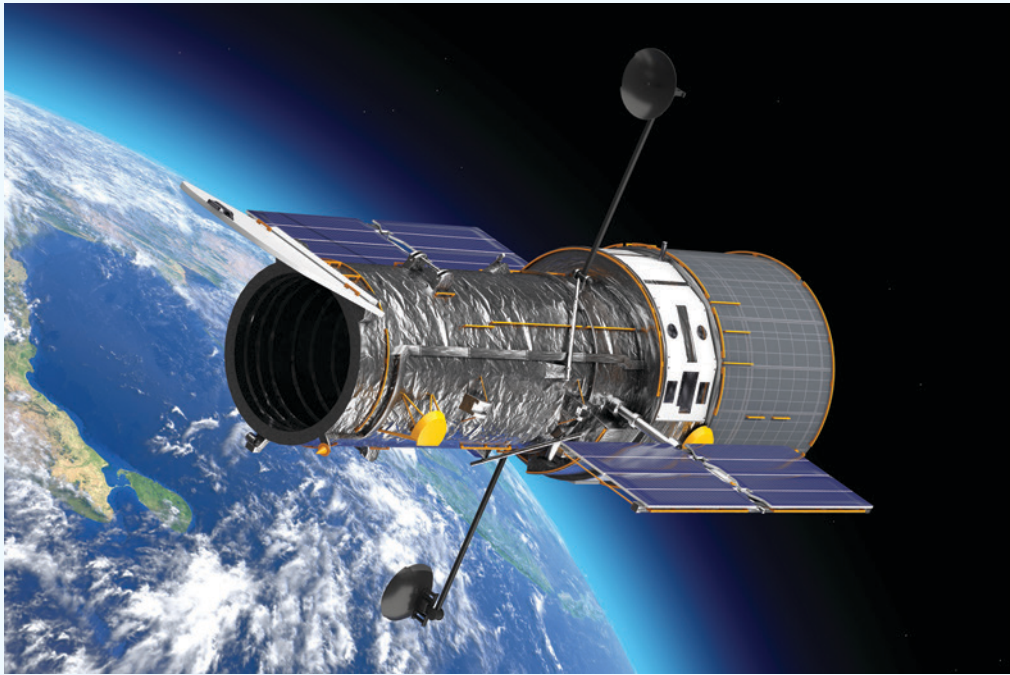
▲ Photo of the Sombrero galaxy, Messier 104 (M104), taken by the Hubble telescope

GLOSSARY

- whooshing** (*v*) moving rapidly through space
- spectacular** (*adj*) showy, visually impressive
- sombrero** (*n*) Spanish for *hat*
- nebula** (*n*) collection of gas and dust in space where stars are formed
- gyroscopes** (*n*) wheels or disks that both spin and rotate
- optics** (*n*) science or study of light

13 This is why I love physics. Everything you learn will come in useful somewhere else, and it’s all one big adventure because you don’t know where it will take you next. As far as we know, the physical laws we observe here on Earth apply everywhere in the universe. Many of the nuts and bolts of our universe are **accessible** to everyone. You can test them for yourself. What you can learn with an egg hatches into a principle that applies everywhere. You step outside armed with your **hatchling**, and the world looks different.

14 In the past, information was treasured more than it is now. Each nugget was hard-earned and valuable. These days, we live on the shore of an ocean of knowledge, one with regular **tsunamis** that threaten our sanity. If you can manage your life as you are, why seek more knowledge and therefore more complications? The Hubble Space Telescope is all very nice, but unless it’s also going to look downward once in a while to find your keys when you’re late for a meeting, does it make any difference?



▲ Rendering of the Hubble Space Telescope in Earth’s orbit

GLOSSARY

- hatchling** (*n*) baby bird
- tsunamis** (*n*) tidal waves

Analyze Figurative
Language: Metaphor

¶ 14 Find the sentence beginning *These days . . .* What does Czerski mean by an *ocean of knowledge*? What do *tsunamis* stand for in her metaphor?

Inspect the Text

- 1. **Comprehension** ¶ 14 Why did people in the past treasure information more than maybe we do today?
- 2. **Analyze figurative language: metaphor** ¶ 13 Explain Czerski’s reference to hatching and hatchlings. What comparison is she making?
- 3. **Expand vocabulary** ¶ 13 Note the idiom *nuts and bolts*. What does this phrase mean?



Analyze Argument:
Claim and
Counterclaim

¶ 15 What claim did Czerski suggest at the end of ¶ 14? How does she counter that claim in this paragraph?

Analyze Claims,
Reasons, and
Evidence

¶ 15 What does Czerski claim about our responsibilities? What evidence supports her claim?

Analyze Craft
and Structure:
Persuasion and
Rhetorical Appeals

¶ 16 Describe the type of rhetorical appeal Czerski uses in this paragraph and explain what makes it effective.

15 Humans are curious about the world, and we get a lot of joy from satisfying our curiosity. The process is even more rewarding if you work things out for yourself, or if you share the journey of discovery with others. And the physical principles you learn from playing also apply to new medical technologies, the weather, mobile phones, self-cleaning clothes, and **fusion reactors**. Modern life is full of complex decisions: Is it worth paying more for a compact fluorescent light bulb? Is it safe to sleep with my phone next to my bed? Should I trust the weather forecast? What difference does it make if my sunglasses have **polarizing** lenses? The basic principles alone often won't provide specific answers, but they'll provide the context needed to ask the right questions. And if we're used to working things out for ourselves, we won't feel helpless when the answer isn't obvious on the first try. We'll know that with a bit of extra thinking, we can clarify things. Critical thinking is essential to make sense of our world, especially with advertisers and politicians all telling us loudly that they know best. We need to be able to look at the evidence and work out whether we agree with them. And there's more than our own daily lives at stake. We are responsible for our civilization. We vote, we choose what to buy and how to live, and we are collectively part of the human journey. No one can understand every single detail of our complex world, but the basic principles are fantastically valuable tools to take with you on the way.

16 Because of all this, I think that playing with the physical toys in the world around us is more than “just fun,” even though I'm a huge fan of fun for its own sake. Science isn't just about collecting facts; it's a logical process for working things out. The point of science is that everyone can look at the data and come to a reasoned conclusion. At first, those conclusions may differ, but then you go and collect more data that helps you decide between one description of the world and another, and eventually the conclusions

GLOSSARY

fusion (*adj*) related to the combining of two atomic nuclei into one
reactors (*n*) devices that produce energy from nuclear reactions
polarizing (*adj*) controlling light to reduce glare

converge. This is what separates science from other **disciplines**—a scientific hypothesis must make specific testable predictions. That means that if you have an idea about how you think something works, the next thing to do is to work out what the **consequences** of your idea would be. In particular, you have to look hard for consequences that you can check for, and especially for consequences that you can prove wrong. If your hypothesis passes every test we can think of, we cautiously agree that this is probably a good model for the way the world works. Science is always trying to prove itself wrong, because that's the quickest route to finding out what's actually going on.

17 You don't have to be a **qualified** scientist to experiment with the world. Knowing some basic physical principles will set you on the right track to work a lot of things out for yourself.

* * *

18 The **essence** of science is experimenting with the principles for yourself, considering all the evidence available, and then reaching your own conclusions.

19 The teacup is only the start.



GLOSSARY

disciplines (*n*) fields of study
qualified (*adj*) formally trained
essence (*n*) true meaning, core of one's being



Academic Vocabulary

converge (v)

definition	
example	
synonyms	
antonyms	
forms	

Inspect the Text

- 1. **Comprehension ¶ 16–18**
According to Czerski, what is one basic definition of science?
- 2. **Analyze text structure: argument** What role does ¶ 16 play in the structure of Czerski's argument? Explain.
- 3. **Expand vocabulary ¶ 17**
Note the expression *on the right track*. What does this expression mean, and how did you figure it out?

Rate the Reading



Rating

★★★★★

Rate Helen Czerski's *Storm in a Teacup: The Physics of Everyday Life* from 1 to 5 stars. Justify your rating by explaining what you liked or did not like.

Summarize and Synthesize

- 1. **Determine importance** Summarize why curiosity is so important to science, according to Czerski.
- 2. **Analyze claims, reasons, and evidence** What claim does Czerski make about the value of information in today's world? What reasons and/or evidence does she offer in support of this claim?
- 3. **Synthesize** Describe the way Czerski synthesizes apparently unlike things to make the main points of her article. What makes this an effective technique?



Note It!

Make a short list of everyday things for which you would like to find out the scientific explanation. (Example: potato sprouting without being planted)

Study Group

Watch the video where the students discuss the Study Group prompt.

Storm in a Teacup

What is the author's argument? Identify a claim within the text, state its importance to the author's point of view, and identify supporting reasons and evidence.



▲ Margarita ▲ Finn ▲ Caleb ▲ Jas

“ So I guess she’s giving evidence of coincidences in the physical world. We can distinguish that from her making a claim about breakfast. ”

Analyze the Reading

- A Discuss the questions** Find evidence to support your answers.
 - 1. **Analyze claims, reasons, and evidence** Identify a major claim in Czerski's argument. Does she provide convincing reasons for her claim? How is her evidence relevant to her claim?
Discussion Starter: Czerski claims that . . . The reasons she gives are convincing because . . .
 - 2. **Determine importance** Choose one argument that Czerski makes in her article. Identify the evidence that you think offers the strongest support for this argument. Explain your answer.
Discussion Starter: Czerski argues that . . . I thought the most convincing piece of evidence was . . . because . . .
 - 3. **Analyze text structure: argument** Describe the way Czerski structures her argument. How effective is this structure?

- B Discuss the questions**
 - 1. Czerski says *Knowing about some basic bits of physics turns the world into a toybox*. What do you think she means by this?
 - 2. Discuss Czerski's writing style. Identify some examples of imagery—language that appeals to one or more of the five senses. What effect does Czerski's use of imagery have on readers?

- C Make connections**
 - 1. What other texts have you read recently that share some of the themes and ideas of *Storm in a Teacup*? Describe the connections.
 - 2. Czerski points out various real-world uses for physics principles, such as fluorescence keeping cyclists more visible and therefore safer. What other examples can you think of?
 - 3. Think about ordinary things that happen in your kitchen every morning. Discuss one that you are curious about.

- D Write** Choose one of the pairs of examples Czerski discusses. Summarize each example in the pair and explain what they have in common.

When you try spinning a raw egg on the counter, . . . In outer space, the Hubble telescope . . . They behave the same way because . . .

- E Revise** Share your summary with a classmate and give each other written suggestions for improvement. Then exchange your feedback several times to have a written discussion about it. Ask for clarification or note how you will revise your writing. Rewrite your summary and incorporate the feedback.



Note It!

Make a list of points raised in Czerski's article that you would like to ask her about or do some further reading about.

LISTENING STRATEGY
Listen for Rhetorical Appeals

Debaters may try to appeal to your senses of logic and your emotions. They will also try to prove that they are qualified to speak on the topic. Listen carefully and ask yourself how the speaker is trying to affect your thinking.

Listen Debate

A **debate** is a structured argument. Two speakers take turns presenting opposing viewpoints, or opinions, about a given issue (problem) or topic. Each speaker’s presentation serves as a rebuttal of the other speaker’s presentation.

A convincing argument may include any or all of the following:

- appeals to logic—relevant facts and evidence that support the speaker’s point of view
- appeals to emotion—descriptive language and imagery that seek to connect with the audience’s feelings
- appeals to credibility—evidence that presents the speaker as a reliable authority on the topic

The audience listens to both speakers and decides which one presents a more convincing case. The winner of a debate is usually the speaker who presents their case more effectively.

-  **A** Listen to the debate “Should we spend millions to explore space?” Pay attention to the way each speaker makes the case (presents an argument) for his or her side.



-  **B** Discuss the questions.
1. What is Speaker A’s position on the topic? What is Speaker B’s position?
Discussion Starter: Speaker A/B believes that . . .
 2. Did both speakers make convincing appeals? Identify one example for each.
 3. Identify relevant facts and ideas introduced by each speaker.
 4. Did you find one speaker more convincing than the other? Why?
Discussion Starter: I found Speaker A/B more convincing because . . .
 5. Offer a rebuttal to each speaker’s argument.

Present Debate

You have listened to a debate about space exploration. Now you will research, write, and present a debate on a topic of your choice.

-  **A** Discuss topics that interest the members of your group. Vote to decide which topic you will develop into a debate.
-  **B** Plan your debate.
- Frame the topic as a question.
 - Determine who will represent each side.
 - Choose three or four important points that will convince listeners to agree with your point of view.
 - Use facts, supporting evidence, and appeals to logic and emotion to convince the audience.
 - Practice your debate.
 - Record your debate.
-  **C** Listen to your debate. Score your performance according to the rubric.

Oral Presentation Rubric

Content & Organization	Language Conventions	Vocabulary	Presentation & Delivery
• demonstrates full knowledge of the topic • considers audience • provides facts and supporting evidence	• few to no grammatical errors • meaning is clear	• uses academic vocabulary • uses collocations	• includes only intentional pauses • free of pronunciation errors that interfere with understanding

- D** Listen to your classmates’ debates. Which side argued its case more convincingly? Justify your answer.

SPEAKING STRATEGY
Use Rhetorical Appeals

There are many ways for effective speakers to persuade their audiences. As you speak, think about how best to do this. Statements of fact that can be proved are always convincing. Emotional appeals often have an even stronger effect on audiences.



Note It!

Note the topics of your classmates’ debates. Note one point you might make in rebuttal.

Why the Moon?



VIEWING STRATEGY
Multimodal Features

Documentary filmmakers tell a story using multimodal features such as interviews, video footage, still images, text, and voiceover. Think about how each multimodal feature contributes to the main idea of the video.

Video Vocabulary

- ambition
- breakthroughs
- broken barriers
- capabilities
- cosmic shore
- entity
- industries
- isolated missions
- lunar economy
- treasure trove
- woven together

Before Viewing

PURPOSE FOR VIEWING As you watch, connect what you hear to the still photos and video footage.

Build Background History of Moon Exploration

In 1969, the National Aeronautics and Space Agency (NASA) astronauts landed on the Moon, launching a new era in space exploration. In this video, NASA promotes their plan to regularly send humans to and from the Moon. You will see still photographs and historical footage (video from past events) of space exploration events, such as:

- technologies developed based on discoveries in space
- professionals speaking about their work
- footage of the lunar surface and Earth from space

multimodal (*adj*) using several methods to do something
example sentences:

- Learn how to make multimodal videos by using text, video, music, and photos.
- The city wants to take a multimodal approach to traffic so people can safely walk, bike, drive, or use scooters.

During Viewing



Sound, Text, Video, and Images

Documentary videos can include **multimodal** features such as:

- a **narrator** who helps tell the stories
- interviews** with experts
- historical footage** (video from past events)
- still photographs** to support the story
- closed captioning:** text of the words in the video

 **A First Viewing: Comprehension** Watch the video.

- What was once viewed as “impossible”?
- Why is the mission a “shared effort”?
- There are two section titles in the video. What is the first section title? What is the second section title?
- What is Artemis base camp?
- What does NASA plan to do on the Moon? List three things.

 **B Second Viewing: Analyze** Watch the video again.

- What NASA accomplishments does the video mention?
- Why does the speaker say “Mars is calling”?
- What is the answer to the title “Why the Moon?”

After Viewing

 **A Evaluate** Answer.

- What makes this video similar to an advertisement?
- Describe the change in music in the second section. How does this affect the tone of the video?
- The video has a narrator and several expert speakers. Describe the narrator’s tone. How does her tone contribute to the message?

 **B Make connections** Answer.

- How is Helen Czerski’s work similar to the work of NASA employees? How is it different?
- What careers did you notice at NASA? Make a list.
- If you worked at NASA, which career would you choose? Why?



C Write Describe the images that you see as the speaker says “We soar in the skies of our home planet . . . we maintain a human presence just outside of gravity and we touch points all across the solar system. We’re going back to the moon, and this is why.”

As the speaker says, “We soar in the skies of our home planet,” we see . . . The speaker continues on to say “We maintain a human presence just outside of gravity.” At this point, we see . . . When the speaker says “And we touch points all across the solar system,” we see . . . Finally, the speaker says “We’re going back to the moon, and this is why.” As he speaks the last line, we see . . .



 **D Revise** Share your paragraph with a classmate. Write suggestions. Exchange your feedback several times to have a written discussion about it. Revise your paragraph based on the feedback.



Note It!

Think about a topic you know about that you could create a multimodal video for. Make a list of the features you can include in this video, such as: interviews, still photos, music, film footage, and voiceovers.

Fundamentals:
Coordinating
Conjunctions

Review coordinating conjunctions with the Practice Book activities on vhlcentral.com.

Tip!

Grammar
Include a comma before the conjunction in compound sentences. Do not include a comma after a conjunction that connects two subjects or two verbs.

Tip!

Spelling
When adding a suffix to a single-syllable word that ends with one vowel followed by one consonant, double the final consonant:
transmit + -ed = transmitted
The exception is words that end with w, x, or y.
play + -ed = played

Independent Clauses TUTORIAL

An **independent clause** is a group of words that can stand alone as a sentence. It has a subject and a verb. An object may be required depending on the verb.

A **simple sentence** is an independent clause. It can have:

- 1 subject + 1 verb (+ object)
Our world is full of patterns.
- 2 or more subjects + 1 verb (+ object)
A raw egg and a boiled egg spin differently.
- 1 subject + 2 or more verbs (+ object)
The telescope produced and transmitted images.

A simple sentence can also have one or more modifiers (adjectives, adverbs, and/or prepositional phrases).

The **same** physics **applies** everywhere.

A **compound sentence** is two or more independent clauses that are joined together with a **coordinating conjunction** (*and, but, or, for, nor, so, and yet*). The coordinating conjunction shows the relationship between the clauses (e.g., addition, contrast). Put a comma before the conjunction.

Earth is bursting with novelty, and this is the place to look if you're interested in the universe.
People often underestimate the power of words, but they can be incredibly impactful.



 **A** Read the beginning of a personal essay.

Studying Science

I can easily answer the question about my favorite subject in school. Science was by far my favorite, and that has been true since I was in elementary school. Biology and chemistry were my two most interesting classes in high school. My teachers challenged and encouraged me.

 **B** Identify one of each of the following types of sentences from “Studying Science.” 

1. simple sentence
2. simple sentence with two (or more) subjects + one verb
3. simple sentence with one subject + two (or more) verbs
4. compound sentence

 **C** Choose the correct answer to identify the type of sentence.

1. The two fluids circled each other and created a swirl.
a. simple with two subjects **b.** simple with two verbs **c.** compound
2. Milk and tea in a teacup can show you a pattern like others in the universe.
a. simple with two subjects **b.** simple with two verbs **c.** compound
3. A stirred mug of tea and rotating storms are both caused by warm and cold air chasing each other in circles.
a. simple with two subjects **b.** simple with two verbs **c.** compound
4. The night sky is fascinating, but we can also find interesting things closer to us.
a. simple with two subjects **b.** simple with two verbs **c.** compound

 **D** Complete each sentence with a comma, a coordinating conjunction, and an independent clause.

1. The author describes objects on the breakfast table _____.
2. Physics can apply to the study of outer space _____.
3. Fluorescence can be found in scorpions _____.

 **E** Write a short paragraph about your favorite subject. Use at least two simple sentences and two compound sentences.

My favorite subject is English. I enjoy reading and writing about fiction. Poetry and dramas are also fascinating to me. English allows me to learn about other people, cultures, and times, and I appreciate that I also have a chance to express myself. Creative writing is enjoyable, and I like sharing my work with others.

 Note It!

List coordinating conjunctions you might use in your writing at the end of the chapter.

Fundamentals:
Subordinating
Conjunctions

Review subordinating conjunctions with the Practice Book activities on vhlcentral.com.

Tip!

Grammar
A sentence can have many clauses and phrases. Be sure to check that each subject in a clause has a verb. Use a connector to join clauses within a sentence.

Dependent Clauses TUTORIAL

A **dependent clause** cannot stand alone as a sentence. It has a subject and a verb, but it does not express a complete thought. A dependent clause joins an independent clause to create a **complex sentence**. A dependent clause can be an **adverb clause**, an **adjective clause**, or a **noun clause**.

- An **adverb clause** modifies an independent clause. It begins with a subordinating conjunction, such as *after, because, before, if, once, though, and when*. An adverb clause expresses ideas such as time, cause and effect, condition, and comparison.

If they're emitting that extra light, they're easier to see and so safer.

- An **adjective clause** modifies a noun. It typically comes after a noun and starts with *that, who, or which*.

Earth is full of things **that we touch and tweak every day**.

- A **noun clause** takes the place of a noun in a sentence. It can be a subject or an object of a verb or preposition. A noun clause often starts with *that, if / whether*, or a question word.

This is the place to look if you're interested in **what makes the universe tick**.

A **compound-complex sentence** includes two independent clauses and at least one dependent clause.

Though science is the study of facts and figures, **it is also the study of our role in the universe**, and **it teaches us about ourselves**.

 **A** Read the article.

The Effects of 3D Printing on Surgery

Hospitals are now using three-dimensional, or 3D, printing to create solid models of a patient's body, which helps make complex surgeries easier and safer. The 3D models are incredibly detailed and accurate, and each model is unique to the patient. If doctors use the models before surgery to analyze the problem, they can make more accurate treatment decisions, and the surgery is often less invasive. Hospitals that use the models can improve surgical outcomes, which can decrease overall costs.



 **B** Identify the following sentences in the article about 3D printing. For each sentence, identify the dependent clause. Inspect the Text

1. 2 complex sentences
2. 1 compound-complex sentence

 **C** Identify each clause as an **adverb clause**, **adjective clause**, or **noun clause**.

1. Because there was a medical supply shortage, hospitals depended on 3D printing to get medical gear.
2. Prosthetics, which are replacement body parts, can be customized on a 3D printer.
3. Although 3D printers create prosthetics, that is not the only way they help surgeons.
4. 3D printers can achieve what no other medical technology has done before.
5. An important question is whether 3D printing will make medical technology more accessible in developing countries.
6. The people who benefited most from 3D printing were the patients.

 **D** Write complete sentences about science by adding an independent clause.

1. even though the study of physics is complex
2. which teaches us about the larger universe
3. while looking at the breakfast table
4. where nature can be observed

 **E** Write a few sentences about someone who influenced how you think about science. Include at least two complex sentences and one compound-complex sentence.

I admire Hedy Lamarr, who helped invent the technology that we use for Wi-Fi and GPS. Although Lamarr was a famous actress, she had a brilliant scientific mind, and her friends recognized her genius for inventing. When World War II began, Lamarr worked with George Antheil to create a communication system to help guide military weapons during the war. The technology, which the military rejected at the time, would later lead to the invention of wireless communication.

 Note It!

Write a list of subordinating conjunctions you might use in your writing at the end of the chapter.

Turning Observations into Literature

Genre Speech and Personal Essay

A **speech** is a text spoken aloud to an audience on a particular occasion (event). A speech may include any of the following:

- **anecdotes**—short stories that illustrate a point
- facts about the speaker’s life and/or work
- references to people who have helped the speaker

A **personal essay** is a short piece of writing about the author. Its main point is to share personal viewpoints and emotional experiences.



Author’s Purpose Claim and Supporting Evidence

The central idea of a persuasive text is a claim—a statement the author believes, and wants the audience to believe. Many claims are **subjective**—true from the author’s point of view, but not necessarily from the readers’. Therefore, authors provide evidence to make their claims convincing. Evidence may include any of the following:

- statements of fact
- examples
- quotations from experts



Expand Vocabulary Collocations

Collocations are words that often appear together and sound natural in a language. These word combinations help us express ideas smoothly and clearly. Notice the collocations from *Storm in a Teacup*.

- This is the place to look if you’re *interested in* what makes the universe tick.
- Critical thinking is essential to *make sense* of our world.

Meet the Author Isabel Allende

Isabel Allende (1942–) was born in Peru to Chilean parents. She worked as a journalist before she turned to literary writing. Her early novels, including *The House of the Spirits*, are set in Latin America and focus on politics and the social position of Latina women. More recently, she has found inspiration in a wide variety of settings and themes. Allende also writes essays and nonfiction. She became a US citizen in 1993.



Build Background

The National Book Awards began in 1950. Their mission is to recognize and celebrate the best new works of American literature. Each year, judges vote on the best new book in several categories: fiction, nonfiction, young-adult literature, poetry, and literature in translation. In 2018, Allende became the first Spanish-language writer to receive the organization’s Lifetime Achievement Award. She shares this honor with novelist Toni Morrison, historian David McCullough, and poet Adrienne Rich, among others.

Preview

1. How do you feel about reading two selections by the same author so close together? Why?
2. Skim the texts. Note that they are both written in the first person. How do you think this will affect the content?
3. **Predict** What do you think the acceptance speech will be about? Why?

PURPOSE FOR READING Isabel Allende won an honorary National Book Award in 2018. She was recognized for her entire body of work. As you read her acceptance speech, think about the role that the power of observation plays in her life.



A Read the speech. Then, read the excerpt from a personal essay.

Acceptance Speech at the National Book Awards

by Isabel Allende

- 1 Well thank you, thank you so much for this unexpected honor that I accept **humbly**, on behalf of millions of people like myself who have come to this country in search of a new life.
- 2 I have always been a foreigner, I was born in Peru and raised in Chile in my grandfather’s house.
- 3 I followed my stepfather in his travels as a diplomat. I was a political **refugee** for 13 years in Venezuela after the military **coup** of 1973 that ended a long tradition of democracy in Chile. And I have been an immigrant in the United States for more than 30 years.

GLOSSARY

humbly (*adv*) in a modest way
refugee (*n*) person who flees his or her country to escape oppression
coup (*n*) violent, illegal takeover of a government



Inspect the Text

1. **Comprehension ¶ 1–3** What makes Allende a foreigner in the United States?
2. **Analyze author’s purpose** Why do you think Allende begins her speech by talking about her early years and her status as a foreigner in the United States?
3. **Expand vocabulary ¶ 1** What does the collocation a *new life* mean?

Expand Vocabulary

¶ 5 Use context to define the expression *I don't take anything for granted*. Explain how you figured it out.

Expand Vocabulary

¶ 5 Notice the collocation “take notes.” What other collocations involving the word “take” can you think of?

Analyze Claim and Supporting Evidence

¶ 6 What claim does Allende make? How convincing is the evidence she offers to support her claim?

READING STRATEGY
Determine Importance

¶ 8 Why does Allende discuss her reasons for being a writer? Why does she think it's important to talk about this?

4 Being **chronically** uprooted has some advantages. Most of my writing comes from **nostalgia**, loss, and separation, from an **incurable** desire to belong in a place. I look Chilean and I dream, cook, and write in Spanish.

5 As a stranger, I don't take anything for granted. I observe and listen carefully. I ask questions and I question everything. For my writing I don't need to invent much, I look around and take notes, I'm a collector of experiences. I draw on other people's lives, especially the strong and **passionate** women that I meet everywhere. I draw on the sorrow and the struggles of every day, on the joy of being alive and not afraid of death. I'm not afraid of life either. I refuse to live in fear and let alone to vote in fear.

6 This is a dark time my friends, it's a time of war in many places, and **potential** war everywhere. A time of nationalism and racism, of cruelty and **fanaticism**, a time where the values and principles that **sustain** our civilization are under siege. It's a time of violence and poverty for many. Masses of people who are forced to leave everything that is familiar to them and undertake dangerous journeys to save their lives.

7 Remember the little 3-year-old Syrian boy whose body the ocean washed up onto a beach in Turkey in 2015? His name was Alan Kurdi. He could have been your son or my grandson. That same day, his father also lost his wife and another child in the **inflatable** boat that took them across the sea as they escaped the war in Syria. Alan Kurdi symbolized the plight of millions of desperate people. For an instant the world was shaken by the image of the dead toddler on the beach, but the world quickly forgot.

8 I write to preserve memory against the erosion of **oblivion** and to bring people together. I believe in the power of stories. If we listen to another person's story, if we tell our own story, we start to heal from division and hatred. Because we realize that the similarities that bring us together are many more than the differences that separate us.

GLOSSARY

- chronically** (*adv*) in a habitual way
- nostalgia** (*n*) sentimental feelings about the past
- incurable** (*adj*) unable to be mended or made better
- passionate** (*adj*) strongly emotional
- potential** (*adj*) possible
- fanaticism** (*n*) zeal, absolute conviction of a particular point of view
- sustain** (*v*) support over time
- inflatable** (*adj*) able to be filled with air
- oblivion** (*n*) forgetfulness

9 I also write to understand. What is writing after all but an attempt to sort out the confusion of life. Often I don't know why I feel compelled to write a certain story and it is only later that I find out that it is connected to some part of my life, or my **psyche**, that I needed to understand and sometimes to heal.



▲ Allende always writes in Spanish. Her works have been translated into many languages, including English.

10 For those without roots in a place, memory is essential to maintain a sense of continuity. Nobody witnesses the length of our lives, we need to remember. And what would a writer do without an **acute** sense of the past, without an **obsession** with memory? I don't know how much of my memory is actual fact and how much I have invented. Maybe I remember what never happened. Memory is subjective, it is **conditioned** by emotion and belief. Our own story is also subjective. We choose what to highlight and what to ignore or forget. We select the adjectives to describe our journey and in doing so we create our own legend. I have created for myself the bigger than life legend, probably to **compensate** for my short **stature**.

GLOSSARY

- psyche** (*n*) mind
- acute** (*adj*) sharp, keen
- obsession** (*n*) intense focus on a given subject
- conditioned** (*v*) trained, taught
- compensate** (*v*) repay, make up for
- stature** (*n*) height



Grammar in Context

¶ 10 Read the first sentence in this paragraph. Identify the independent clause. What is the subject, and what is the verb?

Expand Vocabulary

¶ 10 Allende uses the collocation *bigger than life*. What does this expression mean? Why does she use it?

Inspect the Text

- 1. **Comprehension** Why did Allende become a writer?
- 2. **Analyze claim and supporting evidence** Does Allende make a convincing argument for the subjectivity of memory? Explain.
- 3. **Expand vocabulary** The root *pel*, found in *propellor*, *impel*, and *expel*, means “force.” Use this information to define *compelled* (¶ 9).

Analyze Author’s Purpose

¶ 11 Why does Allende point out that mainly all Americans are immigrants, or are descended from immigrants?

Expand Vocabulary

¶ 12 Note the expression to give something back. What does Allende mean by this phrase?

- 11 In this land, everybody **descends from** someone who came from another place. The only difference between you and me, unless there’s a Native American person in the audience, is that your grandparents got here first. I am just part of this massive **diaspora**, and although I’m critical of many things about this country, I am proud to be an American citizen.
- 12 I have received much more than I ever dreamed of, and I have been offered the opportunity to give something back. This national award is an extraordinary gift for me, it means that maybe I’m not an **alien** after all. It means that maybe it’s time to plant my roots and relax. Maybe I have found a place where I can belong. Maybe I’m not going anywhere anymore.



▲ Isabel Allende has received many honors besides the National Book Award. In 2014, Harvard University awarded her an honorary degree. She chats here with fellow-honoree singer and musician Aretha Franklin (right).

GLOSSARY

descends from (*v*) is the offspring of
diaspora (*n*) scattering of a given group of people across the globe
alien (*n*) foreigner, outsider

PURPOSE FOR READING Allende has written several novels, as well as collections of essays and other shorter writings. As you read this excerpt from a personal essay, consider how reading multiple works by the same author can help you understand the author’s ideas more deeply.



“What Is True?” from *[musings]*

by Isabel Allende

- 1 People often ask me how much truth there is in my books and how much I have invented. I could swear that every word is true. If it has not happened, it certainly will. I can no longer trace a line between reality and fantasy. Before I was called a liar. Now that I make a living with these lies, I am called a writer. Maybe we should simply stick to poetic truth.
- 2 In *The Book of Embraces*, **Eduardo Galeano** has a short story that I love. To me, it is a splendid metaphor of writing:

There was an old and solitary man who spent most of his time in bed. There were rumors that he had a treasure hidden in his house. One day some thieves broke in, they searched everywhere and found a chest in the cellar. They went off with it and when they opened it they found that it was filled with letters. They were the love letters the old man had received all over the course of his long life. The thieves were going to burn the letters, but they talked it over and finally decided to return them. One by one. One a week. Since then, every Monday at noon, the old man would be waiting for the postman to appear. As soon as he saw him, he would start running and the postman, who knew all about it, held the letter ready in his hand. And even St. Peter could hear the beating of that heart, crazed with joy at receiving a message from a woman.

GLOSSARY

Eduardo Galeano (*n*) major Uruguayan writer (1940–2014)
solitary (*adj*) alone, lonely, isolated
rumors (*n*) gossip, unconfirmed tales
St. Peter (*n*) saint and the gatekeeper of Heaven, according to Christian beliefs
crazed (*adj*) extremely excited

Grammar in Context

¶ 1 Identify the dependent and independent clauses in the sentence beginning *Now that I make . . .* What is the relationship between the clauses?

Tip!

Spelling Tip

¶ 2 Many English words that sound alike are spelled differently and mean different things. When you hear the sentence *The postman, who knew all about it, remember that the verb knew has a silent k, while the adjective new does not have the silent k.*



Inspect the Text

1. **Comprehension** ¶ 2 What was hidden in the old man’s treasure chest?
2. **Analyze author’s purpose** ¶ 2 Why do you think Allende quotes the entire story of the old man in her essay, instead of just summarizing it?
3. **Expand vocabulary** In ¶ 1, Allende uses the collocation *make a living*. Explain how to use context clues to define this expression.



Analyze Claim and Supporting Evidence

¶ 3 Allende claims that the thieves are *good*. Recall their actions from ¶ 2. What support does Allende offer for her claim, and does it convince you?

Expand Vocabulary

¶ 3–4 Notice the collocations “worn out” (¶ 3) and “suffers from” (¶ 4). Which of these have you seen before? What do they mean?

Academic Vocabulary

distinctions (n)	
definition	
example	
synonyms	
antonyms	
forms	

- 3 Isn’t this the playful substance of literature? An event transformed by poetic truth? Writers are like those good thieves. They take something that is real, like the letters, and by a trick of magic they transform it into something totally fresh. That is the best part of writing: finding the hidden treasures, giving sparkle to worn out events, **invigorating** the tired soul with imagination, creating some kind of truth with many lies.
- 4 Good fiction is not only the thrill of a plot. At its best it is an invitation to explore beyond the appearance of things, it challenges the reader’s safety, it questions reality. Yes, it can be disturbing. But there may be a reward at the end. With some luck, the author and the reader, hand in hand, may stumble upon some **particles** of truth. Usually, however, that is not the intention of the author in the first place. The writer merely suffers from an uncontrollable need to tell the story. There is nothing more to it, believe me.

GLOSSARY

invigorating (v) giving new energy to
particles (n) very small pieces

-  **B** Reread Allende’s speech and the essay “What Is True?” Use evidence from the texts to explain your answers.  **Inspect the Text**
1. In the speech, why does Allende describe the period when she received the award as being a *dark time*? What makes it a *dark time*?

2. In the essay, Allende distinguishes between the words *liar* and *writer*, and again between the words *lies* and *poetic truth*. Explain the **distinctions** she is making.

3. What arguments does Allende make in both the speech and the essay? How does each text support the arguments made in the other?

 **C** **Use the target vocabulary** Complete the sentences.

1. When life gets challenging, people often feel _____ for a simpler past.
2. Writing fiction is usually a _____ profession, rather than a collaborative one.
3. When an interest becomes an _____, it’s hard to think about anything else.
4. People who are _____ late often miss planes or buses.
5. We tipped the delivery driver to _____ him for his time.

 **D** **Make connections**

1. What connection can you make between *Storm in a Teacup* and the essay “What Is True?” Explain.
2. What real-world evidence can you think of that supports Allende’s view that memory is subjective? Explain.
3. Having read Allende’s speech and her essay “What Is True?” from [musings], do you believe she deserved the National Book Award? Why or why not?

 **E** **Write** In pairs, write a news article covering Allende’s speech at the National Book Awards. Summarize her speech and give your reactions.

Last night Isabel Allende was awarded . . . In her acceptance speech, she spoke about . . . She said that memory was . . . She spoke of all Americans as being . . .

 **F** **Revise** Join with another writing pair and give each other suggestions. Revise your article in pairs with the feedback.



Exploring Careers: Reporter

Reporters use many of the same skills as literary writers like Allende. They observe people, they write to understand, and they tell stories in order to share them with others. A reporter’s main responsibility is to find out the news and write it up for the general public. Reporters attend press conferences where they can directly question and interview public figures. They prepare for these interviews by doing research and writing down relevant questions. To be a reporter, you need to be willing to ask tough questions directly, to weigh people’s answers, and to draw reasonable conclusions. You need excellent communication skills and a willingness to work irregular hours.



Target Vocabulary

chronically
compensate
nostalgia
obsession
solitary



Note It!

Imagine that you were receiving an award for your writing. Note a few ideas for your acceptance speech.

Observing the Birds

Genre Biography

A biography is a story of a real person’s life. Biographers present facts about the subject’s life, and use those facts to draw conclusions of their own. Biographers may use any or all of the following sources.

Primary Sources

- published works written by the subject
- unpublished works like letters, notebooks, and diaries
- statements made about the subject by people who knew him or her

Secondary Sources

- other biographies of the subject
- histories dealing with the era when the subject lived and worked

PURPOSE FOR READING Leonardo da Vinci is considered one of the greatest geniuses of world history. He imagined and designed flying machines and other mechanical devices centuries ahead of modern scientists and inventors. As you read this excerpt from a biography of Leonardo, think about how his curiosity about birds led him to observe things most of the rest of us would never have noticed.

 **A** Read the biography excerpt.

from **Leonardo da Vinci**

by Walter Isaacson

Bird-Watching

1 Here’s a test. All of us have looked at birds in flight, but have you ever stopped to look closely enough to see whether a bird moves its wing upward at the same speed as it flaps it down? Leonardo did, and he was able to observe that the answer differs based on species. “There are some birds that move their wings more swiftly when they lower them than when they raise them, and this is the case with doves and such birds,” he recorded in a notebook. “There are others which lower their wings more slowly than they raise them, and this is seen with crows and similar birds.” And some, such as **magpies**, raise and lower at the same speed.

GLOSSARY

magpies (*n*) long-tailed birds related to crows and jays

READING STRATEGY
Determine
Importance

¶ 1 Why does the author think it’s important to explain that Leonardo noticed things about birds that most people miss seeing?

2 Leonardo had a strategy he used to refine his observational skills. He would write down marching orders to himself, determining how he would sequence his observations in a **methodical** step-by-step way. “First define the motion of the wind and then describe how the birds steer through it with only the simple balancing of the wings and tail,” he wrote in one example. “Do this after the description of their anatomy.”

3 He recorded in his notebooks scores of such observations, most of which we find amazing mainly because we never make the effort, in our daily lives, to observe ordinary phenomena so closely. On a trip to the **vineyard** he had been given by Ludovico in Fiesole, a village just north of Florence, he watched a chukar partridge take flight. “When a bird with a wide **wingspan** and a short tail wants to take off,” he reported, “it will lift its wings with force and turn them to receive the wind beneath them.”



▲ Chukar partridge displaying its wings

4 From observations like that he was able to make a generalization about the relationship between a bird’s tail and its wings: “Birds with short tails have very wide wings, which by their width take the place of the tail; and they make considerable use of the **helms** set on the shoulders when they wish to turn.” And later: “When birds are descending near the ground and the head is below the tail, they lower the tail, which is spread wide open, and take short strokes with the wings; consequently, the head is raised above the tail, and the speed is **checked** so that the bird can **alight** on the ground without a shock.”

5 Ever notice all that?

GLOSSARY

vineyard (*n*) place where grapes are grown
wingspan (*n*) distance from wingtip to wingtip
helms (*n*) something used to steer
checked (*v*) slowed, halted
alight (*v*) land, settle



Academic Vocabulary

methodical (*adj*)

definition	
example	
synonyms	
antonyms	
forms	

READING STRATEGY

Determine
Importance

¶ 2 Why do you think Leonardo found it important to describe a bird’s anatomy first, before he described its method of steering in the air?



Inspect the Text

1. Comprehension ¶ 4 What generalization did Leonardo make about birds with short tails?

2. Analyze author’s purpose ¶ 5 Why does the author address the reader directly with the question *Ever notice all that?* What is the effect?

3. Expand vocabulary ¶ 4 The prefix *con* means “with,” and the root *seque-* means “follow.” Use this information to define the word *consequently*.

Expand Vocabulary

¶ 6 Notice the word *compile*. It contains the Latin root *com-*, meaning “with” or “together.” Use that information and context clues to define the word *compile*.

Grammar in Context

¶ 6 Identify the dependent clause in each sentence and describe its function.

Analyze Author’s Purpose

¶ 7 Why do you think the author includes the information that much of Leonardo’s work remains unfinished?

6 After twenty years of observing, he decided to compile his notes into a **treatise**. Much of the work was gathered into an eighteen-folio notebook, now known as the Codex on the Flight of Birds.

7 It begins by exploring the concepts of gravity and density, and it ends by **envisioning** the launch of a flying machine he had designed and comparing its **components** with the body parts of a bird. But like much of Leonardo’s work, the treatise remained unfinished. He was more interested in **nailing** concepts than he was in polishing them for publication.

8 When he was compiling his bird treatise, Leonardo began a section of another notebook with a directive to put them into a broader context. “To explain the science of the flight of birds, it is necessary to explain the science of the winds, which we shall prove by the motion of the waters,” he wrote. “The understanding of this science of water will serve as a ladder to arrive at the knowledge of things flying in the air.”

9 He not only got the basic principles of fluid **dynamics** correct, but he was able to turn his insights into **rudimentary** theories that foreshadowed those of Newton, Galileo, and Bernoulli.

GLOSSARY

- treatise** (*n*) formal written work about a specific subject
- envisioning** (*v*) seeing in one’s imagination
- components** (*n*) parts
- nailing** fully understanding
- dynamics** (*n*) pattern of change or motion
- rudimentary** (*adj*) basic



▲ A page from the Codex on the Flight of Birds

10 No scientist before Leonardo had methodically shown how birds stay aloft. Most had simply **embellished** on Aristotle, who mistakenly thought that birds were supported by air the way ships were by water.

11 Leonardo realized that keeping aloft in air requires fundamentally different dynamics than doing so in water, because birds are heavier than air and are thus subject to being pulled down by gravity. The first two folios of his Codex on the Flight of Birds deal with the laws of gravity, which he calls the “attraction of one object to another.” The force of gravity, he wrote, acts in the direction of “an imaginary line between the centers of each object.”

12 He then described how to calculate the center of gravity of a bird, a pyramid, and other complex shapes.

13 One important observation he made ended up **informing** his studies of flight and of the flow of water. “Water cannot be **compressed** like air,” he wrote.

14 In other words, a wing beating down on air will compact the air into a smaller space, and as a result the air pressure underneath the wing will be higher than the pressure of the **rarefied** air above it. “If the air could not be compressed, the birds would not be able to support themselves upon the air that is struck by their wings.”

15 The downward flap of the wing pushes the bird higher and thrusts it forward.

16 He also realized that the pressure the bird puts on the air is met by an equal and opposite pressure that the air puts on the bird. “See how the wings, striking against the air, **sustain** the heavy eagle in the thin air on high,” he noted. “As much force is **exerted** by the object against the air as by the air against the object.”

GLOSSARY

- embellished** (*v*) added details or decorations to
- informing** (*v*) shaping, directing
- compressed** (*v*) compacted, made smaller
- rarefied** (*adj*) less dense, thinner
- sustain** (*v*) hold up, support
- exerted** (*v*) put out



Grammar in Context

¶ 11 Identify the independent clauses in all three sentences and explain how you know.

READING STRATEGY
Determine Importance

¶ 13 In this paragraph, the author tells us that *Water cannot be compressed like air* was an important observation. What makes it important?

Inspect the Text

- 1. Comprehension ¶ 13–16**
What effect does the compression of air have on a bird’s flight?
- 2. Analyze genre ¶ 11–16**
Why do you think the author quotes so many of Leonardo’s own words?
- 3. Expand vocabulary ¶ 14**
Find the collocation *in other words*. What does this expression tell you about the text that follows?

READING STRATEGY
Determine Importance

Which of Leonardo’s discoveries and statements discussed in this excerpt are the most important? Explain your choices.

Expand Vocabulary

¶ 20 The prefix *pre-* means “before,” and the root *scien* means “knowledge.” Combine this information with context clues to figure out the meaning of *presciently*.

Tip!

Spelling Tip

To make a verb into a noun, we often add the suffix *-tion*. If the verb ends in *-t* or *-te*, drop those final letters before you add the suffix. Examples from ¶ 11–20 include:

attract	attraction
direct	direction
act	action
react	reaction
intimate	intimation

- 17 Two hundred years later, Newton would state a refined version of this as his third law of motion: “To every action there is always opposed an equal reaction.”
- 18 Leonardo accompanied this concept with a **precursor** to Galileo’s principle of relativity: “The effect of moving air on a **stationary** object is as great as it is when the object is moving and the air is stationary.”
- 19 In other words, the forces that would act upon a bird flying through air are the same as the forces acting on a bird that is stationary but has air rushing past it (such as a bird in a wind tunnel or one **hovering** on a windy day over a spot on the ground). He drew an **analogy** from his studies of water . . . still water resembles that of running water against a stationary pole.
- 20 Even more **presciently**, he had an **intimation** of what became known, more than two hundred years later, as Bernoulli’s principle: when air (or any fluid) flows faster, it exerts less pressure. Leonardo drew a cross section of a bird’s wing, which shows that the top is curved more than the underside. (This is also true of airplane wings, which made use of this principle.) The air flowing over the curved top of the wing has farther to travel than the air flowing under the bottom. Therefore, the air on top has to travel faster. The difference in speed means that the air on top of the wing exerts less pressure than the air on the bottom, thus helping the bird (or airplane) to stay aloft. “The air above birds is thinner than the usual thinness of the other air,” he wrote.
- 21 Leonardo thus realized, before other scientists, that a bird stays aloft not merely because the wings beat downward against the air but also because the wings propel the bird forward and the air lessens in pressure as it rushes over the wing’s curved top surface.

GLOSSARY

- precursor** (*n*) forerunner
- stationary** (*adj*) still, unmoving
- hovering** (*v*) remaining stationary in the air
- analogy** (*n*) comparison
- presciently** (*adv*) in a perceptive, forward-thinking way
- intimation** (*n*) hint

- B** Reread the excerpt from *Leonardo da Vinci*. Use evidence from the text to explain your answers. **Inspect the Text**
1. What major laws of physics did Leonardo learn by observing birds?

2. Why do you think Leonardo was so interested in birds?

3. What is your impression of Leonardo’s writing style? Would you like to read more from his notebooks? Why or why not?

- C** **Use the target vocabulary** Complete the sentences.
1. Leonardo’s observations show that he was a _____ to scientists like Galileo and Newton.

2. We _____ everything into the suitcase by pushing on the top.

3. Leonardo studied how water moves, or its _____.

4. When my brother _____ himself to study, he always got good grades.

Target Vocabulary

compressed
dynamics
exerted
precursor

- D** **Make connections**
1. How does Leonardo’s study of birds in flight connect to the ideas expressed in the excerpt from *The World According to Physics*?

2. Can you think of practical uses in our world for Leonardo’s observations on birds in flight? Explain.

3. Leonardo often failed to polish his writings down to the last detail. Think of a time when you left an idea or a project unfinished and never went back to it. Do you have plans to finish it? Explain.

- E** **Write** In pairs, write a paragraph for a manual for birdwatchers. Describe what they can observe as they watch birds in flight, taking off and landing.
Birds stay aloft by . . . If the bird has a wide wingspan, then . . . If it has a long tail, then it . . .
- F** **Revise** Join with another writing pair and give each other suggestions. Revise your paragraph in pairs with the feedback.

Exploring Careers: Air Traffic Controller

Air traffic controllers closely monitor airplanes from a tower at the airport. They use radio communication to guide arrivals to runways and gates. For departures, they provide instructions on gate departure and runway direction. Controllers also monitor weather forecasts and may hold planes at the gate during storms. Their most important responsibility is ensuring the safety of passengers and crews.



Note It!

List at least two or three things you’ve observed about any bird or animal of your choice. (Example: Squirrels always descend a tree trunk headfirst.)



▲ Upholsterers have to be good at working with small hand tools. Much of this work still has to be done by hand, especially when dealing with antique furniture or museum items.

Manufacturing

Manufacturing is the making of goods or products, either by hand or by machine, to be sold to customers. While some products are still made by hand today, most manufacturing involves large-scale machinery to get the job done faster. There are six career paths:

- Health, Safety, and Environmental Assurance
- Logistics and Inventory Control
- Maintenance, Installation, and Repair
- Manufacturing Production Process Development
- Production
- Quality Assurance

A Read about some careers in manufacturing.

Career	Responsibilities	Education, Skills, and Additional Requirements
Upholsterers	• Cuts upholstery (fabric) to cover furniture • Works with clients to choose colors and fabrics • Pads furniture seats and backs as needed • Repairs and replaces damaged upholstery	• at least some high school • manual dexterity • knowledge of furniture design, fabrics, and their history
Watch and Clock-Repair Technicians	• Resets and repairs clocks and watches • Oils and cleans clock mechanisms • Maintains clocks on a regular basis • Repairs and replaces broken parts	• associate’s degree or post-secondary certificate • manual dexterity • attention to detail
Robotics Technicians	• Installs, repairs, and maintains robotic systems • Trains clients and customers to use robotic systems • Inspects installation sites	• associate’s degree or bachelor’s degree • computer skills



▲ Notice the small tools the technician uses to do his work. Also notice the safety goggles that protect his eyes.

B Answer the questions.

1. Why do you think a clock-repair technician would need to have good attention to detail?
2. Which of the careers from the chart would be best for someone who loves fabric and decor? Explain.
3. Since most of these jobs do not require a college degree, how do you think most people learn their skills?

C Respond.

1. Which of the six manufacturing career paths is most interesting to you? Why?
2. Find out more about one of the careers in the Manufacturing group. Do you think you would be successful at it? Why or why not?

Genre Informational Article

Informational articles provide readers with facts on a variety of topics. An author may start with a central idea. The author will then provide facts and evidence to support that idea.

PURPOSE FOR READING From the early 1800s to about 1960, the United States’ economy was based on manufacturing. Today, most manufacturing has moved to other countries, and we import most of our goods. People in the industry are trying to reverse this trend. As you read this informational article, think about what we can gain by a return to a manufacturing economy.



D Read the informational article.



Revolutionizing American Manufacturing

by Katie Rapp

1 A major focus of the current **administration** is **revitalizing** American **manufacturing**, and new technologies are changing the way things are made. Manufacturing Extension Partnership (MEP) Director Pravina Raghavan recently appeared on Government Matters TV, where she discussed how MEP National Network™ experts around the country are working with small manufacturers to revolutionize U.S. manufacturing. From 3D-printed body organs and **predictive** maintenance to sensors that improve **supply chain** visibility, the future of manufacturing is about making processes more efficient and getting people what they need when they need it. Raghavan said, “Last year alone, we helped do \$18.8 billion in sales for manufacturers. These types of technology **modifications** ensure that manufacturers are getting what they need at the right time, and real-time **inventory** getting out to the public.”

GLOSSARY

- administration (*n*) federal government under a particular president
- revitalizing (*v*) bringing back to life
- manufacturing (*n*) process of making products
- predictive (*adj*) characterized by making predictions
- supply chain (*adj*) referring to the steps that move products from manufacturers to consumers (users of the products)
- modifications (*n*) changes
- inventory (*n*) quantity of items available

READING STRATEGY
Determine Importance

¶ 1 Which sentence do you think contains the author’s central claim? Explain your choice.



Inspect the Text

1. **Comprehension** ¶ 1 What are the two main goals of US manufacturing today?
2. **Analyze claim and supporting evidence** Reread ¶ 1. How does the author support her central claim?
3. **Expand vocabulary** The prefix *re-* means “again,” and the root *vita* means “life.” Use this information to define the word *revitalizing* in ¶ 1.

Analyze Text Structure

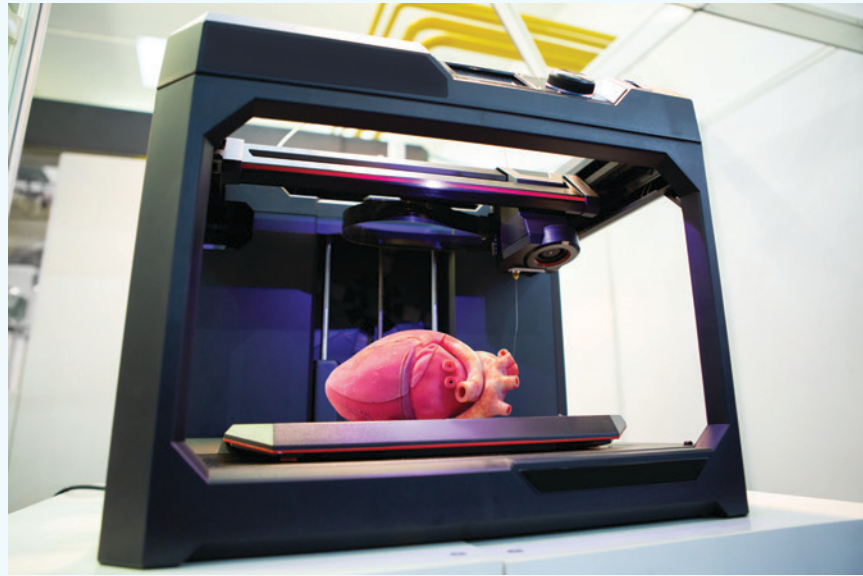
Note the subheads in the article. Which element of ¶ 1 do these subheads refer to? What is their purpose?

Grammar in Context

¶ 3 Identify the independent clause in the first sentence of this paragraph. Explain your answer.

The potential of 3D-printed body organs

2 3D printing holds great promise for manufacturing. One exciting area is the possibility of 3D-printing human tissue, be it **valves** or entire organs. Currently in the active research phase, scientists at the National Institute of Standards and Technology (NIST) are hard at work developing the necessary measurement **infrastructure** to unlock this technology’s full potential. 3D printing could eventually help Americans get the vital organs they need more quickly, reducing wait times and the chance of rejection and ultimately saving lives, all while cutting the cost of surgeries dramatically.



▲ 3D-printed human heart

Predictive maintenance is transforming manufacturing

3 Predictive maintenance, or **prognostic** health management, is transforming manufacturing. Like the sensors in your smart watch that collect your health data, predictive maintenance provides data about the health of a manufacturing facility. Sensors enable manufacturers to better understand their production lines, correct problems and save money. This increases efficiency, brings costs down for the manufacturer, and benefits the public with lower-priced consumer goods.

GLOSSARY

3D (*adj*) short for *three-dimensional*; having height, width, and depth
valves (*n*) structures that control bloodflow in the heart
infrastructure (*n*) basic and necessary framework
prognostic (*adj*) characterized by the ability to predict

4 In addition, the current workforce shortage means many manufacturers don’t have enough people to check machines. Sensors can do this instead so manufacturers can correct problems before they shut down a production line. This helps prevent supply chain issues, product shortages, **recalls** and other issues that prevent people from getting goods when they need them.

Increasing supply chain visibility

5 Most people never thought about supply chains before the pandemic. It’s not an issue until you can’t get something you need – like toilet paper. Where do the components come from? How does a product get from point A to point B? Where is it **assembled**? Supply chain visibility means understanding these details.

6 Smart manufacturing supports supply chain visibility and allows it to happen more quickly than in the past. With sensors, manufacturers can tell what’s going on every step of the way, from suppliers to the person who puts the product together. That kind of data is very empowering because it shows where the gaps are. Using this technology, a manufacturer can **pivot** when a part isn’t available from the usual supplier and find another supplier. This helps eliminate the long wait times we’ve experienced in the supply chain during the past few years.



GLOSSARY

recalls (*n*) requests to customers to return defective products
assembled (*v*) put together
pivot (*v*) turn quickly



Inspect the Text

- 1. **Comprehension** ¶ 4–6 What are some of the problems that affect the supply chain?
- 2. **Analyze text structure** Go back to ¶ 1 and locate the phrase *improving supply chain visibility*. Why does the author repeat this phrase in the subhead above ¶ 5?
- 3. **Expand vocabulary** Use context to define the expression *every step of the way* (¶ 6).

Grammar in Context

¶ 7 Locate the sentence beginning *It's about getting goods . . .* Identify the dependent clause and explain how you know.

Analyze Text Structure

¶ 7–8 What is the relevance of the article's final two paragraphs? What function does this section have in the structure of the article?

Excitement for the future of manufacturing

- 7 The future of manufacturing is about making things more efficient. It's about getting goods – whether it's cheese or dishwashers or airplanes – to people faster. The future includes small manufacturers incorporating smart manufacturing technologies and sensors. With these, manufacturers can identify and correct problems and make sure products are on the shelves when people need and want them.
- 8 Supporting small U.S. manufacturers in the supply chain is critical. The mission of the MEP National Network is to strengthen and empower U.S. manufacturers. More than 1,450 trusted advisors and experts at approximately 430 MEP service locations in every state and Puerto Rico help U.S. manufacturers learn new technologies, identify inefficiencies, find **domestic** suppliers and grow.



GLOSSARY

🔍 **domestic** (*adj*) related to business within a country, opposite of *international*

👥 **E** Reread “Revolutionizing American Manufacturing.” Use evidence from the text to explain your answers. 🔍 **Inspect the Text**

- 1. Explain how the use of new technologies will result in more goods being available on store shelves.
- 2. Think of one point you might make to rebut the author’s central argument. What evidence supports your rebuttal?
- 3. What questions would you like to ask the author about the topic?

👥 **F** **Use the target vocabulary** Complete the sentences.

- 1. We gathered all the parts and then _____ the cabinet.
- 2. When the store’s _____ is low, they order more products.
- 3. There’s nothing like a nourishing meal for _____ a tired person.
- 4. _____ means making things, either in a factory or by hand.
- 5. _____ suppliers are those within one’s own country.

Target Vocabulary

- assembled
- domestic
- inventory
- manufacturing
- revitalizing

👥 **G** **Make connections**

- 1. Imagine that Leonardo da Vinci could have looked into the future and seen the technology of 3D printing of human organs. How do you think he would have reacted? What evidence supports your answer?
- 2. The article refers to the importance of US companies working with domestic suppliers. Do you support or oppose this practice? Why?

✍️ **H** **Write** Write a summary of this article. Include only the central claim and the key supporting details in your summary.

The central claim of the article is . . . One key piece of supporting evidence is . . . Another key piece of evidence is . . .

✍️ 👥 **I** **Revise** Share your summary with a classmate and give each other suggestions. Revise your summary and incorporate the feedback.

📖 **Exploring Careers: Pilot**

Airplanes are not just for human passengers on vacation! Airplanes carry goods such as foods or medicines. That makes airline pilots an important part of the supply chain. Although many things are too heavy to be flown, pilots carry lightweight goods that have to reach their destinations quickly. Sometimes they’re carried in very small planes or even helicopters, as these smaller craft can land in remote places or on rooftops. To earn a pilot’s license, you need flight instruction and training.



📝 **Note It!**

Write down the four careers highlighted in this section (upholsterer, watch and clock repair technician, robotics technician, and pilot). Rate them in order of your interest from 1 (most interested) to 5 (least interested).



Tip!

Writing

Connectors such as *and* and *but* do not always signal a compound sentence. A compound sentence must have two independent clauses joined by a comma and conjunction (connector).
Allende was born in Peru, and she grew up in Chile.

Writing Combining Sentences

Writers can **combine sentences** to condense (make concise) ideas, to show relationships among ideas, and to make text easier to read. Using connectors, writers can combine independent clauses and dependent clauses to form:

- **compound sentences:** independent + independent
I look Chilean, and I dream, cook, and write in Spanish.
- **complex sentences:** dependent + independent
If it has not happened, it certainly will.
When I was a little girl, my father bought me a ball that I loved.
- **compound-complex sentences:** two or more independent + one or more dependent
I am just part of this massive diaspora, and although I’m critical of many things about this country, I am proud to be an American citizen.

Connectors	
Compound sentences	<i>and, but, for, nor, or, so, yet</i>
Complex sentences	<i>after, although, as, as soon as, because, before, since, so, though, unless, unlike, when, while</i>

-  **A** Read each sentence from the readings and choose the type of sentence.
1. I have received much more than I ever dreamed of, and I have been offered the opportunity to give something back.
a. compound **b.** complex **c.** compound-complex
 2. When he was compiling his bird treatise, Leonardo began a section of another notebook with a directive to put them into a broader context.
a. compound **b.** complex **c.** compound-complex
-  **B** Combine the sentences. Use the type of sentence and connector provided.
1. Allende has moved often. She finds advantages in being uprooted many times.
type of sentence: compound connector: but
 2. Allende accepted the honor for her work. She acknowledged the role her upbringing had in her writing.
type of sentence: compound connector: and
 3. Allende has lived in many countries. She feels a sense of belonging to the United States. She is proud to be an American citizen.
type of sentence: compound-complex connectors: although, and
-  **C** Write three sentences about something you are curious about. Write one of each type: compound, complex, and compound-complex.



Note It!

Make a list of 6–8 connectors you will use in your writing.

Writing Skills Avoiding Run-Ons, Comma Splices, and Fragments

A **run-on sentence** is two or more sentences joined incorrectly.

Allende is an author she has been honored for her work.

To correct a run-on sentence:

- add a period and make two sentences
Allende is an author. **S**he has been honored for her work.
- add a semicolon when the clauses are related
Allende is an author; she has been honored for her work.
- add a comma and a conjunction
Allende is an author, **and** she has been honored for her work.

A **comma splice** is when a comma separates two sentences.

Allende is an activist, she is also a widely read author.

To correct a comma splice:

- replace the comma with a period or a semicolon
Allende is an activist. She is also a widely read author.
Allende is an activist; she is also a widely read author.
- add a coordinating conjunction
Allende is an activist, **and** she is also a widely read author.

A **sentence fragment** is an incomplete thought. It is punctuated like a sentence, but it is missing a subject, a verb, or both.

To correct a fragment, add what is missing.

They finally decided to return them. One by one.

They finally decided to return them, **one** by one.

A Choose **run-on**, **comma splice**, or **fragment** to identify the error.

1. The study of physics is challenging, it requires knowledge of math.
2. A great success! The experiment’s data still needs to be analyzed.
3. Astronomy involves physics and math this knowledge helps scientists make observations.
4. I am studying chemistry, it is preparing me for a career in science.



B Use two different ways to correct each sentence in Activity A.



C Write 4–5 sentences about why curiosity is important. Avoid run-on sentences, comma splices, and fragments.

Curiosity is a vital quality for helping people grow and learn. Without it, there would be no scientific achievements or great works of literature. When it is encouraged in children, . . .

Tip!

Writing

When the sentences in a run-on or comma splice are long, it is often best, for clarity, to split them into two separate sentences.



Note It!

Make a note of the punctuation you can use to correct a comma splice in your argument.



WRITING STRATEGY
Rhetorical Appeals

Writers use rhetorical appeals to logic, emotion, and credibility to help persuade their audience.

Writers appeal to logic by including facts and statistics to support their argument.

Writers appeal to readers’ emotions by using specific word choices, creating a particular tone, and by including personal stories to support their argument.

Writers appeal to credibility by showing how or why they are an expert on the topic and by citing other experts’ viewpoints to support their argument.

Argument Essay

In this chapter, you read arguments from an excerpt from *Storm in a Teacup*. Remember, an argument:

- states a precise claim with an opinion or viewpoint
- validates the claim with reasons and facts, details, examples, and other evidence from reliable sources
- includes a counterclaim
- acknowledges a strength and limitation of each side
- uses persuasive techniques such as appeals to logic and emotion
- is logically organized to clearly present information

Writing Prompt

Think about an issue you feel strongly about. Write an argument to persuade others to agree with your point of view. Remember to consider the level of interest and knowledge of your audience.

Consider focusing on one of the following topics or use your own idea.

- Is there a cause or current news issue that you strongly believe in?
- Is there something you feel is worth arguing for?
- Is there an issue in your community that you feel should be addressed or resolved differently?
- Is there something you find unjust or unfair either for you or someone you care about?

Writing Rubric

Organization	Development of Ideas	Vocabulary & Word Choice	Language Conventions
• begins with a claim • includes an explanation of the significance of the claim • presents reasons and evidence in logical order	• states a precise claim that presents a clear opinion or viewpoint • supports the claim with reasons and evidence • includes and rebuts a counterclaim • explains a strength and a limitation of each side	• includes words and phrases that anticipate the audience’s knowledge level, concerns, and values • includes words and phrases that appeal to logic and emotions • includes words and phrases that appeal to credibility	• uses correct spelling, capitalization, and punctuation • uses correct grammar, avoiding sentence fragments, comma splices, and run-on sentences • demonstrates cohesive writing with sentences combined in logical ways

Student Model Final Draft

Self-Driving Cars in Our Future

by Wyatt Miller

- 1 Automobile manufacturers should be investing heavily in researching and funding self-driving car technology. As we look to the future, it is important to embrace new technologies, which include self-driving cars, that have the potential to improve our daily lives. Although some may be hesitant to give up the control of driving themselves, the benefits far outweigh any concerns. Self-driving cars have the potential to reduce traffic congestion and improve safety on the roads.
- 2 One of the biggest benefits of self-driving cars is their ability to reduce accidents on the road. According to a study by the National Highway Traffic Safety Administration, human error accounts for 94% of all accidents. Human error is not only due to distraction or carelessness; many errors occur when conditions change too quickly for humans to react. With self-driving cars, the risk of human error is greatly reduced, and this could potentially save thousands of lives. The cars are equipped with sensors, cameras, and other technology that can detect obstacles, making them safer than human drivers.
- 3 Self-driving cars also have the potential to reduce traffic. Think about how navigation apps have the ability to calculate the shortest and most efficient routes in real time. That built-in knowledge allows self-driving cars to automatically take the best routes, reducing the number of traffic jams.
- 4 While there are many benefits to using self-driving cars, some people are concerned about their safety. It’s true that there have been some accidents involving self-driving cars, but they have been relatively rare. In fact, research has shown that eliminating human error is more of a benefit to safety than any concerns about self-driving cars malfunctioning. Additionally, as self-driving technology continues to evolve, these vehicles will only become safer and more reliable.
- 5 In conclusion, self-driving cars have the potential to revolutionize the way we travel. They have the potential to reduce traffic congestion, improve safety on the roads, and increase people’s ability to relax while moving around. Many people may be hesitant to trust the technology, but we should embrace the future and the benefits that self-driving cars can bring.

Notice

Look at the highlighted claim and the explanation for why this is a significant issue for most people. How does the writer explain to the audience why they should care about this argument?

Notice

Look at the highlighted text to see how the writer started two paragraphs with clear reasons for the claim. How did the writer use evidence to support each reason?

Notice

Look at the highlighted text to find the counterclaim to the writer’s claim. How does he discuss both sides of this argument?

PLAN

Use Your Notes

- Look through all the notes you wrote for **Note It!**
- Which of your responses could be included in your argument essay?

Use a graphic organizer, such as a chart, to plan your ideas.

Claim:		
Reason:	Reason:	Reason:
Evidence:	Evidence:	Evidence:
Counterclaim:		
Rebuttal:		

DRAFT

Once you have organized your ideas, begin writing your draft. Use your notes and graphic organizers to help you.

Remember to include a counterclaim to your claim and explain the strength and limitations of both.

Read the following exemplar texts and consider how you could use them as models for your own writing.

Exemplar 1 Precise Claim: Excerpt from Storm in a Teacup: The Physics of Everyday Life by Helen Czerski

There is sometimes a bit of snobbery about the science found in kitchens and gardens and city streets. It’s seen as something to occupy children with, a trivial distraction which is important for the young, but of no real use to adults. An adult might buy a book about how the universe works, and that’s seen as being a proper adult topic. But that attitude misses something very important: The same physics applies everywhere. A toaster can teach you about some of the most fundamental laws of physics, and the benefit of a toaster is that you’ve probably got one, and you can see it working for yourself. Physics is awesome precisely because the same patterns are universal: They exist both in the kitchen and in the farthest reaches of the universe.

Exemplar 2 Reasons and Evidence: Excerpt from “Revolutionizing American Manufacturing” by Katie Rapp

3D printing holds great promise for manufacturing. One exciting area is the possibility of 3D-printing human tissue, be it valves or entire organs. Currently in the active research phase, scientists at the National Institute of Standards and Technology (NIST) are hard at work developing the necessary measurement infrastructure to unlock this technology’s full potential. 3D printing could eventually help Americans get the vital organs they need more quickly, reducing wait times and the chance of rejection and ultimately saving lives, all while cutting the cost of surgeries dramatically.

Exemplar 3 Counterclaim: Excerpt from Storm in a Teacup: The Physics of Everyday Life by Helen Czerski

In the past, information was treasured more than it is now. Each nugget was hard-earned and valuable. These days, we live on the shore of an ocean of knowledge, one with regular tsunamis that threaten our sanity. If you can manage your life as you are, why seek more knowledge and therefore more complications? The Hubble Space Telescope is all very nice, but unless it’s also going to look downward once in a while to find your keys when you’re late for a meeting, does it make any difference?

Notice

In Exemplar 1, what is Czerski’s claim about physics? How does she explain why this argument matters?

Apply

Look at your draft. Is your claim easy to find? Do you explain why the argument is significant for the audience?

Notice

In Exemplar 2, what reason does Rapp give for the claim that 3D printing holds great promise for manufacturing? How does she use facts about scientific work to support this reason?

Apply

Look at your draft. Do you include several reasons for your claim? Is each reason supported by evidence like facts, explanations, or examples?

Notice

In Exemplar 3, what counterclaim does Helen Czerski include to the claim that scientific understanding, even in small doses, is crucial for decision-making, and participation in society?

Apply

Look at your draft. Check that you have included a reasonable counterclaim and acknowledge that it is a fair argument as well.

Tip!

Writing

When writing an argument, consider your audience. How might they feel about this topic, based on their background? What kinds of counterarguments might they already have? Use this to determine how to present the issue.

For additional practice with revision and editing, see the Practice Book activities on vhlcentral.com.

REVISE DRAFT 1

A Review the edits for Draft 1 of the Student Model “Self-Driving Cars in Our Future” by Wyatt Miller. Notice the improvements the author made.

Automobile manufacturers should be investing heavily in researching and funding self-driving car technology. As we look to the future, it is important to embrace new technologies, which include self-driving cars, that have the potential to improve our daily lives. ~~There are many reasons for using self-driving cars, such as reducing traffic and improving safety.~~ Although some may be hesitant to give up the control of driving themselves, the benefits far outweigh any concerns. Self-driving cars have the potential to reduce traffic congestion and improve safety on the roads.

One of the biggest benefits of self-driving cars is their ability to reduce accidents on the road. According to a study by the National Highway Traffic Safety Administration, human error accounts for 94% of all accidents. ~~People make errors when they do things like text while driving.~~ Human error is not only due to distraction or carelessness; many errors occur when conditions change too quickly for humans to react. With self-driving cars, the risk of human error is greatly reduced. ~~This, and this~~ could potentially save thousands of lives. The cars are equipped with sensors, cameras, and other technology that can detect obstacles, making them safer than human drivers.

Self-driving cars also have the potential to reduce traffic. Think about how navigation apps have the ability to calculate the shortest and most efficient routes in real time. That built-in knowledge allows self-driving cars to automatically take the best routes, reducing the number of traffic jams.

While there are many benefits to using self-driving cars, some people are concerned about their safety. ~~It's true that there have been some accidents involving self-~~

~~driving cars, but they have been relatively rare.~~ In fact, ~~research~~ ~~research~~ has shown that eliminating human error is more of a benefit to safety than any concerns about self-driving cars malfunctioning. Additionally, as self-driving technology continues to evolve, these vehicles will only become safer and more reliable.

In conclusion, self-driving cars have the potential to revolutionize the way we travel. They have the potential to reduce traffic congestion, improve safety on the roads, and increase people’s ability to relax while moving around. Many people may be hesitant to trust the technology, but we should embrace the future and the benefits that self-driving cars can bring.

B **Revise** your draft. Use the rubric, model student revision, and exemplars to help you. Then, use the Revision Checklist to look for additional places to improve.

Revision Checklist

- ☐ Is my **viewpoint** clearly stated in the introduction?
- ☐ Did I follow argument **text structure** by including a **claim**, **reasons**, **evidence**, and a **counterclaim**?
- ☐ Did I consider what the **audience** already knows and what concerns or **biases** they might already have?
- ☐ What can I **add** to the writing to be more persuasive?
- ☐ Does anything need to be rearranged to be more persuasive?
- ☐ Does my writing flow in a way that is cohesive and clear?
- ☐ Do I include **citations** for any sources I included?

 **C** **Peer review** Share your writing with a classmate and discuss. Ask your classmate:

1. What did you like about my argument essay?
2. Was there anything confusing or unclear?
3. Is there anything else you want to know more about?

D **Revise again** Based on the conversations you had during your peer review, make any final revisions.

Tip!

Writing

To develop a strong, persuasive argument, appeal to your audience’s emotions and logic. For example, you can make points that they can personally relate to. (*Wouldn’t it be great if college campuses provided self-driving cars to easily get to class on time?*) You can also use evidence to help them see that you have a logical basis for making your claim.

Editing Checklist

Check your writing for:

- ☐ spelling
- ☐ capitalization
- ☐ punctuation, including: commas, semicolons, colons, dashes, and hyphens
- ☐ grammar, including:
 - ☐ avoiding comma splices and fragments
 - ☐ avoiding run-on sentences

Presentation Checklist

- ☐ The presentation is clearly organized with a claim, reasons, evidence, a counterclaim, and a rebuttal.
- ☐ The audience’s knowledge and opinions are considered.
- ☐ The audio or visuals used support the argument.

EDIT

A Review a part of this student’s Draft 3 edits. Notice the corrections the author made to improve the paragraph.

Editing Model

1 One of the biggest benefits of self-driving cars is their ability to reduce accidents on the road. According to a study by the ~~a~~National ~~h~~Highway ~~t~~Traffic ~~a~~Safety ~~a~~Administration, human error accounts for 94% of all accidents. Human errors is not only due to distraction or carelessness; many errors occur when conditions change too quickly for humans to react. With self-driving cars, the risk of human error is greatly reduced, and this could potentially save thousands of lives. ~~the~~ The cars are equipped with sensors, cameras, and other technology that can detect obstacles, making them safer ~~then~~ than human drivers.

B Use the editing checklist to edit your draft.

PUBLISH AND PRESENT

Step 1 Type and print out your argument essay, or rewrite it neatly.

Step 2 Find photos or create illustrations to include with your argument essay, and write captions or labels to accompany them.

Step 3 Discuss with a classmate how you might present this argument essay.

Select one of the following ways to present and share your argument essay:

Deliver a **speech**

- Speak clearly, loudly, and slowly so your audience can understand you.
- Speak with expression and emotion to make your points persuasive.

Create a **slide presentation**

- Create slides to share your claim, reasons, evidence, and counterclaim.
- Include graphics to show your evidence in a clear and interesting way.

Develop an **online debate forum**

- Present your argument with section headings such as **Claim**, **Evidence**, and **Counterclaim** to help organize the information.
- Include quotations, statistics, and links that help support your argument.

After you create your presentation, check for any final details that you can add. Practice your presentation. Then, share your presentation with your audience.

Review and Explore

1. Now that you have completed this chapter, how would you answer the Essential Question?
2. What readings or conversations helped shape your answer to the Essential Question? Explain.
3. What strategies helped you better understand what you read in this chapter?
4. What is one skill or strategy that you want to continue to practice in the next chapter?
5. Choose two topics from the chapter that you would like to explore further. How will you find out more about these topics?



Essential Question

How can curiosity and observation help you make sense of the world around you?

Independent Reading and Viewing Suggestions

Choose additional reading and viewing to continue your exploration of new perspectives and the Essential Question.

Read (print and online books)	View (videos and films)
<i>The Martian Chronicles</i> by Ray Bradbury Read this series of linked stories about the first humans to colonize Mars, who encounter a planet already inhabited by Martians. The humans and Martians come into conflict, and the humans eventually destroy the Martian civilization.	<i>Particle Fever</i>, 2013 Go on a journey inside the high-stakes world of particle physics. Through the eyes of scientists at CERN’s Large Hadron Collider, the film explores the quest for the elusive Higgs boson particle.
<i>Quantum: A Guide for the Perplexed</i> by Jim Al-Khalili Quantum physics explores the strange behaviors of the smallest particles. Written for both scientists and non-scientists, this book explores the mind-bending world of the tiniest of particles.	<i>The Spiderwick Chronicles</i>, 2013 When three curious kids discover a magical world in their new home, the adventure begins. As they explore this new world, they also unravel a web of family secrets.
<i>The Neuroscience of You: How Every Brain Is Different and How to Understand Yours</i> by Chantel Prat Have you ever been curious about how your brain works? The author takes you on a journey into the world of neuroscience while guiding you through activities and exercises that reveal how <i>your</i> brain works.	<i>Kubo and the Two Strings</i>, 2016 In this stop-motion animation film, a young boy named Kubo embarks on a magical adventure to uncover the truth about his family’s history. With the help of a talking monkey and a samurai beetle, Kubo learns the power of storytelling and the importance of embracing one’s unique identity.
<i>The Physics of Superheroes</i> by James Kakalios <i>The Physics of Superheroes</i> explores the physics behind the powers of superheroes, such as flight, strength, energy, and technology. It is a fun and informative read that will teach you something about the world around you.	<i>Dolphin Reef</i>, 2020 This amazing documentary takes you beneath the waves to discover the incredible lives of dolphins. With breathtaking footage, this film offers a captivating glimpse into the underwater world of these remarkable creatures.