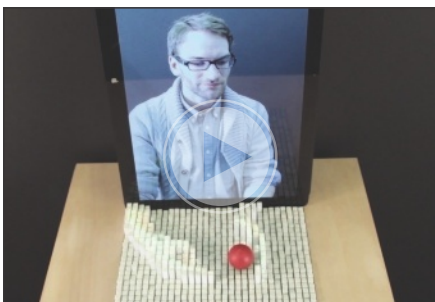


Invention


Building something out of nothing is hard work.



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Amazing Technology Invented By
MIT - Tangible Media

 **Discuss It** What are some ways in which this invention might have failed?
Write your response before sharing your ideas.



ESSENTIAL QUESTION:

Are inventions realized through inspiration or perspiration?

LAUNCH TEXT ARGUMENT MODEL
Inspiration Is Overrated!



WHOLE-CLASS LEARNING

ANCHOR TEXT: NOVEL EXCERPT

Uncle Marcos

from *The House of the Spirits*
Isabel Allende, translated by Magda Bogin

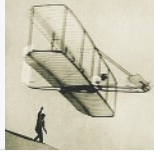


ANCHOR TEXT: ESSAY

To Fly

from *Space Chronicles*
Neil deGrasse Tyson

▶ MEDIA CONNECTION:
When I Look Up

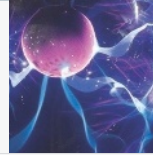


SMALL-GROUP LEARNING

BIOGRAPHY

Nikola Tesla: The Greatest Inventor of All?

Vicky Baez

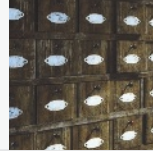


COMPARE

NOVEL EXCERPT

from The Invention of Everything Else

Samatha Hunt



SCIENCE ARTICLE

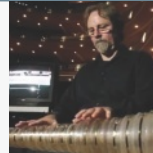
25 Years Later, Hubble Sees Beyond Troubled Start

Dennis Overbye



MEDIA: VIDEO

Sounds of a Glass Armonica



INDEPENDENT LEARNING

WEB ARTICLE

Ada Lovelace: A Science Legend

James Essinger



WEB ARTICLE

Fermented Cow Dung Air Freshener Wins Two Students Top Science Prize

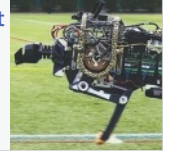
Kimberley Mok



NEWS ARTICLE

Scientists Build Robot That Runs, Call It "Cheetah"

Rodrique Ngowi



NOVEL EXCERPT

from The Time Machine

H. G. Wells



MYTH

Icarus and Daedalus

retold by Josephine Preston Peabody



PERFORMANCE TASK

WRITING FOCUS:
Write an Argument

PERFORMANCE TASK

SPEAKING AND LISTENING FOCUS:
Conduct a Debate

PERFORMANCE-BASED ASSESSMENT PREP

Review Evidence for an Argument

PERFORMANCE-BASED ASSESSMENT

Argument: Essay and Speech

PROMPT:

Which invention described in this unit has had the biggest impact on humanity?

Unit Goals

Throughout this unit, you will deepen your perspective about creativity and invention by reading, writing, speaking, listening, and presenting. These goals will help you succeed on the Unit Performance-Based Assessment.

Rate how well you meet these goals right now. You will revisit your ratings later when you reflect on your growth during this unit.

SCALE	1	2	3	4	5
	NOT AT ALL WELL	NOT VERY WELL	SOMEWHAT WELL	VERY WELL	EXTREMELY WELL
READING GOALS					
	1	2	3	4	5
• Read a variety of texts to gain the knowledge and insight needed to write about inspiration and invention.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Expand your knowledge and use of academic and concept vocabulary.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
WRITING AND RESEARCH GOALS					
	1	2	3	4	5
• Write an argumentative essay in which you effectively incorporate the key elements of an argument.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Conduct research projects of various lengths to explore a topic and clarify meaning.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
LANGUAGE GOAL					
	1	2	3	4	5
• Improve your writing by using gerund phrases and participial phrases to combine short, choppy sentences.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
SPEAKING AND LISTENING GOALS					
	1	2	3	4	5
• Collaborate with your team to build on the ideas of others, develop consensus, and communicate.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
• Integrate audio, visuals, and text in presentations.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

STANDARDS

Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Academic Vocabulary: Argument

Understanding and using academic terms can help you read, write, and speak with precision and clarity. Here are five academic words that will be useful in this unit as you analyze and write arguments.

Complete the chart.

1. Review each word, its root, and the mentor sentences.
2. Use the information and your own knowledge to predict the meaning of each word.
3. For each word, list at least two related words.
4. Refer to the dictionary or other resources if needed.

TIP

FOLLOW THROUGH

Study the words in this chart, and mark them or their forms wherever they appear in the unit.

WORD	MENTOR SENTENCES	PREDICT MEANING	RELATED WORDS
<p>opponent</p> <p>ROOT: -pon- "place"; "put"</p>	<p>1. He managed to win the game against a strong <i>opponent</i>.</p> <p>2. I respect her even though she is my <i>opponent</i>.</p>		<p><i>postpone; component</i></p>
<p>position</p> <p>ROOT: -pos- "place"; "put"</p>	<p>1. His <i>position</i> that everyone receive a different amount angered the other children.</p> <p>2. Our debate team took the <i>position</i> that cellphone use should be banned from classrooms.</p>		
<p>contradict</p> <p>ROOT: -dic- "speak"; "assert"</p>	<p>1. Even though Abby knew Kyle was wrong, she did not <i>contradict</i> him.</p> <p>2. The results of this study <i>contradict</i> the findings from earlier studies.</p>		
<p>legitimate</p> <p>ROOT: -leg- "law"</p>	<p>1. It's a <i>legitimate</i> argument, but they pretended not to hear it.</p> <p>2. The judge determined that the oldest son was the <i>legitimate</i> heir to the fortune.</p>		
<p>dissent</p> <p>ROOT: -sent- "feel"</p>	<p>1. The proposal caused <i>dissent</i> because the members were against it.</p> <p>2. The whole family wanted to go to the beach, so there was no <i>dissent</i> this time.</p>		

LAUNCH TEXT | ARGUMENT MODEL

This text is an example of an **argument**, a type of writing in which an author states and defends a position on a topic. This is the type of writing you will develop in the Performance-Based Assessment at the end of the unit.

As you read, look at the way the writer builds a case. Mark the text to answer this question: What is the writer's position, and how is it supported?

Inspiration Is Overrated!

NOTES

- 1 **H**ere's something that isn't on everyone's shopping list: a coffee mug that irons clothes. It's just one of a multitude of inventions that most of us have never heard of. Each of those forgotten contraptions was probably someone's bright idea—a flash of inspiration experienced while walking in the woods, an idea guaranteed to change the world. So what went wrong?
- 2 Some inventions are so much a part of everyday life we forget that they started off as someone's bright idea. Others are long forgotten or remembered only as being colossal duds.
- 3 For every invention that actually makes it to production, there are thousands that don't. The line between the bizarre and the ingenious is often very thin. History is filled with examples of new inventions that supporters thought would be transformational but turned out to be just minor fads.
- 4 Experts say that the odds are stacked astronomically against inventors, and that no amount of marketing can turn a situation around. The number of failed inventions reinforces how hard it is for inventors to make the leap from idea to marketable product.
- 5 Let's look at some figures. According to the U.S. Patent and Trademark Office, there are about 1.5 million products that have patents. Perhaps 3,000 of those make money. A noted business magazine states that only one in 5,000 inventions succeeds in the marketplace. This estimate is ten times lower than the one from the Trademark Office!

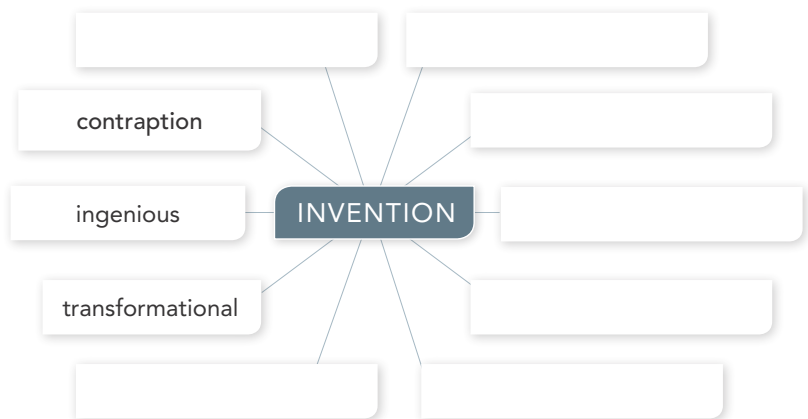


- 6 What explains the high rate of failure? Is there something the inventors failed to see? The answer is *yes*: They failed to see how much work is involved in getting a product off the ground. Someone once said that genius is one percent inspiration and ninety-nine percent perspiration. That is true for invention, too. Hard work is more important than a good idea.
- 7 Developing something new that actually works—and that people want—can take years. After an inventor has a brilliant idea, the hard part begins. A working model must be developed and tested. If the results are poor or inconsistent, the project may have to be rethought—or even scrapped. A good idea is necessary, but what comes after is more important.
- 8 When a working model is finally developed, the inventor must conduct what is called a “search for prior art.” That means checking to make sure that there isn’t a similar or even identical invention around. Sometimes it seems as if all the good ideas have been taken! That means more work.
- 9 When everything is ready to go, the inventor has to apply for a patent—a legal right to ownership of the invention. It’s like a contract, and every single word has legal consequences. Many inventors hire patent lawyers to make sure their interests are protected. That means more work.
- 10 It’s a common mistake to think that you can sell an idea. You can’t. You can only sell an invention. Turning an idea into a viable invention takes work—time-consuming, tedious, and sometimes frustrating work!
- 11 If invention is one percent inspiration and ninety-nine percent perspiration, I’m putting my money on the ninety-nine percent. 🐼

NOTES

 WORD NETWORK FOR INVENTION

Vocabulary A Word Network is a collection of words related to a topic. As you read the selections in this unit, identify interesting words related to the idea of invention and add them to your Word Network. For example, you might begin by adding words from the Launch Text, such as *contraption*, *ingenious*, and *transformational*. Continue to add words as you complete this unit.



 **Tool Kit**
Word Network Model



ESSENTIAL QUESTION:

Are inventions realized through inspiration or perspiration?

How do people invent? Does an idea simply come in a flash, or is there a long struggle to find a solution to a particular problem? You will work with your whole class to explore the concept of invention. The selections you are going to read present insights into some aspects of the topic.

Whole-Class Learning Strategies

Throughout your life, in school, in your community, and in your career, you will continue to learn and work in large-group environments.

Review these strategies and the actions you can take to practice them as you work with your whole class. Add ideas of your own for each step. Get ready to use these strategies during Whole-Class Learning.

STRATEGY	ACTION PLAN
Listen actively	<ul style="list-style-type: none"> • Eliminate distractions. For example, put your cellphone away. • Keep your eyes on the speaker. •
Clarify by asking questions	<ul style="list-style-type: none"> • If you're confused, other people probably are, too. Ask a question to help your whole class. • If you see that you are guessing, ask a question instead. •
Monitor understanding	<ul style="list-style-type: none"> • Notice what information you already know and be ready to build on it. • Ask for help if you are struggling. •
Interact and share ideas	<ul style="list-style-type: none"> • Share your ideas and answer questions, even if you are unsure. • Build on the ideas of others by adding details or making a connection. •

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CONTENTS

ANCHOR TEXT: NOVEL EXCERPT

Uncle Marcos

from *The House of the Spirits*

Isabel Allende,
translated by Magda Bogin

Clara's favorite uncle is an unusual explorer and inventor.



ANCHOR TEXT: ESSAY

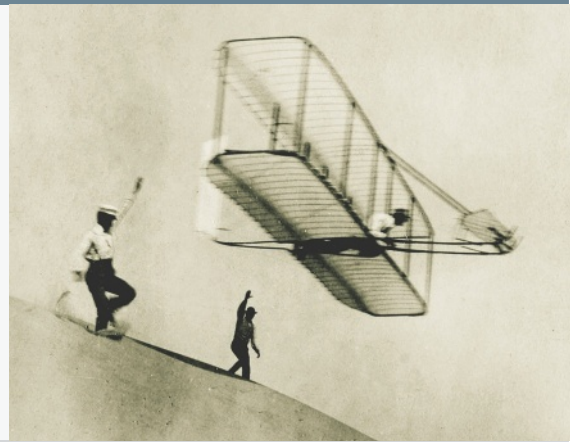
To Fly

from *Space Chronicles*

Neil deGrasse Tyson

A famous astrophysicist ponders the appeal and challenge of human flight.

► MEDIA CONNECTION: When I Look Up



PERFORMANCE TASK

WRITING FOCUS

Write an Argument

The Whole-Class readings focus on human flight—as realized by both real and fictitious inventors. After reading, you will write an essay in which you express your position about which text best captures the power of human inventiveness.



About the Author



Isabel Allende (b. 1942) is a Chilean American novelist, essayist, and lecturer who has been called the world's most widely read Spanish-language author. Allende's novels combine elements of myth and realism ("magical realism") and are often based on her personal experiences. In 1992, after the tragic death of her daughter, she established a foundation dedicated to the protection and empowerment of women and children worldwide. Allende became a U.S. citizen in 1993 and, in 2014, was awarded the Presidential Medal of Freedom by President Barack Obama.

Tool Kit

First-Read Guide and Model Annotation

STANDARDS

Reading Literature

By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6–8 text complexity band independently and proficiently.

Uncle Marcos

Concept Vocabulary

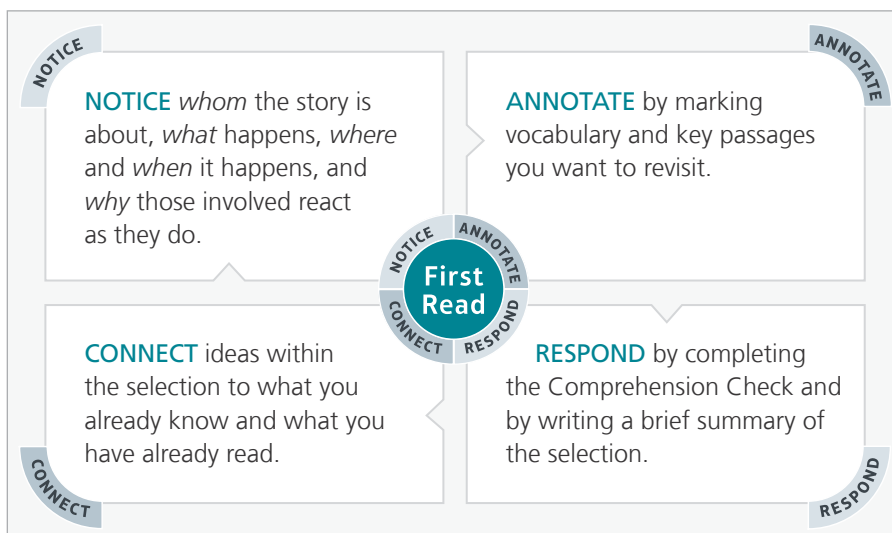
As you conduct your first read of "Uncle Marcos," you will encounter these words. Before reading, note how familiar you are with each word. Then, rank the words in order from most familiar (1) to least familiar (6).

WORD	YOUR RANKING
decipher	
invincible	
contraption	
newfangled	
ingenuity	
improvisations	

After completing the first read, come back to the concept vocabulary and review your rankings. Mark changes to your original rankings as needed.

First Read FICTION

Apply these strategies as you conduct your first read. You will have an opportunity to complete the close-read notes after your first read.



Uncle Marcos

from *The House of the Spirits*

Isabel Allende

translated by
Magda Bogin

BACKGROUND

“Uncle Marcos” is from Isabel Allende’s first novel, which began as a letter to her 100-year-old grandfather. This excerpt draws on the Greek myth of Icarus and Daedalus. In the myth, Daedalus invents a pair of wings and teaches his son how to use them, but warns him not to fly too close to the sun because the wax in the wings would melt. Icarus is too excited to listen, and he drowns in the ocean after his wings melt.

SCAN FOR
MULTIMEDIA 

1 **I**t had been two years since Clara had last seen her Uncle Marcos, but she remembered him very well. His was the only perfectly clear image she retained from her whole childhood, and in order to describe him she did not need to consult the daguerreotype¹ in the drawing room that showed him dressed as an explorer leaning on an old-fashioned double-barreled rifle with his right foot on the neck of a Malaysian tiger, the same triumphant position in which she had seen the Virgin standing between plaster clouds and pallid angels at the main altar, one foot on the vanquished devil. All Clara had to do to see her uncle was close her eyes and there he was, weather-beaten and thin, with a pirate’s mustache through which his strange, sharklike smile peered out at her. It seemed impossible that he could be inside that long black box that was lying in the middle of the courtyard.

2 Each time Uncle Marcos had visited his sister Nívea’s home, he had stayed for several months, to the immense joy of his nieces and nephews, particularly Clara, causing a storm in which the

NOTES

CLOSE READ

ANNOTATE: In paragraph 1, mark details that show how Clara pictures her uncle, particularly his mustache and smile.

QUESTION: Why does the author use these descriptive details?

CONCLUDE: What is the effect of these details?

1. **daguerreotype** (duh GEHR oh typ) *n.* early type of photograph.

sharp lines of domestic order blurred. The house became a clutter of trunks, of animals in jars of formaldehyde,² of Indian lances and sailor's bundles. In every part of the house people kept tripping over his equipment, and all sorts of unfamiliar animals appeared that had traveled from remote lands only to meet their death beneath Nana's irate broom in the farthest corners of the house. Uncle Marcos's manners were those of a cannibal, as Severo put it. He spent the whole night making incomprehensible movements in the drawing room; later they turned out to be exercises designed to perfect the mind's control over the body and to improve digestion. He performed alchemy³ experiments in the kitchen, filling the house with fetid smoke and ruining pots and pans with solid substances that stuck to their bottoms and were impossible to remove. While the rest of the household tried to sleep, he dragged his suitcases up and down the halls, practiced making strange, high-pitched sounds on savage instruments, and taught Spanish to a parrot whose native language was an Amazonic dialect. During the day, he slept in a hammock that he had strung between two columns in the hall, wearing only a loincloth that put Severo in a terrible mood but that Nívea forgave because Marcos had convinced her that it was the same costume in which Jesus of Nazareth had preached. Clara remembered perfectly, even though she had been only a tiny child, the first time her Uncle Marcos came to the house after one of his voyages. He settled in as if he planned to stay forever. After a short time, bored with having to appear at ladies' gatherings where the mistress of the house played the piano, with playing cards, and with dodging all his relatives' pressures to pull himself together and take a job as a clerk in Severo del Valle's law practice, he bought a barrel organ and took to the streets with the hope of seducing his Cousin Antonieta and entertaining the public in the bargain. The machine was just a rusty box with wheels, but he painted it with seafaring designs and gave it a fake ship's smokestack. It ended up looking like a coal stove. The organ played either a military march or a waltz, and in between turns of the handle the parrot, who had managed to learn Spanish although he had not lost his foreign accent, would draw a crowd with his piercing shrieks. He also plucked slips of paper from a box with his beak, by way of selling fortunes to the curious. The little pink, green, and blue papers were so clever that they always divulged the exact secret wishes of the customers. Besides fortunes there were little balls of sawdust to amuse the children. The idea of the organ was a last desperate attempt to win the hand of Cousin Antonieta after more conventional means of courting her had failed. Marcos thought

2. **formaldehyde** (fawr MAL duh hyd) *n.* solution used as a preservative.

3. **alchemy** (AL kuh mee) *n.* early form of chemistry, with philosophical and magical associations.

no woman in her right mind could remain impassive before a barrel-organ serenade. He stood beneath her window one evening and played his military march and his waltz just as she was taking tea with a group of female friends. Antonieta did not realize the music was meant for her until the parrot called her by her full name, at which point she appeared in the window. Her reaction was not what her suitor had hoped for. Her friends offered to spread the news to every salon⁴ in the city, and the next day people thronged the downtown streets hoping to see Severo del Valle's brother-in-law playing the organ and selling little sawdust balls with a moth-eaten parrot, for the sheer pleasure of proving that even in the best of families there could be good reason for embarrassment. In the face of this stain to the family reputation, Marcos was forced to give up organ-grinding and resort to less conspicuous ways of winning over his Cousin Antonieta, but he did not renounce his goal. In any case, he did not succeed, because from one day to the next the young lady married a diplomat who was twenty years her senior; he took her to live in a tropical country whose name no one could recall, except that it suggested negritude,⁵ bananas, and palm trees, where she managed to recover from the memory of that suitor who had ruined her seventeenth year with his military march and his waltz. Marcos sank into a deep depression that lasted two or three days, at the end of which he announced that he would never marry and that he was embarking on a trip around the world. He sold his organ to a blind man and left the parrot to Clara, but Nana secretly poisoned it with an overdose of cod-liver oil, because no one could stand its lusty glance, its fleas, and its harsh, tuneless hawking of paper fortunes and sawdust balls.

3 That was Marcos's longest trip. He returned with a shipment of enormous boxes that were piled in the far courtyard, between the chicken coop and the woodshed, until the winter was over. At the first signs of spring he had them transferred to the parade grounds, a huge park where people would gather to watch the soldiers file by on Independence Day, with the goosestep they had learned from the Prussians. When the crates were opened, they were found to contain loose bits of wood, metal, and painted cloth. Marcos spent two weeks assembling the contents according to an instruction manual written in English, which he was able to **decipher** thanks to his **invincible** imagination and a small dictionary. When the job was finished, it turned out to be a bird of prehistoric dimensions, with the face of a furious eagle, wings that moved, and a propeller on its back. It caused an uproar. The families of the oligarchy⁶ forgot all about the barrel organ, and Marcos became the star attraction of the season.

4. **salon** (suh LON) *n.* regular gathering of distinguished guests that meets in a private home.

5. **negritude** (NEHG ruh tood) *n.* black people and their cultural heritage.

6. **oligarchy** (OL ih gahr kee) *n.* government ruled by only a few people.

NOTES

CLOSE READ

ANNOTATE: Mark the sentence in the latter part of paragraph 2 that suggests how Antonieta reacts to Marcos's barrel-organ music.

QUESTION: Why does the author provide so little description of her reaction?

CONCLUDE: What is the effect of this choice to suggest but not describe Antonieta's reaction?

decipher (dih SY fuhr) *v.* succeed in interpreting or understanding something

invincible (ihn VIHN suh buhI) *adj.* impossible to defeat

NOTES

contraption (kuhn TRAP shuhn) *n.* machine that seems strange or unnecessarily complicated

newfangled (NOO fang uhld) *adj.* invented only recently and, therefore, strange-seeming

People took Sunday outings to see the bird; souvenir vendors and strolling photographers made a fortune. Nonetheless, the public's interest quickly waned. But then Marcos announced that as soon as the weather cleared he planned to take off in his bird and cross the mountain range. The news spread, making this the most talked-about event of the year. The **contraption** lay with its stomach on terra firma,⁷ heavy and sluggish and looking more like a wounded duck than like one of those **newfangled** airplanes they were starting to produce in the United States. There was nothing in its appearance to suggest that it could move, much less take flight across the snowy peaks. Journalists and the curious flocked to see it. Marcos smiled his immutable⁸ smile before the avalanche of questions and posed for photographers without offering the least technical or scientific explanation of how he hoped to carry out his plan. People came from the provinces to see the sight. Forty years later his great-nephew Nicolás, whom Marcos did not live to see, unearthed the desire to fly that had always existed in the men of his lineage. Nicolás was interested in doing it for commercial reasons, in a gigantic hot-air sausage on which would be printed an advertisement for carbonated drinks. But when Marcos announced his plane trip, no one believed that his contraption could be put to any practical use. The appointed day dawned full of clouds, but so many people had turned out that Marcos did not want to disappoint them. He showed up punctually at the appointed spot and did not once look up at the sky, which was growing darker and darker with thick gray clouds. The astonished crowd filled all the nearby streets, perching on rooftops and the balconies of the nearest houses and squeezing into the park. No political gathering managed to attract so many people until half a century later, when the first Marxist candidate attempted, through strictly democratic channels, to become President. Clara would remember this holiday as long as she lived. People dressed in their spring best, thereby getting a step ahead of the official opening of the season, the men in white linen suits and the ladies in Italian straw hats that were all the rage that year. Groups of elementary-school children paraded with their teachers, clutching flowers for the hero. Marcos accepted their bouquets and joked that they might as well hold on to them and wait for him to crash, so they could take them directly to his funeral. The bishop himself, accompanied by two incense bearers, appeared to bless the bird without having been asked, and the police band played happy, unpretentious music that pleased everyone. The police, on horseback and carrying lances, had trouble keeping the crowds far enough away from the center of

7. **terra firma** (TEHR uh FUR muh) *n.* firm earth; solid ground (from Latin).

8. **immutable** (ih MYOOT uh buhl) *adj.* never changing.

the park, where Marcos waited dressed in mechanic's overalls, with huge racer's goggles and an explorer's helmet. He was also equipped with a compass, a telescope, and several strange maps that he had traced himself based on various theories of Leonardo da Vinci and on the polar knowledge of the Incas.⁹ Against all logic, on the second try the bird lifted off without mishap and with a certain elegance, accompanied by the creaking of its skeleton and the roar of its motor. It rose flapping its wings and disappeared into the clouds, to a send-off of applause, whistlings, handkerchiefs, drumrolls, and the sprinkling of holy water. All that remained on earth were the comments of the amazed crowd below and a multitude of experts, who attempted to provide a reasonable explanation of the miracle. Clara continued to stare at the sky long after her uncle had become invisible. She thought she saw him ten minutes later, but it was only a migrating sparrow. After three days the initial euphoria that had accompanied the first airplane flight in the country died down and no one gave the episode another thought, except for Clara, who continued to peer at the horizon.

- 4 After a week with no word from the flying uncle, people began to speculate that he had gone so high that he had disappeared into outer space, and the ignorant suggested he would reach the moon. With a mixture of sadness and relief, Severo decided that his brother-in-law and his machine must have fallen into some hidden crevice of the *cordillera*,¹⁰ where they would never be found. Nívea wept disconsolately and lit candles to San Antonio, patron of lost objects. Severo opposed the idea of having masses said, because he did not believe in them as a way of getting into heaven, much less of returning to earth, and he maintained that masses and religious vows, like the selling of indulgences, images, and scapulars,¹¹ were a dishonest business. Because of his attitude, Nívea and Nana had the children say the rosary¹² behind their father's back for nine days. Meanwhile, groups of volunteer explorers and mountain climbers tirelessly searched peaks and passes, combing every accessible stretch of land until they finally returned in triumph to hand the family the mortal remains of the deceased in a sealed black coffin. The intrepid traveler was laid to rest in a grandiose funeral. His death made him a hero and his name was on the front page of all the papers for several days. The same multitude that had gathered to see him off the day he flew away in his

9. **Leonardo da Vinci . . . Incas** Leonardo da Vinci (1452–1519) was an Italian painter, sculptor, architect, and scientist. The Incas were Native Americans who dominated ancient Peru until Spanish conquest.

10. **cordillera** (kawr dihI YAIR uh) *n.* system or chain of mountains.

11. **indulgences, images, and scapulars** Indulgences are pardons for sins. Images are pictures or sculptures of religious figures. Scapulars are garments worn by Roman Catholics as tokens of religious devotion.

12. **say the rosary** use a set of beads to say prayers.

NOTES

CLOSE READ

ANNOTATE: Toward the end of paragraph 3, mark details that describe how Marcos is dressed as he waits to begin his flight.

QUESTION: Why does the author mention these details?

CONCLUDE: What do these details show about Marcos's knowledge and experience?

ingenuity (ihn juh NOO uh tee) *n.* quality of being original and clever

CLOSE READ

ANNOTATE: In paragraph 5, mark details that present the crystal ball as mysterious and magical. Mark other details that present it as ordinary.

QUESTION: Why does the author include these contrasting elements?

CONCLUDE: What is the effect of these details?

bird paraded past his coffin. The entire family wept as befit the occasion, except for Clara, who continued to watch the sky with the patience of an astronomer. One week after he had been buried, Uncle Marcos, a bright smile playing behind his pirate's mustache, appeared in person in the doorway of Nívea and Severo del Valle's house. Thanks to the surreptitious¹³ prayers of the women and children, as he himself admitted, he was alive and well and in full possession of his faculties, including his sense of humor. Despite the noble lineage of his aerial maps, the flight had been a failure. He had lost his airplane and had to return on foot, but he had not broken any bones and his adventurous spirit was intact. This confirmed the family's eternal devotion to San Antonio, but was not taken as a warning by future generations, who also tried to fly, although by different means. Legally, however, Marcos was a corpse. Severo del Valle was obliged to use all his legal **ingenuity** to bring his brother-in-law back to life and the full rights of citizenship. When the coffin was pried open in the presence of the appropriate authorities, it was found to contain a bag of sand. This discovery ruined the reputation, up till then untarnished, of the volunteer explorers and mountain climbers, who from that day on were considered little better than a pack of bandits.

- 5 Marcos's heroic resurrection made everyone forget about his barrel-organ phase. Once again he was a sought-after guest in all the city's salons and, at least for a while, his name was cleared. Marcos stayed in his sister's house for several months. One night he left without saying goodbye, leaving behind his trunks, his books, his weapons, his boots, and all his belongings. Severo, and even Nívea herself, breathed a sigh of relief. His visit had gone on too long. But Clara was so upset that she spent a week walking in her sleep and sucking her thumb. The little girl, who was only seven at the time, had learned to read from her uncle's storybooks and been closer to him than any other member of the family because of her prophesying powers. Marcos maintained that his niece's gift could be a source of income and a good opportunity for him to cultivate his own clairvoyance. He believed that all human beings possessed this ability, particularly his own family, and that if it did not function well it was simply due to a lack of training. He bought a crystal ball in the Persian bazaar, insisting that it had magic powers and was from the East (although it was later found to be part of a buoy from a fishing boat), set it down on a background of black velvet, and announced that he could tell people's fortunes, cure the evil eye, and improve the quality of dreams, all for the modest sum of five centavos. His first customers were the maids from around the neighborhood. One of them had been accused of stealing, because her employer had misplaced a valuable ring. The crystal ball revealed the

13. **surreptitious** (sur uhp TIHSH uhs) *adj.* secretive.



NOTES

exact location of the object in question: it had rolled beneath a wardrobe. The next day there was a line outside the front door of the house. There were coachmen, storekeepers, and milkmen; later a few municipal employees and distinguished ladies made a discreet appearance, slinking along the side walls of the house to keep from being recognized. The customers were received by Nana, who ushered them into the waiting room and collected their fees. This task kept her busy throughout the day and demanded so much of her time that the family began to complain that all there ever was for dinner was old string beans and jellied quince. Marcos decorated the carriage house with some frayed curtains that had once belonged in the drawing room but that neglect and age had turned to dusty rags. There he and Clara received the customers. The two divines wore tunics “the color of the men of light,” as Marcos called the color yellow. Nana had dyed them with saffron powder, boiling them in pots usually reserved for rice and pasta. In addition to his tunic, Marcos wore a turban around his head and an Egyptian amulet around his neck. He had grown a beard and let his hair grow long and he was thinner than ever before. Marcos and Clara were utterly convincing, especially because the child had no need to look into the crystal ball to guess what her clients wanted to hear. She would whisper in her Uncle Marcos’s ear, and he in turn would transmit the message to the client, along with any **improvisations** of his own that he thought pertinent. Thus their fame spread, because all those who arrived sad and bedraggled at the consulting room left filled with hope. Unrequited lovers were told how to win over indifferent hearts, and the poor left with foolproof tips on how to place their money at the dog track. Business grew so prosperous that the waiting room was always packed with people, and Nana began to suffer dizzy spells from being on her feet so many hours a day. This time Severo had no need to intervene to put a stop to his brother-in-law’s venture, for both Marcos and Clara, realizing

improvisations (ihm pruh vy ZAY shuhnz) *n.* things that are created without any preparation

CLOSE READ

ANNOTATE: In the description of Marcos's stories in paragraph 6, mark details that relate to the senses of touch, sight, and hearing.

QUESTION: Why does the author include these sensory details?

CONCLUDE: What is the effect of these details?

that their unerring guesses could alter the fate of their clients, who always followed their advice to the letter, became frightened and decided that this was a job for swindlers. They abandoned their carriage-house oracle and split the profits, even though the only one who had cared about the material side of things had been Nana.

- 6 Of all the del Valle children, Clara was the one with the greatest interest in and stamina for her uncle's stories. She could repeat each and every one of them. She knew by heart words from several dialects of the Indians, was acquainted with their customs, and could describe the exact way in which they pierced their lips and earlobes with wooden shafts, their initiation rites, the names of the most poisonous snakes, and the appropriate antidotes for each. Her uncle was so eloquent that the child could feel in her own skin the burning sting of snakebites, see reptiles slide across the carpet between the legs of the jacaranda room divider, and hear the shrieks of macaws behind the drawing-room drapes. She did not hesitate as she recalled Lope de Aguirre's search for El Dorado¹⁴, or the unpronounceable names of the flora and fauna her extraordinary uncle had seen; she knew about the lamas who take salt tea with yak lard and she could give detailed descriptions of the opulent women of Tahiti, the rice fields of China, or the white prairies of the North, where the eternal ice kills animals and men who lose their way, turning them to stone in seconds. Marcos had various travel journals in which he recorded his excursions and impressions, as well as a collection of maps and books of stories and fairy tales that he kept in the trunks he stored in the junk room at the far end of the third courtyard. From there they were hauled out to inhabit the dreams of his descendants, until they were mistakenly burned half a century later on an infamous pyre.
- 7 Now Marcos had returned from his last journey in a coffin. He had died of a mysterious African plague that had turned him as yellow and wrinkled as a piece of parchment. When he realized he was ill, he set out for home with the hope that his sister's ministrations and Dr. Cuevas's knowledge would restore his health and youth, but he was unable to withstand the sixty days on ship and died at the latitude of Guayaquil, ravaged by fever and hallucinating about musky women and hidden treasure. The captain of the ship, an Englishman by the name of Longfellow, was about to throw him overboard wrapped in a flag, but Marcos, despite his savage appearance and his delirium, had made so many friends on board and seduced so many women that the


14. **Lope de Aguirre's...El Dorado** Lope de Aguirre (LOH pay day ah GEER ray) was a Spanish adventurer (1510–1561) who journeyed through South America in search of the legendary city of El Dorado, which was supposedly rich in gold.

passengers prevented him from doing so, and Longfellow was obliged to store the body side by side with the vegetables of the Chinese cook, to preserve it from the heat and mosquitoes of the tropics until the ship's carpenter had time to improvise a coffin. At El Callao they obtained a more appropriate container, and several days later the captain, furious at all the troubles this passenger had caused the shipping company and himself personally, unloaded him without a backward glance, surprised that not a soul was there to receive the body or cover the expenses he had incurred. Later he learned that the post office in these latitudes was not as reliable as that of far-off England, and that all his telegrams had vaporized en route. Fortunately for Longfellow, a customs lawyer who was a friend of the del Valle family appeared and offered to take charge, placing Marcos and all his paraphernalia in a freight car, which he shipped to the capital to the only known address of the deceased: his sister's house....

NOTES

Comprehension Check

Complete the following items after you finish your first read.

1. How does Uncle Marcos try to win the hand of Cousin Antonieta?
2. What does Uncle Marcos make from the materials he brings back in "enormous boxes"?
3. What special power does Clara have that Marcos pretends to possess?
4.  **Notebook** To confirm your understanding, write a summary of "Uncle Marcos."

RESEARCH

Research to Clarify Choose at least one unfamiliar detail from the text. Briefly research that detail. In what way does the information you learned shed light on an aspect of the story?



UNCLE MARCOS

Close Read the Text

1. This model, from paragraph 3 of the text, shows two sample annotations, along with questions and conclusions. Close read the passage, and find another detail to annotate. Then, write a question and your conclusion.

ANNOTATE: These phrases have similar structures but present contrasting ideas.

QUESTION: Why does the author use these similar phrases?

CONCLUDE: The structure emphasizes the contrast and hints at the surprise of the successful lift-off.

ANNOTATE: This series of nouns indicates the reactions of the crowd.

QUESTION: Why does the author present the crowd's reaction in this way?

CONCLUDE: The series of nouns shows how different types of people respond. The nouns suggest their social roles.

Against all logic, on the second try the bird lifted off without mishap and with a certain elegance, accompanied by the creaking of its skeleton and the roar of its motor. It rose flapping its wings and disappeared into the clouds, to a send-off of applause, whistlings, handkerchiefs, drumrolls, and the sprinkling of holy water.

Tool Kit

Close-Read Guide and Model Annotation

2. For more practice, go back into the text and complete the close-read notes.
3. Revisit a section of the text you found important during your first read. Read this section closely and **annotate** what you notice. Ask yourself **questions** such as "Why did the author make this choice?" What can you **conclude**?

Analyze the Text

CITE TEXTUAL EVIDENCE to support your answers.

Notebook Respond to these questions.

1. **Analyze** Why might Uncle Marcos be "the only perfectly clear image" Clara remembers from her childhood? Explain.
2. **Interpret** What motivates Uncle Marcos to undertake the flying machine project? Explain your thinking.
3. **Compare and Contrast** In what ways is the barrel organ incident similar to and different from the incident with the mechanical bird?
4. **Essential Question: Are inventions realized through inspiration or perspiration?** What has this story taught you about the concept of invention?

STANDARDS

Reading Literature

- Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- Analyze how particular lines of dialogue or incidents in a story or drama propel the action, reveal aspects of a character, or provoke a decision.

Analyze Craft and Structure

Propelling the Action: Character A **character** is a personality that is part of a story. A character may be a person, an animal, or even an object. In all narratives, the **plot**, or sequence of related events, is moved by a conflict that characters face. The story involves the ways in which characters experience and solve the conflict.

- The **main character** is the most important character in the narrative, the one whose conflict drives the plot.
- **Character traits** are the qualities, attitudes, and values that a character has. For example, a character might be reliable, smart, selfish, or stubborn.
- A **round character** has many different traits, both good and bad. In contrast, a **flat character** is one-dimensional, displaying only a single trait.
- A **dynamic character** changes and learns. A **static character** does not change or learn.

Writers use a variety of techniques to portray characters. They describe what characters look like and how they behave. They reveal what characters want, feel, think, and say. **Dialogue**, or words characters say, is a tool most fiction writers use to help portray characters. Dialogue reflects the words as a character speaks them, and is set off with quotation marks. In this excerpt, Isabel Allende does not use dialogue in a traditional way. She refers to things characters say, but does not quote them directly.

Practice

 **Notebook** Respond to these questions.

1. **(a)** What happens to Nivea's household when Uncle Marcos visits? Cite details that support your response. **(b)** What does his effect on the household tell you about Uncle Marcos's character?
2. **(a)** What does Clara do repeatedly after her uncle disappears on the flying machine? **(b)** How does her reaction differ from those of other family members? **(c)** What does Clara's reaction show about her character and relationship to Uncle Marcos? Explain.
3. Allende does not quote characters directly. However, she sometimes tells the reader what they say. Cite an example of a statement Uncle Marcos makes. Explain what this statement shows about his character.
4. Reread sections of the text that describe Clara and Uncle Marcos. **(a)** Determine whether each character is round or flat. **(b)** Determine whether each character is static or dynamic. For both (a) and (b), explain your responses and cite textual details that support them.

CITE TEXTUAL EVIDENCE
to support your answers.



UNCLE MARCOS


Concept Vocabulary

decipher**contraption****ingenuity****invincible****newfangled****improvisations**

Why These Words? The concept vocabulary words are all related to cleverness and innovation. For example, Uncle Marcos manages to *decipher* an instruction manual written in English in order to build his flying machine. Severo must use his *ingenuity*, or original, clever thinking to restore Uncle Marcos's citizenship rights.

1. How does the concept vocabulary help the reader understand Uncle Marcos as an inventor?
2. What other words in the selection describe Uncle Marcos's inventions or inventiveness?

Practice

 **Notebook** The concept vocabulary words appear in "Uncle Marcos." Complete each sentence with the correct word.

1. A person who prefers old-fashioned objects might not want something _____.
2. A spy might have to _____ a code to find the hidden message.
3. If things do not go according to plan, you might have to think quickly and make _____.
4. You might admire a creative person's _____ in solving problems.
5. People might call a strange or unusual machine a _____.
6. A superhero who is _____ has nothing to fear from a villain's attacks.

Word Study

Latin Suffix: -ity The Latin suffix *-ity* means "state or quality of being." The author of this story refers to Severo's legal *ingenuity*, or his quality of being *ingenious* (original, clever, and resourceful). Use what you know about the Latin suffix *-ity* to answer these questions.

1. How does the Latin suffix *-ity* help you understand the meaning of the word *ability* as it is used in paragraph 5?
2. Explain what the word *responsibility* means. Then, give an example of a situation in which a person demonstrates responsibility.

WORD NETWORK

Add words related to invention from the text to your Word Network.

STANDARDS

Language

- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.
 - b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word.

Conventions

Subject Complements One essential tool for Allende and other writers is the subject complement, which allows a writer to define or describe the subject of a sentence.


A **linking verb** connects its subject to a subject complement. A **subject complement** is a noun, a pronoun, or an adjective that follows a linking verb and tells something about the subject.

The most common linking verbs are forms of *be*, such as *am*, *is*, *are*, *was*, and *were*. Other verbs that function as linking verbs when they are followed by subject complements include *seem*, *look*, *feel*, *become*, *grow*, and *appear*. There are three types of subject complements:

- A **predicate noun** or **predicate pronoun** (also called **predicate nominatives**) follows a linking verb and identifies or renames the subject of a sentence.
- A **predicate adjective** follows a linking verb and describes the subject of a sentence.

PREDICATE NOUN	PREDICATE PRONOUN	PREDICATE ADJECTIVE
Ronnie <i>became</i> the <u>captain</u> of the team.	The winners <i>are</i> <u>they</u> .	The flight to Houston <i>seemed</i> <u>swift</u> .
The noun <i>captain</i> renames the subject, <i>Ronnie</i> .	<i>They</i> identifies the subject, <i>winners</i> .	<i>Swift</i> describes the subject, <i>flight</i> .

Read It

-  **Notebook** Identify the predicate noun, pronoun, or adjective in each sentence. Then, briefly describe its function in the sentence.
 - The man who returned was really he, alive and well.
 - Clara is a genuine fortune-teller.
 - When Uncle Marcos leaves, Clara grows upset.
- Reread paragraph 2 of “Uncle Marcos.” Find and label at least one predicate noun and one predicate adjective.

Write It

- Fill in each of the following sentences with a predicate noun or a phrase that includes a predicate noun.
 - Uncle Marcos is a(n) _____.
 - Clara is the _____.
- Fill in each of the following sentences with a predicate adjective.
 - When he works on his inventions, Uncle Marcos seems _____.
 - The character of Clara appears _____.



UNCLE MARCOS

Writing to Sources

A critical review is a type of argument in which a writer states and supports an interpretation or evaluation of a literary work.

Assignment

Write a **critical review** in which you state, explain, and support your understanding of the character of Uncle Marcos. In your view, is Uncle Marcos a dreamer, a crackpot, an innovator, a phony, just an unusual person, or something else? Your critical review should include the following elements:

- a main claim in which you state your position about Uncle Marcos
- an explanation of specific ways in which author Isabel Allende shows what Uncle Marcos is like
- evidence, including quotations from the narrative, that supports your main claim
- reasons that clarify your claim or show why it is valid

As you write your review, be clear about the ways in which your ideas fit together. Use words and phrases that show how one idea leads to the next, and how your evidence connects to the ideas. For example, words and phrases such as *because*, *as a result*, and *consequently* show cause-and-effect relationships. Words and phrases such as *like*, *similarly*, or *on the other hand* show comparison and contrast.

Vocabulary and Conventions Connection Consider including several of the concept vocabulary words. Also, remember to use subject complements correctly to strengthen your writing.

decipher

contraption

ingenuity

invincible

newfangled

improvisations

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
- Use words, phrases, and clauses to create cohesion and clarify the relationships between claim(s), counterclaims, reasons, and evidence.

Reflect on Your Writing

After you have written your critical review, answer these questions.

- How does stating a claim and finding support for it help you write a critical review?
- What was the most difficult part of writing your critical review?
- Why These Words?** The words you choose make a difference in your writing. Which words did you specifically choose to clearly convey the connections between your ideas and evidence from the text?

Speaking and Listening

Assignment

Prepare for a **class discussion** about how the episode involving Uncle Marcos and his mechanical bird draws on themes from the Greek myth of Icarus.

- 1. Prepare to Participate in Class Discussion** Find a version of the myth of Icarus online or in the Independent Learning section of this unit. Read the myth and jot down some notes about the key events. Then, skim paragraphs 3 and 4 of “Uncle Marcos” to review the episode involving the mechanical bird. Think about connections you see between the two stories.
- 2. Cite Specific Text Evidence** As you begin the discussion, refer to your notes so that you can support your ideas with evidence from the texts. Make sure you can answer the following questions during the discussion.
 - How is Uncle Marcos similar to and different from Icarus?
 - What passages from “Uncle Marcos” support your ideas?
 - Why might the author have chosen to draw on the myth of Icarus in her portrayal of Uncle Marcos?
- 3. Evaluate Discussion Participation** As you and your classmates contribute to the discussion, listen to one another attentively. Use an evaluation guide like the one shown to analyze the quality of the discussion.

DISCUSSION PARTICIPATION GUIDE

Rate each statement on a scale of 1 (not demonstrated) to 5 (demonstrated).

- The participants were prepared for the discussion.
- The participants cited specific passages and examples from the texts to support ideas.
- The participants built on one another’s ideas and expressed their own clearly.
- The participants posed questions that connected ideas.
- The participants responded to questions and comments with relevant evidence, observations, and ideas.

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you learned from “Uncle Marcos.”

STANDARDS

Reading Literature

Analyze how a modern work of fiction draws on themes, patterns of events, or character types from myths, traditional stories, or religious works such as the Bible, including describing how the material is rendered new.

Speaking and Listening

Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others’ ideas and expressing their own clearly.

a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

c. Pose questions that connect the ideas of several speakers and respond to others’ questions and comments with relevant evidence, observations, and ideas.



About the Author



Neil deGrasse Tyson

(b. 1958) is an American astrophysicist, author, and science communicator, as well as the current director of the Hayden Planetarium's Rose Center for Earth and Space. From 2006 to 2011, he hosted the educational science show NOVA ScienceNow on PBS. Tyson grew up in the Bronx and attended the Bronx High School of Science from 1972 to 1976, where he was the editor-in-chief of "Physical Science," the school paper, and also the captain of the wrestling team.

Tool Kit

First-Read Guide and Model Annotation

STANDARDS

Reading Informational Text
By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.

To Fly

Concept Vocabulary

As you conduct your first read of "To Fly," you will encounter these words. Before reading, note how familiar you are with each word. Then, rank the words in order from most familiar (1) to least familiar (6).

Table with 2 columns: WORD and YOUR RANKING. Rows include: myopic, foresight, naiveté, prescient, enable, seminal.

After completing the first read, come back to the concept vocabulary and review your rankings. Mark changes to your original rankings as needed.

First Read NONFICTION

Apply these strategies as you conduct your first read. You will have an opportunity to complete the close-read notes after your first read.



To Fly

from Space Chronicles

Neil deGrasse Tyson

BACKGROUND

The history of human flight is closely tied to the history of speed—flying has meant setting speed records. Heavy flying vehicles, like airplanes, have to move very quickly in order to stay in the air, and space shuttles have to travel at a very high speed called “escape velocity” to get into space.

SCAN FOR
MULTIMEDIA 

- 1 **I**n ancient days two aviators procured to themselves wings. Daedalus flew safely through the middle air, and was duly honored in his landing. Icarus soared upwards to the sun till the wax melted which bound his wings, and his flight ended in a fiasco. In weighing their achievements perhaps there is something to be said for Icarus. The classic authorities tell us, of course, that he was only “doing a stunt”; but I prefer to think of him as the man who certainly brought to light a serious constructional defect in the flying-machines of his day [and] we may at least hope to learn from his journey some hints to build a better machine.

—Sir Arthur Eddington, *Stars & Atoms* (1927)

NOTES

CLOSE READ

ANNOTATE: In paragraphs 2, 3, and 4, mark details that describe how people move about on Earth. Mark other details that describe how birds and other creatures fly.

QUESTION: Why does the author present such a strong contrast between walking and flying?

CONCLUDE: What point do these descriptive details emphasize?

myopic (my OP ihk) *adj.*
nearsighted; unable to see clearly; showing a lack of understanding

foresight (FAWR syt) *n.*
knowledge or insight gained by looking toward the future

- 2 For millennia, the idea of being able to fly occupied human dreams and fantasies. Waddling around on Earth's surface as majestic birds flew overhead, perhaps we developed a form of wing envy. One might even call it wing worship.
- 3 You needn't look far for evidence. For most of the history of broadcast television in America, when a station signed off for the night, it didn't show somebody walking erect and bidding farewell; instead it would play the "Star Spangled Banner" and show things that fly, such as birds soaring or Air Force jets whooshing by. The United States even adopted a flying predator as a symbol of its strength: the bald eagle, which appears on the back of the dollar bill, the quarter, the Kennedy half dollar, the Eisenhower dollar, and the Susan B. Anthony dollar. There's also one on the floor of the Oval Office in the White House. Our most famous superhero, Superman, can fly upon donning blue pantyhose and a red cape. When you die, if you qualify, you might just become an angel—and everybody knows that angels (at least the ones who have earned their wings) can fly. Then there's the winged horse Pegasus; the wing-footed Mercury; the aerodynamically unlikely Cupid; and Peter Pan and his fairy sidekick, Tinkerbell.
- 4 Our inability to fly often goes unmentioned in textbook comparisons of human features with those of other species in the animal kingdom. Yet we are quick to use the word "flightless" as a synonym for "hapless" when describing such birds as the dodo and the booby, which tend to find themselves on the wrong end of evolutionary jokes. We did, however, ultimately learn to fly because of the technological ingenuity afforded by our human brains. And of course, while birds can fly, they are nonetheless stuck with bird brains. But this self-aggrandizing line of reasoning is somewhat flawed, because it ignores all the millennia that we were technologically flightless.
- 5 I remember as a student in junior high school reading that the famed physicist Lord Kelvin, at the turn of the twentieth century, had argued the impossibility of self-propelled flight by any device that was heavier than air. Clearly this was a **myopic** prediction. But one needn't have waited for the invention of the first airplanes to refute the essay's premise. One merely needed to look at birds, which have no trouble flying and, last I checked, are all heavier than air.
- 6 If something is not forbidden by the laws of physics, then it is, in principle, possible, regardless of the limits of one's technological **foresight**. The speed of sound in air ranges from seven hundred to eight hundred miles per hour, depending

on the atmospheric temperature. No law of physics prevents objects from going faster than Mach 1,¹ the speed of sound. But before the sound “barrier” was broken in 1947 by Charles E. “Chuck” Yeager, piloting the Bell X-1 (a US Army rocket plane), much claptrap² was written about the impossibility of objects moving faster than the speed of sound. Meanwhile, bullets fired by high-powered rifles had been breaking the sound barrier for more than a century. And the crack of a whip or the sound of a wet towel snapping at somebody’s buttocks in the locker room is a mini sonic boom, created by the end of the whip or the tip of the towel moving through the air faster than the speed of sound. Any limits to breaking the sound barrier were purely psychological and technological.

7 During its lifetime, the fastest winged aircraft by far was the space shuttle, which, with the aid of detachable rockets and fuel tanks, exceeded Mach 20³ on its way to orbit. Propulsionless on return, it fell back out of orbit, gliding safely down to Earth. Although other craft routinely travel many times faster than the speed of sound, none can travel faster than the speed of light. I speak not from a **naiveté** about technology’s future but from a platform built upon the laws of physics, which apply on Earth as they do in the heavens. Credit the Apollo astronauts who went to the Moon with attaining the highest speeds at which humans have ever flown: about seven miles per second at the end of the rocket burn that lifted their craft beyond low Earth orbit. This is a paltry 1/250 of one percent of the speed of light. Actually, the real problem is not the moat that separates these two speeds but the laws of physics that prevent any object from ever achieving the speed of light, no matter how inventive your technology. The sound barrier and the light barrier are not equivalent limits on invention.

8 The Wright brothers of Ohio are, of course, generally credited with being “first in flight” at Kitty Hawk, North Carolina, as that state’s license-plate slogan reminds us. But this claim needs to be further delineated. Wilbur and Orville Wright were the first to fly a heavier-than-air, engine-powered vehicle that carried a human being—Orville, in this case—and that did not land at a lower elevation than its takeoff point. Previously, people had flown in balloon gondolas and in gliders and had executed controlled descents from the sides of cliffs, but none of those efforts would have made a bird jealous. Nor would Wilbur and Orville’s first trip have turned any bird heads. The first of their four flights—at 10:35 A.M. eastern time on December 17, 1903—lasted twelve

naiveté (nah eev TAY) *n.*
quality of innocent
simplicity

1. **Mach** (mok) **1** speed of sound in dry air; sound travels faster in denser substances.

2. **claptrap** *n.* nonsensical talk.

3. **Mach 20** twenty times the speed of sound.

prescient (PREHSH uhnt)
adj. having knowledge
of things before they
happen

enable (ehn AYB uhl) *v.*
make possible

CLOSE READ

ANNOTATE: In paragraph 11, mark the word the author uses to refer to the writer of the passage quoted in paragraph 10.

QUESTION: Why does the author use this informal term?

CONCLUDE: What is the effect of this casual language?

seconds, at an average speed of 6.8 miles per hour against a 30-mile-per-hour wind. The Wright Flyer, as it was called, had traveled 120 feet, not even the length of one wing on a Boeing 747.

- 9 Even after the Wright brothers went public with their achievement, the media took only intermittent notice of it and other aviation firsts. As late as 1933—six years after Lindbergh’s historic solo flight across the Atlantic—H. Gordon Garbedian ignored airplanes in the otherwise **prescient** introduction to his book *Major Mysteries of Science*:

Present day life is dominated by science as never before. You pick up a telephone and within a few minutes you are talking with a friend in Paris. You can travel under sea in a submarine, or circumnavigate the globe by air in a Zeppelin. The radio carries your voice to all parts of the earth with the speed of light. Soon, television will **enable** you to see the world’s greatest spectacles as you sit in the comfort of your living room.

- 10 But some journalists did pay attention to the way flight might change civilization. After the Frenchman Louis Blériot crossed the English Channel from Calais to Dover on July 25, 1909, an article on page three of the *New York Times* was headlined “Frenchman Proves Aeroplane No Toy.” The article went on to delineate England’s reaction to the event:

Editorials in the London newspapers buzzed about the new world where Great Britain’s insular⁴ strength is no longer unchallenged; that the aeroplane is not a toy but a possible instrument of warfare, which must be taken into account by soldiers and statesmen, and that it was the one thing needed to wake up the English people to the importance of the science of aviation.

- 11 The guy was right. Thirty-five years later, not only had airplanes been used as fighters and bombers in warfare but the Germans had taken the concept a notch further and invented the V-2 to attack London. Their vehicle was significant in many ways. First, it was not an airplane; it was an unprecedentedly large missile. Second, because the V-2 could be launched several hundred miles from its target, it basically birthed the modern rocket. And third, for its entire airborne journey after launch, the V-2 moved under the influence of gravity alone; in other words, it was a suborbital ballistic missile, the fastest way to deliver a bomb from one location on Earth to another. Subsequently, Cold War “advances” in the design of missiles enabled military power to target cities on

4. **insular** (IHN suh luhr) *adj.* literally, related to being an island; figuratively, detached or isolated.

opposite sides of the world. Maximum flight time? About forty-five minutes—not nearly enough time to evacuate a targeted city.

- 12 While we can say they’re suborbital, do we have the right to declare missiles to be flying? Are falling objects in flight? Is Earth “flying” in orbit around the Sun? In keeping with the rules applied to the Wright brothers, a person must be onboard the craft and it must move under its own power. But there’s no rule that says we cannot change the rules.
- 13 Knowing that the V-2 brought orbital technology within reach, some people got impatient. Among them were the editors of the popular, family-oriented magazine *Collier’s*, which sent two journalists to join the engineers, scientists, and visionaries gathered at New York City’s Hayden Planetarium on Columbus Day, 1951, for its **seminal** Space Travel Symposium. In the March 22, 1952, issue of *Collier’s*, in a piece titled “What Are We Waiting For?” the magazine endorsed the need for and value of a space station that would serve as a watchful eye over a divided world:

In the hands of the West a space station, permanently established beyond the atmosphere, would be the greatest hope for peace the world has ever known. No nation could undertake preparations for war without the certain knowledge that it was being observed by the ever-watching eyes aboard the “sentinel in space.” It would be the end of the Iron Curtains⁵ wherever they might be.

- 14 We Americans didn’t build a space station; instead we went to the Moon. With this effort, our wing worship continued. Never mind that Apollo astronauts landed on the airless Moon, where wings are completely useless, in a lunar module named after a bird. A mere sixty-five years, seven months, three days, five hours, and forty-three minutes after Orville left the ground, Neil Armstrong gave his first statement from the Moon’s surface: “Houston, Tranquility Base here. The Eagle has landed.”
- 15 The human record for “altitude” does not go to anybody for having walked on the Moon. It goes to the astronauts of the ill-fated Apollo 13. Knowing they could not land on the Moon after the explosion in their oxygen tank, and knowing they did not have enough fuel to stop, slow down, and head back, they executed a single figure-eight ballistic trajectory around the Moon, swinging them back toward Earth. The Moon just happened to be near apogee, the farthest point from Earth in its elliptical orbit. No other Apollo mission (before or since) went to the Moon during apogee, which granted the Apollo 13 astronauts the human

seminal (SEHM uh nuhl)
adj. being the first of something that is later recognized as important

5. **Iron Curtains** figurative walls of secrecy and suspicion between the Soviet Union and non-communist countries during the Cold War.

NOTES

CLOSE READ

ANNOTATE: In paragraph 16, mark the point at which the author stops using scientific words and phrases and begins to use poetic, emotional language.

QUESTION: Why does the language change so dramatically at this point?

CONCLUDE: What is the effect of this change, especially in a concluding paragraph?

altitude record. (After calculating that they must have reached about 245,000 miles “above” Earth’s surface, including the orbital distance from the Moon’s surface, I asked Apollo 13 commander Jim Lovell, “Who was on the far side of the command module as it rounded the Moon? That single person would hold the altitude record.” He refused to tell.)

- 16 In my opinion, the greatest achievement of flight was not Wilbur and Orville’s aeroplane, nor Chuck Yeager’s breaking of the sound barrier, nor the Apollo 11 lunar landing. For me, it was the launch of Voyager 2, which ballistically⁶ toured the solar system’s outer planets. During the flybys, the spacecraft’s slingshot trajectories stole a little of Jupiter’s and Saturn’s orbital energy to enable its rapid exit from the solar system. Upon passing Jupiter in 1979, Voyager’s speed exceeded forty thousand miles an hour, sufficient to escape the gravitational attraction of even the Sun. Voyager passed the orbit of Pluto in 1993 and has now entered the realm of interstellar space. Nobody happens to be onboard the craft, but a gold phonograph record attached to its side is etched with the earthly sounds of, among many things, the human heartbeat. So with our heart, if not our soul, we fly ever farther. 🎧

6. **ballistically** (buh LIHS tihk lee) *adv.* like a thrown object.

MEDIA CONNECTION



When I Look Up


Discuss It How does viewing this video affect your thinking about space exploration?

Write your response before sharing your ideas.



Comprehension Check

Complete the following items after you finish your first read.

1. According to Tyson, what idea occupied human fantasies for millennia?
2. According to Tyson, what two ideas did people once think were impossible, even though they do not defy any laws of physics?
3. In Tyson's opinion, what is the greatest achievement of human flight?
4.  **Notebook** Create a rough timeline showing when the inventions discussed in the article were first created. Make sure the order is correct, even if you do not have an exact date for every invention.

RESEARCH

Research to Clarify Choose at least one unfamiliar detail from the text. Briefly research that detail. In what way does the information you learned shed light on an aspect of the essay?

Research to Explore Choose something that interested you from the text, and formulate a research question.



TO FLY

Close Read the Text

1. This model from the text shows two sample annotations, along with questions and conclusions. Close read the passage, and find another detail to annotate. Then, write a question and your conclusion.

ANNOTATE: These words and phrases have an informal, jokey quality.

QUESTION: Why does the author use an informal, lighthearted tone?

CONCLUDE: The author is presenting scientific information in a way that makes it entertaining for non-scientists.

ANNOTATE: This description applies a scientific term to a mythological figure.

QUESTION: Why does the author describe Cupid in this way?

CONCLUDE: The description is funny, and also reminds readers that scientific principles guide the technology of flight.

When you die, **if you qualify**, you **might just become** an angel—and **everybody knows that angels (at least the ones who have earned their wings)** can fly. Then there’s the winged horse Pegasus; the wing-footed Mercury; **the aerodynamically unlikely Cupid**; and Peter Pan and his fairy **sidekick**, Tinkerbell.

Tool Kit

Close-Read Guide and Model Annotation

STANDARDS

Reading Informational Text

- Analyze how a text makes connections among and distinctions between individuals, ideas, or events.
- Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
- Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.

Language

Interpret figures of speech in context.

2. For more practice, go back into the text, and complete the close-read notes.
3. Revisit a section of text you found important during your first read. **Annotate** what you notice. Ask **questions** such as “Why did the author make this choice?” What can you **conclude**?

Analyze the Text

CITE TEXTUAL EVIDENCE to support your answers.

Notebook Respond to these questions.

1. **Interpret** What is the author’s attitude toward the achievements he describes? Explain your interpretation.
2. **Make a Judgment** Which of the achievements described in the article do you think is the most significant? Why? Cite details from the text to support your answer.
3. **Essential Question:** *Are inventions realized through inspiration or perspiration?* What have you learned about how inventions are created?


Analyze Craft and Structure

Text Structure: Expository Writing The word *exposition* means “explanation.” An **expository essay** is a brief work of nonfiction that explains a topic. That explanation may involve the presentation of information, discussion of ideas, or clarification of a process. In this essay, Neil deGrasse Tyson presents information and ideas related to human flight. He uses a variety of methods to make ideas and information clear to readers.

- **Allusions** are references in a text to well-known people, places, characters, myths, events, or works of literature or art. These references appear without explanation. They are designed to help readers make connections and expand their thinking about the writer’s ideas.
- **Comparisons and contrasts** present similarities and differences among two or more items or ideas. By showing how one thing is like or unlike another, an expository writer clarifies the qualities of each item.
- **Description** uses words and phrases that appeal to the senses. In expository writing, description can help readers understand a topic by “showing” what something looks like, how it sounds or moves, and even what it smells or tastes like.
- **Cause-and-effect** relationships show how one situation can result from another and then lead to yet another. These connections help readers understand how or why a situation developed as it did.

Practice

CITE TEXTUAL EVIDENCE
to support your answers.

 **Notebook** Answer these questions.

1. Reread paragraph 3. **(a)** What allusions does the author make? **(b)** What do these allusions have in common? **(c)** What idea do these allusions support? Explain.
2. Reread paragraph 4. **(a)** What two different things does the author compare and contrast? **(b)** What idea does this comparison-and-contrast help the author explain?
3. Reread paragraph 6. **(a)** What descriptive elements does this paragraph include? **(b)** What idea does the description help the author develop?
4. Reread paragraphs 11 to 13. **(a)** According to Tyson, under what circumstances was the German V-2 invented? **(b)** What was important about the V-2 at the time? **(c)** What changes in technology did the V-2 lead to or influence? Explain. **(d)** What idea does Tyson’s example of the V-2 help develop or support?



TO FLY

Concept Vocabulary

enable**foresight****prescient****myopic****naivete****seminal**

Why These Words? These concept words help to show the contrast between innovative and conventional ways of thinking. For example, in paragraph 5, the author criticizes Lord Kelvin's limited vision of flight as *myopic*. This word vividly reveals the author's view of Kelvin's mistake.

1. How does the concept vocabulary help the reader better understand the author's attitude toward invention and the future?
2. What other words in the selection connect to innovative or conventional thinking?

Practice

 **Notebook** The concept vocabulary words appear in "To Fly."

1. Write a paragraph in which you describe something that might *enable* someone to become a groundbreaking artist or musician. Use at least three of the concept vocabulary words in your paragraph.
2. Divide the concept vocabulary words into two categories: innovative thinking and conventional thinking. Explain why you placed each word in its category.

Word Study

Old English Prefix: fore- The prefix *fore-* means "before," "toward," or "front." In paragraph 6, the author notes that lack of *foresight*, or looking ahead, can be an obstacle to creating new inventions. Use what you know about the prefix *fore-* to answer these questions.

1. Where is a book's foreword located?
2. Where would you expect to find an animal's *foreleg*?

WORD NETWORK

Add words related to invention from the text to your Word Network.

STANDARDS

Language

- Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
 - c. Spell correctly.
- Determine or clarify the meaning of unknown and multiple meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.
 - b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word.


Conventions

Capitalization Capital letters signal the beginning of a sentence or quotation and identify proper nouns and proper adjectives. **Proper nouns** include the names of people, geographical locations, specific events and time periods, organizations, languages, documents, and religions. **Proper adjectives** are derived from proper nouns, as in *French* (from *France*) and *Canadian* (from *Canada*).

This chart shows examples of situations in which capitalization is required.

CAPITALIZE	EXAMPLES
the first letter of the first word in a sentence	<i>The blue jay is a very aggressive bird. Wait! Can you give me back my pen?</i>
the beginning of the first word in a quotation that is a complete sentence; the beginning of the first word in a line of dialogue	<i>Einstein said, "Anyone who has never made a mistake has never tried anything new."</i>
the pronoun <i>I</i>	<i>After swimming, I felt tired.</i>
proper nouns, including people's names, people's titles when used as part of their names, place names, and names of organizations	<i>Elsa went sailing down the Hudson River with Ms. Liu and her Girl Scout troop.</i>
proper adjectives, or adjectives formed from proper nouns	<i>Many people of Brazilian background speak the Portuguese language.</i>

Read It

- Identify the capital letters in each sentence, and explain why each one is capitalized.
 - Superman, a famous American superhero, has the power to fly.
 - Neil deGrasse Tyson studied physics at Harvard and Columbia.
 - I believe that *Collier's* published editorials about building a space station.
-  **Notebook** In "To Fly," find examples of two types of capitalization, and explain why each word is capitalized.

Write It

 **Notebook** Rewrite this paragraph, correcting errors in capitalization.

In this article, neil degrasse tyson starts by discussing birds and mythical flying figures, such as pegasus, mercury, and peter pan. he continues with the invention of the airplane by the wright brothers. Although tyson mainly focuses on american technology, he also discusses the german v-2 rocket. he writes, "their vehicle was significant in many ways."



TO FLY

Writing to Sources

In an argumentative essay, a writer states a position on a subject. He or she then defends or supports that position through the use of logical reasoning and relevant evidence.

Assignment

Tyson mentions the golden record that is attached to the side of the Voyager 2. That record includes music, voices, and other sounds that represent Earth and its occupants. Imagine that you are able to choose a sound to add to that record. What sound would it be? Write an **argumentative essay** in which you state and defend your choice.

Follow these steps as you write:

- Clearly state your position, or claim, in an introductory paragraph. This should include both your choice of a sound and a broad reason for it.
- In the body of the essay, provide specific reasons for your choice, and support them with evidence from Tyson's essay, your own observations, or another source.
- Organize your reasons and evidence logically. Use transitional words and phrases, such as *because*, *instead*, and *after*, to clarify the relationships between your claims, your reasons, and the supporting evidence.
- Conclude with a strong closing statement that follows from and supports your argument.

Vocabulary and Conventions Connection Consider using several of the concept vocabulary words. Also, remember to use correct capitalization for proper nouns and proper adjectives.

enable

foresight

prescient

myopic

naivete

seminal

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
- e. Provide a concluding statement or section that follows from and supports the argument presented.

Speaking and Listening

- Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

Reflect on Your Writing

After you have written your essay, answer the following questions.

1. How might you revise your claim to make it stronger?
2. How might you revise the way you present your evidence to help it more strongly support your claim?
3. **Why These Words?** The words you choose make a difference in your writing. Which words did you specifically choose to clearly convey your ideas?

Speaking and Listening

Assignment

Work with a partner to create and deliver an **informative presentation** on one of the historic flying feats or scientific principles that Neil deGrasse Tyson discusses in the text.

- 1. Research Your Topic** Choose a science-related topic mentioned in the text. Divide up tasks between partners. Be sure that you know enough about the topic that you are able to explain it in easy-to-understand language.
- 2. Plan Your Presentation** Once you have completed the research, decide how to best present the information. You may find and add images, or create your own graphics, such as a table or chart. As you create the presentation, keep the following in mind:
 - Clearly state your main idea and supporting ideas.
 - Identify interesting and relevant details to support your key points.
 - Select images that add useful information or illustrate your ideas.
- 3. Prepare Your Delivery** Practice your presentation with your partner. Include the following performance techniques.
 - Vary your speaking volume to emphasize key points. Use eye contact appropriately to connect with your audience.
 - Present images at appropriate points.
 - Invite questions from listeners, and work to clarify any information they may not understand.
- 4. Evaluate Presentations** As your classmates deliver their presentations, listen carefully. Use an evaluation guide like the one shown to analyze classmates' presentations.

PRESENTATION EVALUATION GUIDE

Rate each statement on a scale of 1 (not demonstrated) to 5 (demonstrated).

- The information was well organized and easy to understand.
- The presenters connected with their audience by maintaining eye contact and varying the volume of their voices.
- Relevant details provided support for the main ideas.
- Images fit well with the information and were presented in a way that made sense for the subject.
- Presenters allowed time for the audience to ask questions.

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you learned from "To Fly."



WRITING TO SOURCES

- UNCLE MARCOS
- TO FLY

ACADEMIC VOCABULARY

As you craft your argument, consider using some of the academic vocabulary you learned in the beginning of the unit.

- opponent
- position
- contradict
- legitimate
- dissent

Tool Kit

Student Model of an Argument

Write an Argument

You have just read two texts in which the authors explore the idea of human flight. In "Uncle Marcos," Uncle Marcos builds a flying machine and becomes a hero when he attempts to fly it over the mountains. In "To Fly," author Neil deGrasse Tyson discusses the development of human flight, from myths to airplanes and space travel. Now you will use your knowledge of these texts to explore your thoughts and write your own argument about human flight.

Assignment

Think about what flying means to people, both individually and collectively. Then, write an **argumentative essay** in which you make a claim that answers this question:

Which text—"Uncle Marcos" or "To Fly"—best describes the dream or fantasy of human flight?

Be sure to clearly state your position and support it with logical reasoning and evidence from the texts.

Elements of an Argument

An **argument** is a logical way of presenting a viewpoint, belief, or stand on an issue. A well-written argument may convince the reader, change the reader's mind, or motivate the reader to take a certain action.

An effective argumentative essay about a literary work contains these elements:

- an analysis of the work, including its content and style
- a thesis statement or precise claim that expresses your interpretation of the work
- inclusion of a counterclaim, or alternate interpretation, and a discussion of why it is less convincing than yours
- textual evidence that supports your interpretation
- a logical organization, including a conclusion that follows from and supports your claim
- a formal style and objective tone appropriate for an academic purpose and audience
- error-free grammar, including correct use of gerunds and participles

Model Argument For a model of a well-crafted argument, see the Launch Text, "Inspiration Is Overrated!"

Challenge yourself to find all of the elements of an effective argument in the text. You will have an opportunity to review these elements as you prepare to write your own argument.



STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

Prewriting / Planning

Write a Working Claim You may already have a clear idea about which text you feel best portrays the dream of human flight. Start by writing a working claim. As you gather evidence that claim may shift or even change completely.

- **Working Claim:** _____

Identify Types of Details Your claim and supporting reasons determine the kinds of details you need to include. Consider these tips:

- **To analyze a text**, support your ideas with evidence from the selection.
- **To explain a personal response**, show how the work connects to your own experiences, observations, and ideas.
- **To refute an opposing point of view**, identify other interpretations of a text. Use the chart to gather textual details that support your position and could be used to refute, or argue against, a different opinion.

COUNTERCLAIM	RESPONSE WITH SUPPORTING EVIDENCE

Use Direct Quotations and Paraphrases When you write about literature, include textual details that show the accuracy of your interpretation. You may use direct quotations or paraphrases.

- A **direct quotation** is the inclusion of exact words from the text. Use a direct quotation when the words are especially powerful or unique.
- A **paraphrase** is a restatement of an author’s ideas in your own words. You may choose to use a paraphrase because the exact words are not particularly interesting or you have so many direct quotations that your own words get lost. Make sure your paraphrase accurately reflects the meaning of the original.

Formatting Direct Quotations Shorter direct quotations appear within a sentence or paragraph. They are preceded by a comma or a colon. The page number on which the quotation appears is indicated in parentheses. Direct quotations that are four lines or longer are introduced with a colon, set apart, and indented ten spaces. The page number on which the quotation appears is always indicated in parentheses.

Direct Quotation in Running Text:

Rainsford is horrified when he realizes the truth of his situation: “The Cossack was the cat; he was the mouse” (232).

Direct Quotation Block Indented:

Rainsford breathes a sigh relief. Then, the horror hits him:

Rainsford did not want to believe what his reason told him was true, but the truth was as evident as the sun that had by now pushed through the morning mists. The general was playing with him! (231)

 EVIDENCE LOG

Review your Evidence Log and identify key details you may want to cite in your argument.

 STANDARDS

- Writing**
Write arguments to support claims with clear reasons and relevant evidence.
- Introduce claim(s), acknowledge and distinguish the claim(s) from alternate claims, and organize the reasons and evidence logically.
 - Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.



Drafting

Present Your Reasoning In a strong argument, reasons are supported by evidence and organized in an order that makes sense. Use an outline to help you plan your reasons and the evidence that supports them.

LAUNCH TEXT

Model: "Inspiration Is Overrated!"

CLAIM

Inspiration does not always produce successful inventions.

REASON

Many ideas for inventions never succeed.

EVIDENCE

One source says that only 3,000 products make money out of the 1.5 million products that have patents. Another says that only 1 in 5,000 products succeeds in the marketplace.

REASON

There is a reason many new inventions fail.

EVIDENCE

The author compares genius and invention by referring to the saying "genius is one percent inspiration and ninety-nine percent perspiration."

CONCLUSION

The conclusion restates and extends the claim: Successfully turning an idea into an invention requires a lot of hard work, not just inspiration.

Argument Outline

CLAIM

REASON

EVIDENCE

REASON

EVIDENCE

CONCLUSION

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- e. Provide a concluding statement or section that follows from and supports the argument presented.

Write a First Draft As you write, use your outline as a guide.

- Start by writing an introduction that clearly introduces your claim about which text best captures the dream of human flight.
- Confirm that you have presented sufficient evidence from the texts, as well as personal experience or observations, to support your claim.
- Present your reasons and evidence in an order that makes sense.
- End with a concluding statement or section that briefly summarizes or extends your argument.

LANGUAGE DEVELOPMENT: CONVENTIONS

Revising to Combine Sentences Using Gerunds and Participles

Gerunds and participles are **verbals**, or verb forms that are used as nouns or adjectives.

Identifying Gerunds A **gerund** is a verb form ending in *-ing* that acts as a noun. A **gerund phrase** is a gerund with modifiers or complements, all acting together as a noun. Like all nouns, gerunds and gerund phrases may be used in different parts of a sentence, as in these examples:

As a subject: *Baking cookies* is Felice's hobby.

As a direct object: Antoine enjoys *swimming*.

As a predicate noun: David's greatest talent is *playing the piano*.

As the object of a preposition: Greta never gets tired of *surfing*.

Identifying Participles A **participle** is a verb form that acts as an adjective. There are two kinds: present participles and past participles. A **participial phrase** is a participle with modifiers or complements, all acting together as an adjective.

Present participle: The *chirping* canary sang sweetly.

Past participle in participial phrase: The runner, *filled with hope*, raced toward the finish line.

Revising Sentences To combine sentences using gerunds and participles, first identify pairs of sentences that sound choppy and that relate to the same idea. Then, combine the sentences by using participles, gerunds, or participial or gerund phrases.

Read these choppy sentences: *The sisters like to draw and paint. They like to play together.* These sentences can be combined with two gerunds and a gerund phrase: *The sisters like **drawing, painting, and playing together.***

Read It

These sentences from the Launch Text contain gerunds and participles. Describe the function of each verbal in the sentence shown.

- *Each of these **forgotten** contraptions was probably someone's bright idea, a flash of inspiration **experienced while walking in the woods.** (past participle and past participial phrase)*
- ***Developing something new that actually works—and that people want—can take years.** (gerund)*

Write It

As you draft your argument, find pairs of sentences that deal with the same subject. If they are too choppy or repetitive, combine them using gerund or participial phrases.

TIP

SPELLING

Make sure to spell verbs used as gerunds or participles correctly.

- Remember that when a verb ends in *e*, the *e* should almost always be dropped before adding *-ing*. For example, the verb *hike* becomes the gerund *hiking*.
- The past participles of regular verbs are the same as the past tense, which ends in *-ed*. For example, *remembered* is both the past tense and the past participle of *remember*.
- Irregular verbs form the past tense differently. Many of these verbs also have special forms for the past participle, such as *forgotten*. Make sure to use the correct form as your participle.

STANDARDS

Language

- Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
 - Explain the function of verbals in general and their function in particular sentences.
 - Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
 - Spell correctly.



Revising

Evaluating Your Draft

Use the following checklist to evaluate the effectiveness of your first draft. Then, use your evaluation and the instruction on this page to guide your revision.

FOCUS AND ORGANIZATION	EVIDENCE AND ELABORATION	CONVENTIONS
<input type="checkbox"/> Presents a clearly stated claim that is distinguished from other possible claims.	<input type="checkbox"/> Uses relevant, logical evidence and reasons to support the main claim.	<input type="checkbox"/> Attends to the norms and conventions of the discipline, especially correct use of gerunds and participles.
<input type="checkbox"/> Organizes information in a logical way that makes connections between claims, counterclaims, reasons, and evidence.	<input type="checkbox"/> Considers and discusses possible counterclaims.	
<input type="checkbox"/> Presents ideas in a clear and formal style.	<input type="checkbox"/> Includes language that helps make connections among claims, counterclaims, and supporting details.	
<input type="checkbox"/> Includes a conclusion that logically supports or extends the argument.		

WORD NETWORK

Include interesting words from your Word Network in your argument.

Revising for Focus and Organization

Conclusion Make sure that your concluding statement or section logically supports or extends your argument. You may wish to restate your claim and summarize the strongest reasons and evidence that support it. You may also introduce a final quotation or example. If you wish to extend your argument, make sure the connection between what you have written and your new idea is clear and logical. Use transition words and other language to make connections and help readers understand your train of thought.

Revising for Evidence and Elaboration

Use Language to Make Connections Make sure you are using transitions effectively in your argument. Add new transition words and phrases if necessary to make connections and clarify the relationship between ideas. Use words such as *because* and *therefore* to make connections that establish clearly how one event or idea led to another. Use words and phrases such as *such as* and *for example* to introduce evidence and examples. Use words such as *before* and *later* to clarify when events occurred.

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- c. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.

- e. Provide a concluding statement or section that follows from and supports the argument presented.

PEER REVIEW

Exchange essays with a classmate. Use the checklist to evaluate your classmate’s essay and provide supportive feedback.

1. Is the claim clearly stated and distinguished from other possible claims and counterclaims?
 yes no If no, suggest how the writer might improve it.
2. Are the reasons and evidence logical and relevant?
 yes no If no, explain what the author might add or remove.
3. Does the organization make clear connections among claims, counterclaims, reasons, and evidence?
 yes no If no, tell what you think might be missing.
4. What is the strongest part of your classmate’s essay? Why?

Editing and Proofreading

Edit for Conventions Reread your draft for accuracy and consistency. Correct errors in grammar and word usage. Make sure you have correctly combined sentences using gerunds and participles.

Proofread for Accuracy Read your draft carefully, looking for errors in spelling and punctuation. As you proofread, make sure that you have used the correct spelling for gerunds and other verbs ending in *-ing*. Also check that you have used the correct form of any irregular past participles, such as *lit* and *broken*.

Publishing and Presenting

Post your final essay to a class or school website so classmates can read and comment on your ideas. Consider the ways in which other students’ arguments are similar to and different from your own.

Reflecting

Reflect on what you learned as you wrote your argument. What did you learn about how ideas for inventions are realized? What was the most challenging aspect of composing your argument? Did you learn something from reviewing yours and others’ work that might inform your writing process in the future?

STANDARDS

Writing

- Write arguments to support claims with clear reasons and relevant evidence.
- With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.



ESSENTIAL QUESTION:

Are inventions realized through inspiration or perspiration?

Can hard work alone—or a great idea alone—result in a successful invention? How much of an invention’s success results from creativity as opposed to hard work? You will work in a group to continue your exploration of the process of invention.

Small-Group Learning Strategies

Throughout your life, you’ll continue to develop strategies that make you a better learner. In school, in your community, and in your career, you will continue to learn and work in teams.

Review these strategies and the actions you can take to practice them as you work in teams. Add ideas of your own for each step. Use these strategies during Small-Group Learning.

STRATEGY	ACTION PLAN
Prepare	<ul style="list-style-type: none"> • Complete your assignments so that you are prepared for group work. • Organize your thinking so you can contribute to your group’s discussions. •
Participate fully	<ul style="list-style-type: none"> • Make eye contact to signal that you are listening and taking in what is being said. • Use text evidence when making a point. •
Support others	<ul style="list-style-type: none"> • Build off ideas from others in your group. • Invite others who have not yet spoken to do so. •
Clarify	<ul style="list-style-type: none"> • Paraphrase the ideas of others to ensure that your understanding is correct. • Ask follow-up questions. •

COMPARE

BIOGRAPHY

Nikola Tesla: The Greatest Inventor of All?

Vicky Baez

How did history forget about one of its most visionary inventors?



NOVEL EXCERPT

from **The Invention of Everything Else**

Samantha Hunt

The combination of fact, fiction, biography, and history creates an engaging portrait of an under-appreciated inventor.



SCIENCE ARTICLE

25 Years Later, Hubble Sees Beyond Troubled Start

Dennis Overbye

In spite of its flaws, the Hubble Space Telescope remains a groundbreaking invention that has changed the way people see the universe.



MEDIA: VIDEO

Sounds of a Glass Armonica

Watch one of Benjamin Franklin’s favorite inventions in action!



PERFORMANCE TASK

SPEAKING AND LISTENING FOCUS

Conduct a Debate

The Small-Group readings offer various ideas about the hard work and creative thinking that goes into inventions. After reading, your group will plan and conduct a debate on the Essential Question.



Working as a Team

1. **Take a Position** In your group, discuss the following question:

Is an invention typically created by a single inventor, or is an invention usually the result of many minds working together?

As you take turns sharing your thoughts, be sure to provide information and examples to support your ideas. After all group members have shared, discuss your responses. Did other group members' ideas change your own response? Why or why not?

2. **List Your Rules** As a group, decide on the rules that you will follow as you work together. Samples are provided; add two more of your own. You may add or revise rules based on your experience together.

- Everyone should participate in group discussions.
- People should not interrupt.

- _____

- _____

3. **Apply the Rules** Practice working as a group. Share what you have learned about invention. Make sure each person in the group contributes. Take notes and be prepared to share with the class one thing that you heard from another member of your group.

4. **Name Your Group** Choose a name that reflects the unit topic.

Our group's name: _____

5. **Create a Communication Plan** Decide how you want to communicate with one another. For example, you might use online collaboration tools, email, or instant messaging.

Our group's decision: _____

Making a Schedule

First, find out the due dates for the small-group activities. Then, preview the texts and activities with your group and make a schedule for completing the tasks.

SELECTION	ACTIVITIES	DUE DATE
Nikola Tesla: The Greatest Inventor of All?		
from The Invention of Everything Else		
25 Years Later, Hubble Sees Beyond Troubled Start		
Sounds of a Glass Armonica		

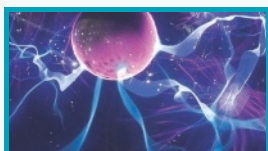
Working on Group Projects

As your group works together, you'll find it more effective if each person has a specific role. Different projects require different roles. Before beginning a project, discuss the necessary roles and choose one for each group member. Here are some possible roles; add your own ideas.

Project Manager: monitors the schedule and keeps everyone on task

Researcher: organizes research activities

Recorder: takes notes during group meetings



NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?

Comparing Texts

In this lesson, you will read and compare the biographical work “Nikola Tesla: The Greatest Inventor of All?” with an excerpt from *The Invention of Everything Else*, a fictional account of Tesla’s life.



from THE INVENTION OF EVERYTHING ELSE

About the Author

Vicky Baez (b. 1971) was born in Albuquerque, New Mexico. In elementary school, one of Baez’s teachers gave exciting science demonstrations that instilled in her a love of the subject, and she frequently writes about science and scientists. Her own science library currently exceeds 1,000 books.

Nikola Tesla: The Greatest Inventor of All?

Concept Vocabulary

As you perform your first read, you will encounter these words.

engineer

generators

current

Base Words If these words are unfamiliar, check to see if any of them contain a base word you know. Then, use context and your knowledge of the “inside” word to find the meanings of the concept words. Follow this strategy:

Unfamiliar Word: *equipment*

Familiar “Inside” Word: *equip*, which means “to supply with necessary items for a particular purpose”

Context: At each place where he worked, [Tesla] designed and made improvements to the **equipment**.

Conclusion: Tesla designed *equipment*, or items used for a purpose.

Apply your knowledge of base words and other vocabulary strategies to determine the meanings of words you encounter during your first read.

First Read NONFICTION

Apply these strategies as you conduct your first read. You will have an opportunity to complete a close read after your first read.

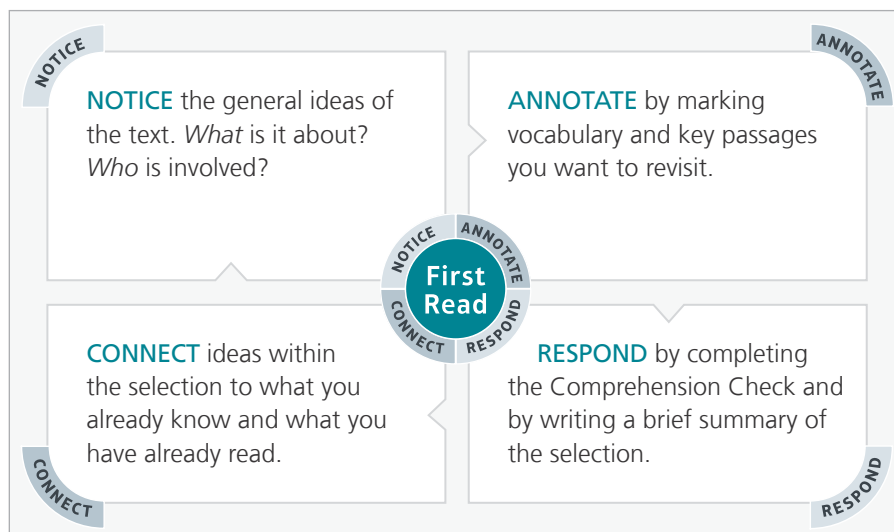
STANDARDS

Reading Informational Text

By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.

Language

- Demonstrate understanding of figurative language, word relationships, and nuances in word meaning.
 - b. Use the relationship between particular words to better understand each of the words.
- Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.



Nikola Tesla: The Greatest Inventor of All?

Vicky Baez

BACKGROUND

At the end of the nineteenth century, electricity was a new technology. At this time, very few people had access to electric lighting, and most people used coal, gas, and steam power for energy. Today, electricity has become a common utility because of inventors like Nikola Tesla and Thomas Edison.

SCAN FOR
MULTIMEDIA 

- N**ikola Tesla was born in 1856 to a Serbian family in the country that is now called Croatia. When Tesla was young, he was able to do such complex math problems in his head that his teachers thought he was cheating. He finished high school in 3 years instead of 4.
- He started college, but didn't finish. However, he learned enough to go to work. He moved several times over the next few years, each time getting a job as an electrician. At each place where he worked, he designed and made improvements to the equipment.
- In 1884, he moved to New York City. He came with a letter of recommendation to Thomas Edison from one of his bosses. The letter is claimed to have said, "I know two great men and you are one of them; the other is this young man." Edison hired Tesla, who began as an electrical **engineer**. He quickly became very important to the company, solving some of its most difficult problems. Tesla was able to use his mind to imagine how different methods worked. Edison always made a lot of models and tried them out, which took a lot longer.
- In 1885, Tesla and Edison had a falling out. Tesla told Edison he could improve some of Edison's motors and **generators**. Edison told him he would pay him \$50,000 if he did. This was quite a lot of money at that time. Tesla worked hard and spent months on the task. When he succeeded, he asked Edison for the reward, but Edison told him he had been joking. He said, "Tesla, you don't understand our American humor." He offered Tesla a \$10 raise on his \$18 weekly pay. Tesla quit the job.
- Tesla started his own company in 1887, Tesla Electric Light and Manufacturing. There he worked on making a system called

NOTES

Mark base words or indicate another strategy that helped you determine meaning.

engineer (ehn jih NEER) *n.*

MEANING:

generators (JEHN uhr ray tuhrz) *n.*

MEANING:

NOTES

Mark base words or indicate another strategy that helped you determine meaning.

current (KUR uhnt) *n.*

MEANING:

“alternating **current**” to produce electricity. Thomas Edison thought his system, called “direct current,” was better and safer. The two became rivals. They each gave talks about why his particular method was better. They had public demonstrations to show people how they created electricity. This rivalry was referred to as the “War of the Currents.”

- 6 Another rival of Edison’s, George Westinghouse, had also been trying to create an electrical system. He bought some of Tesla’s inventions and paid him \$2,000 a month to consult with him. Tesla spent all his money on new inventions and ideas. He invented the Tesla coil, which carried electricity without wires. You can still see a Tesla coil at some museums today. Tesla invented or helped develop a long list of devices, including X-ray machines, radio, wireless remotes, fluorescent lights, and the system of electricity that is still used today in our cities. He helped create a power plant in Niagara Falls that provided power all the way to New York City. He was given many awards and honorary degrees from universities all over the world.
- 7 Sadly, Tesla died without a cent. People forgot about him, and remembered Edison, whose companies still exist and have his name, like Consolidated Edison, the electric company that powers New York City. In the 1990s, people started to write about Tesla, and now he is becoming better known again. The owner of a new car company named it Tesla Motors because they make electric cars. Their first car used Tesla’s design from 1882 for an electric car. 🚗

Comprehension Check

Complete the following items after you finish your first read. Review and clarify details with your group.

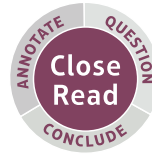
1. Why did Tesla’s teachers sometimes think he was cheating?
2. Why did Tesla leave Edison’s company?
3. Why does Tesla Motors use Tesla’s name?
4. 📖 **Notebook** Confirm your understanding of the biography by writing a short summary.

RESEARCH

Research to Clarify Choose at least one unfamiliar detail from the biography. Briefly research that detail. In what way does the information you learned shed light on an aspect of the biography?

Close Read the Text

With your group, revisit sections of the text you marked during your first read. **Annotate** what you notice. What **questions** do you have? What can you **conclude**?



NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?

Analyze the Text

CITE TEXTUAL EVIDENCE to support your answers.

Notebook Complete the activities.

- 1. Review and Clarify** With your group, reread paragraph 3. Discuss the differences between Edison’s and Tesla’s approaches to invention. Whose approach, Edison’s or Tesla’s, do you think is better? Why?
- 2. Present and Discuss** Discuss what you noticed in the selection, what questions you asked, and what conclusions you reached.
- 3. Essential Question: Are inventions realized through inspiration or perspiration?** What has this selection taught you about invention? Discuss with your group.

TIP

GROUP DISCUSSION

If you do not understand a group member’s contribution, ask for clarification. Respond politely when others ask you for clarification, and try to state your point more simply and clearly.

LANGUAGE DEVELOPMENT

Concept Vocabulary

engineer **generators** **current**

Why These Words? The three concept vocabulary words are related. With your group, discuss the words, and determine what they have in common. Write another word related to this concept.

Practice

Notebook Confirm your understanding of these words by using them in sentences. Include context clues that hint at meaning.

Word Study

Multiple-Meaning Words Many English words have more than one meaning. In “Nikola Tesla: The Greatest Inventor of All?,” the word *current* refers to an *electrical current*, which is the flow of electricity through a wire. In this context, *current* is a technical word with a definition specific to the fields of science, electricity, and physics. Use a dictionary to look up other definitions of the word *current*, and record the meaning and the part of speech for each.

WORD NETWORK

Identify words from the selection that relate to the concept of invention. Add these words to your Word Network.

STANDARDS

Reading Informational Text

Analyze how a text makes connections among and distinctions between individuals, ideas, or events.

Language

- Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.

c. Consult general and specialized reference materials, both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.



NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?

Analyze Craft and Structure


Text Structure: Biographical Writing **Biographical writing** is a type of nonfiction in which the author tells about important events in the life of another person. Biographies provide factual information about the subject, and details and descriptions related to the person’s life.

Most biographies are written in chronological order, describing key events in the subject’s life. Individual paragraphs, however, may be organized differently, in order to provide information that supports a key idea. Here are some common paragraph structures:

- **chronological order:** the order in which events actually occur
- **comparison and contrast:** explanation and analysis of the similarities and differences between related subjects
- **cause and effect:** explanation of why something happens and how it affects other things

CITE TEXTUAL EVIDENCE
to support your answers.

Practice

 **Notebook** Use the chart to analyze the organization and development of ideas in the text. Model your analysis on the example. Then, answer the questions that follow.

PARAGRAPH	ORGANIZATION	DEVELOPMENT OF IDEAS
paragraph 1	chronological organization	<ul style="list-style-type: none"> • describes Tesla’s early years • descriptive details provide information about early signs of Tesla’s genius
paragraph 2		
paragraph 3		
paragraph 4		
paragraph 5		
paragraph 6		
paragraph 7		
paragraph 8		

1. What organizational strategy does the author use in paragraph 4? How does its organization link individuals, ideas, and events in the selection?
2. What organizational strategy does the author use in paragraphs 3 and 5? How does its organization help link ideas and events?

STANDARDS

Reading Informational Text

- Analyze how a text makes connections among and distinctions between individuals, ideas, or events.
- Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.



Conventions

Commas and Semicolons Effective writers use commas and semicolons correctly. Here are some guidelines for using commas and semicolons.

- A **comma (,)** is a punctuation mark that signals a brief pause.
- A **semicolon (;)** may be used to join two independent clauses.

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you learned from “Nikola Tesla: The Greatest Inventor of All?”

USE A COMMA	EXAMPLES
before a coordinating conjunction (<i>and, but, or, nor, for, so, yet</i>) that joins two independent clauses in a compound sentence	Tesla worked hard, and he invented many things.
between items in a series	He worked on radio, fluorescent lights, and electric plants.
between coordinate adjectives , adjectives of equal rank whose order may be switched	The ingenious, inventive products changed the world.
after introductory words, phrases, or clauses	In his later years, Tesla had little money.
to set off nonrestrictive , or nonessential, phrases or clauses	Edison's company, which was in the United States, hired Tesla.

USE A SEMICOLON	EXAMPLES
to join independent clauses not connected by a coordinating conjunction	Edison did not pay Tesla \$50,000; Tesla quit.
to separate independent clauses joined by adverbs such as <i>however</i> and <i>therefore</i>	Tesla had many great inventions; however, his fame faded over the years.

Read It

Notebook Complete the following items by identifying a comma or semicolon in the selection paragraph and explaining the reason it is used in the sentence.

1. paragraph 1 (comma)
2. paragraph 3 (semicolon)
3. paragraph 5 (comma)
4. paragraph 7 (comma)

Write It

Correct each sentence by adding commas or semicolons as needed.

1. Tesla contributed many great electrical inventions to the world however he died a poor man.
2. Tesla invented or helped to develop X-ray machines wireless remotes fluorescent lights and the Tesla coil.
3. Edison preferred direct current he thought it was safer than alternating current.

TIP

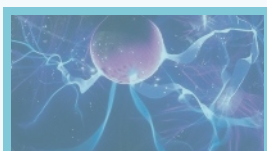
COLLABORATION TIP

To ensure that your group understands the correct use of commas and semicolons in different grammatical situations, challenge members to come up with examples of each type of sentence modeled in the charts.

STANDARDS

Language
Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing

- a. Use punctuation (comma, ellipsis, dash) to indicate a pause or break.



NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?

Comparing Texts

You will now read an excerpt from the novel *The Invention of Everything Else*. First, complete the first-read and close-read activities for the excerpt. Then, you will analyze the differences in how a subject is portrayed in a work of nonfiction and in a work of fiction.



from THE INVENTION OF EVERYTHING ELSE

About the Author



Samantha Hunt (b. 1971) is an American novelist, essayist, and short story writer. Her award-winning stories and essays have appeared in many prestigious publications, including the *New Yorker*, the *New York Times Magazine*, and *Esquire*. In 2006, she won the National Book Foundation's *5 Under 35* award, which, each year, honors five young fiction writers for their excellence.

from The Invention of Everything Else

Concept Vocabulary

As you perform your first read of the excerpt from *The Invention of Everything Else*, you will encounter these words.

deficiencies **triumph** **revolutionized**

Context Clues If these words are unfamiliar to you, try using context clues—words and phrases that surround an unfamiliar word in a text to determine their meanings. There are various types of context clues that you may encounter as you read.

Related Details: I maintain a small **infirmary** for injured and geriatric pigeons.

Restatement: So **plentiful** was the supply that the jar was filled to the brim in no time.

Apply your knowledge of context clues and other vocabulary strategies to determine the meanings of unfamiliar words you encounter during your first read.

First Read FICTION

Apply these strategies as you conduct your first read. You will have an opportunity to complete a close read after your first read.

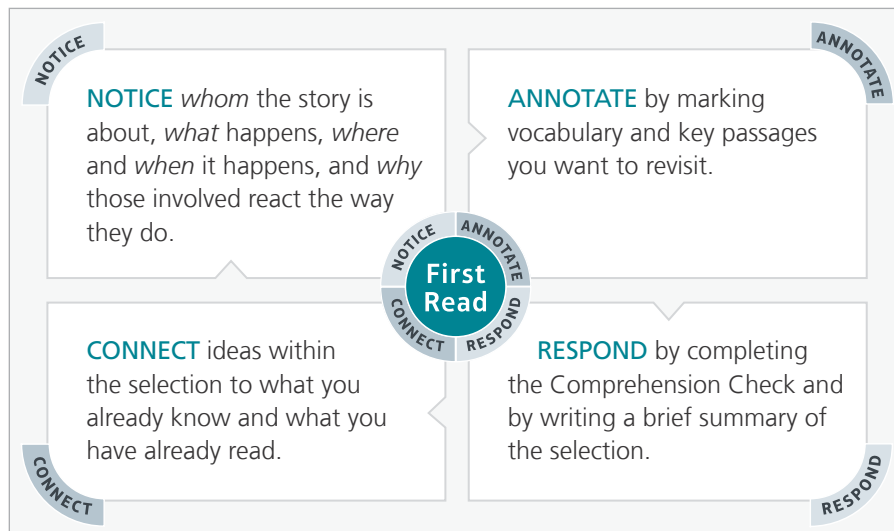
STANDARDS

Reading Literature

By the end of the year, read and comprehend literature, including stories, dramas, and poems, at the high end of grades 6–8 text complexity band independently and proficiently.

Language

Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.
a. Use context as a clue to the meaning of a word or phrase.



from *The Invention of Everything Else*

Samantha Hunt

BACKGROUND

In her novel, Samantha Hunt imagines the last days in the life of Nikola Tesla from the perspective of the famous inventor. This excerpt refers to Guglielmo Marconi, an inventor who sent the first wireless signal across an ocean and received a Nobel Prize for his work in 1911. However, he did so by using many key inventions that were initially developed by Nikola Tesla.

- 1 **L**ightning first, then the thunder. And in between the two I'm reminded of a secret. I was a boy and there was a storm. The storm said something muffled. Try and catch me, perhaps, and then it bent down close to my ear in the very same way my brother Dane used to do. Whispering. A hot, damp breath, a tunnel between his mouth and my ear. The storm began to speak. You want to know what the storm said? Listen.

SCAN FOR
MULTIMEDIA



NOTES

- 2 Things like that, talking storms, happen to me frequently. Take for example the dust here in my hotel room. Each particle says something as it drifts through the last rays of sunlight, pale blades that have cut their way past my closed curtains. Look at this dust. It is everywhere. Here is the tiniest bit of a woman from Bath Beach who had her hair styled two days ago, loosening a few small flakes of scalp in the process. Two days it took her to arrive, but here she is at last. She had to come because the hotel where I live is like the sticky tongue of a frog jutting out high above Manhattan, collecting the city particle by wandering particle. Here is some chimney ash. Here is some buckwheat flour blown in from a Portuguese bakery on Minetta Lane and a pellicle of curled felt belonging to the haberdashery¹ around the corner. Here is a speck of evidence from a shy graft inspector. Maybe he lived in the borough of Queens. Maybe a respiratory influenza killed him off in 1897. So many maybes, and yet he is still here. And, of course, so am I. Nikola Tesla, Serbian, world-famous inventor, once celebrated, once visited by kings, authors and artists, welterweight pugilists,² scientists of all stripes, journalists with their prestigious awards, ambassadors, mezzo-sopranos,³ and ballerinas. And I would shout down to the dining hall captain for a feast to be assembled. “Quickly! Bring us the Stuffed Saddle of Spring Lamb. Bring us the Mousse of Lemon Sole and the Shad Roe Belle Meunière! Potatoes Raclette! String Bean Sauté! Macadamia nuts! A nice bourbon, some tonic, some pear nectar, coffees, teas, and please, please make it fast!”
- 3 That was some time ago. Now, more regularly, no one visits. I sip at my vegetable broth listening for a knock on the door or even footsteps approaching down the hallway. Most often it turns out to be a chambermaid on her rounds. I’ve been forgotten here. Left alone talking to lightning storms, studying the mysterious patterns the dust of dead people makes as it floats through the last light of day.
- 4 Now that I have lived in the Hotel New Yorker far longer than any of the tourists or businessmen in town for a meeting, the homogeneity⁴ of my room, a quality most important to any hotel décor, has all but worn off. Ten years ago, when I first moved in, I constructed a wall of shelves. It still spans floor to ceiling. The wall consists of seventy-seven fifteen-inch-tall drawers as well as a number of smaller cubbyholes to fill up the odd spaces. The

1. **haberdashery** *n.* store that sells men’s clothing, including hats made from felt.
 2. **welterweight pugilists** (PYOO juh lihsts) *n.* professional boxers of intermediate weight, between lightweight and middleweight.
 3. **mezzo-sopranos** (MEHT soh suh PRAN ohz) singers.
 4. **homogeneity** (hoh muh juh NEE uh tee) *n.* similar and uniform quality.

top drawers are so high off the ground that even I, at over six feet tall, am forced to keep a wooden step stool behind the closet door to access them. Each drawer is stained a deep brown and is differentiated from the others by a small card of identification taped to the front. The labels have yellowed under the adhesive. COPPER WIRE. CORRESPONDENCE. MAGNETS. PERPETUAL MOTION. MISC.

- 5 Drawer #42. It sticks and creaks with the weather. This is the drawer where I once thought I'd keep all my best ideas. It contains only some cracked peanut shells. It is too dangerous to write my best ideas down. "Whoops. Wrong drawer. Whoops." I repeat the word. It's one of my favorites. If it were possible I'd store "Whoops" in the safe by my bed, along with "OK" and "Sure thing" and the documents that prove that I am officially an American citizen.
- 6 Drawer #53 is empty, though inside I detect the slightest odor of ozone. I sniff the drawer, inhaling deeply. Ozone is not what I am looking for. I close #53 and open #26. Inside there is a press clipping, something somebody once said about my work: "Humanity will be like an anthheap stirred up with a stick. See the excitement coming!" The excitement, apparently, already came and went.
- 7 That is not what I'm looking for.
- 8 Somewhere in one of the seventy-seven drawers I have a clipping from an article published in the *New York Times*. The article includes a photo of the inventor Guglielmo Marconi riding on the shoulders of men, a loose white scarf held in his raised left hand, flagging the breeze. All day thoughts of Marconi have been poking me in the ribs. They often do whenever I feel particularly low or lonely or poorly financed. I'll shut my eyes and concentrate on sending Marconi a message. The message is, "Marconi, you are a thief." I focus with great concentration until I can mentally access the radio waves. As the invisible waves advance through my head I attach a few words to each—"donkey," and "worm," and "limacine," which is an adjective that I only recently acquired the meaning of, *like a slug*. When I'm certain that the words are fixed to the radio waves I'll send the words off toward Marconi, because he has stolen my patents.⁵ He has stolen my invention of radio. He has stolen my notoriety. Not that either of us deserved it. Invention is nothing a man can own.
- 9 And so I am resigned.

5. **patents** *n.* documents that give an individual the right to make or sell new inventions or products; patents prevent others from making, using, or selling the inventions or products for a set period of time.

- 10 Out the window to the ledge, thirty-three stories above the street, I go legs first. This is no small feat. I am no small man. Imagine an oversized skeleton. I have to wonder what a skeleton that fell thirty-three stories, down to the street below, would look like. I take one tentative glance toward the ground. Years ago power lines would have stretched across the block in a mad cobweb, a net, because years ago, any company that wanted to provide New York with electricity simply strung its own decentralized power lines all about the city before promptly going out of business or getting forced out by J. P. Morgan.⁶ But now there is no net. The power lines have been hidden underground.
- 11 That's not why I've come here. I have no interest in jumping. I'm not resigned to die. Most certainly not. No, I'm resigned only to leave humans to their humanness. Die? No. Indeed, I've always planned to see the far side of one hundred and twenty-five. I'm only eighty-six. I've got thirty-nine more years. At least.



- 12 “HooEEEHoo. HooEEEHoo.” The birds answer the call. Gray flight surrounds me, and the reverse swing of so many pairs of wings, some iridescent, some a bit duller, makes me dizzy. The birds slow to a landing before me, beside me, one or two perching directly on top of my shoulders and head. Mesmerized by their feathers—such engineering!—I lose my balance. The ledge is

6. **J.P. Morgan** powerful businessman who merged several electrical companies to create one massive company in 1891.

perhaps only forty-five centimeters wide. My shoulders lurch forward a bit, just enough to notice the terrific solidity of the sidewalks thirty-three stories down. Like a gasp for air, I pin my back into the cold stone of the window's casing. A few pigeons startle and fly away out over Eighth Avenue, across Manhattan. Catching my breath, I watch them go. I watch them disregard gravity, the ground, and the distance between us. And though an old feeling, one of wings, haunts my shoulder blades, I stay pinned to the window. I've learned that I cannot go with them.

13 Out on the ledge of my room, I maintain a small infirmary for injured and geriatric⁷ pigeons. A few tattered boxes, some shredded newspaper. One new arrival hobbles on a foot that has been twisted into an angry knuckle, a pink stump. I see she wants nothing more to do with the hydrogen peroxide that bubbled fiercely in her wound last night. I let her be, squatting instead to finger the underside of another bird's wing. Beneath his sling the ball of his joint has finally stayed lodged in its orbit, and for this I am relieved. I turn my attention to mashing meal.

14 "Hello, dears." The air of New York this high up smells gray with just a hint of blue. I sniff the air. "It's getting chilly, hmm?" I ask the birds. "And what are your plans for the New Year tonight?" The hotel has been in a furor, preparing for the festivities all week. The birds say nothing. "No plans yet? No, me neither."

15 I stand, looking out into the darkening air. "HooEEehoo?" It's a question. I stare up into the sky, wondering if she will show tonight. "HooEEehoo?"

16 Having lived in America for fifty-nine years, I've nearly perfected my relationships with the pigeons, the sparrows, and the starlings of New York City. Particularly the pigeons. Humans remain a far greater challenge.

17 I sit on the ledge with the birds for a long while, waiting for her to appear. It is getting quite cold. As the last rays of sun disappear from the sky, the undersides of the clouds glow with a memory of the light. Then they don't anymore, and what was once clear becomes less so in the darkening sky. The bricks and stones of the surrounding buildings take on a deeper hue. A bird cuts across the periphery of my sight. I don't allow myself to believe it might be her. "HooEEehoo?" Don't look, I caution my heart. It won't be her. I take a look just the same. A gorgeous checkered, his hackle purple and green. It's not her.

18 She is pale gray with white-tipped wings, and into her ear I have whispered all my doubts. Through the years I've told her of my childhood, the books I read, a history of Serbian battle songs, dreams of earthquakes, endless meals and islands, inventions,

7. **geriatric** (jehr ee AT rihk) *adj.* elderly.

Mark context clues or indicate another strategy you used to help you determine connotations and denotations.

deficiencies (dih FIHSH uhn seez) *n.*

MEANING:

lost notions, love, architecture, poetry—a bit of everything. We’ve been together since I don’t remember when. A long while. Though it makes no sense, I think of her as my wife, or at least something like a wife, inasmuch as any inventor could ever have a wife, inasmuch as a bird who can fly could ever love a man who can’t.

19 Most regularly she allows me to smooth the top of her head and neck with my pointer finger. She even encourages it. I’ll run my finger over her feathers and feel the small bones of her head, the delicate cage made of calcium built to protect the bit of magnetite⁸ she keeps inside. This miraculous mineral powers my system of alternating-current electrical distribution. It also gives these birds direction, pulling north, creating a compass in their bodies, ensuring that they always know the way home.

20 I’ve not seen my own home in thirty-five years. There is no home anymore. Everyone is gone. My poor, torn town of Smiljan—in what was once Lika, then Croatia, now Yugoslavia. “I don’t have wings,” I tell the birds who are perched beside me on the ledge. “I don’t have magnetite in my head.” These **deficiencies** punish me daily, particularly as I get older and recall Smiljan with increasing frequency.

21 When I was a child I had a tiny laboratory that I’d constructed in an alcove of trees. I nailed tin candle sconces to the trunks so that I could work into the night while the candles’ glow crept up the orange bark and filled my laboratory with odd shadows—the stretched fingers of pine needles as they shifted and grew in the wind.

22 There is one invention from that time, one of my very first, that serves as a measure for how the purity of thought can dwindle with age. Once I was clever. Once I was seven years old. The invention came to me like this: Smiljan is a very tiny town surrounded by mountains and rivers and trees. My house was part of a farm where we raised animals and grew vegetables. Beside our home was a church where my father was the minister. In this circumscribed⁹ natural setting my ears were attuned to a different species of sounds: footsteps approaching on a dirt path, raindrops falling on the hot back of a horse, leaves browning. One night, from outside my bedroom window, I heard a terrific buzzing noise, the rumble of a thousand insect wings beating in concert. I recognized the noise immediately. It signaled the seasonal return of what people in Smiljan called May bugs, what people in America call June bugs. The insects’ motions, their constant energy, kept me awake through the night, considering, plotting, and scheming. I roiled in my bed with the possibility these insects presented.

8. **magnetite** (MAG nuh tyt) *n.* type of iron that is strongly attracted by magnets.

9. **circumscribed** (suh kuhm SKRYBD) *adj.* limited.

23 Finally, just before the sun rose, I sneaked outside while my family slept. I carried a glass jar my mother usually used for storing stewed vegetables. The jar was nearly as large as my rib cage. I removed my shoes—the ground was still damp. I walked barefoot through the paths of town, stopping at every low tree and shrub, the leaves of which were alive with June bugs. Their brown bodies hummed and crawled in masses. They made my job of collection quite easy. I harvested the beetle crop, sometimes collecting as many as ten insects per leaf. The bugs' shells made a hard click when they struck against the glass or against another bug. So plentiful was the supply that the jar was filled to brimming in no time.

24 I returned to my pine-tree laboratory and set to work. First, by constructing a simple system of gear wheels, I made an engine in need of a power supply. I then studied the insects in the jar and selected those that demonstrated the most aggressive and muscular tendencies. With a dab of glue on their thorax undersides, I stuck my eight strongest beetles to the wheel and stepped back. The glue was good; they could not escape its harness. I waited a moment, and in that moment my thoughts grew dark. Perhaps, I thought, the insects were in shock. I pleaded with the bugs, "Fly away!" Nothing. I tickled them with a twig. Nothing. I stomped my small feet in frustration and stepped back prepared to leave the laboratory and hide away from the failed experiment in the fronds of breakfast, when, just then, the engine began to turn. Slowly at first, like a giant waking up, but once the insects understood that they were in this struggle together their speed increased. I gave a jump of **triumph** and was immediately struck by a vision of the future in which humans would exist in a kingdom of ease, the burden of all our chores and travails would be borne by the world of insects. I was certain that this draft of the future would come to pass. The engine spun with a whirling noise. It was brilliant, and for a few moments I burned with this brilliance.

25 In the time it took me to complete my invention the world around me had woken up. I could hear the farm animals. I could hear people speaking, beginning their daily work. I thought how glad my mother would be when I told her that she'd no longer have to milk the goats and cows, as I was developing a system where insects would take care of all that. This was the thought I was tumbling joyfully in when Vuk, a boy who was a few years older than me, entered into the laboratory. Vuk was the urchin son of an army officer. He was no friend of mine but rather one of the older children in town who, when bored, enjoyed needling

Mark context clues or indicate another strategy you used to help you determine connotations and denotations.

triumph (TRY uhmf) *n.*

MEANING:

NOTES

Mark context clues or indicate another strategy you used to help you determine connotations and denotations.

revolutionized (rehv uh LOO shuh nyzd) *v.*

MEANING:

me, vandalizing the laboratory I had built in the trees. But that morning my delight was such that I was glad to see even Vuk. I was glad for a witness. Quickly I explained to him how I had just **revolutionized** the future, how I had developed insect energy, the source that would soon be providing the world with cheap, replenishable power. Vuk listened, glancing once or twice at the June bug engine, which, by that time, was spinning at a very impressive speed. His envy was thick; I could nearly touch it. He kept his eyes focused on the glass jar that was still quite full of my power source. Vuk twisted his face up to a cruel squint. He curled the corners of his fat lips. With my lecture finished, he nodded and approached the jar. Unscrewing the lid he eyed me, as though daring me to stop him. Vuk sank his hand, his filthy fingernails, down into the mass of our great future and withdrew a fistful of beetles. Before I could even understand the annihilation I was about to behold, Vuk raised his arm to his mouth, opened the horrid orifice, and began to chew. A crunching sound I will never forget ensued. Tiny exoskeletons mashed between molars, dark legs squirming for life against his chubby white chin. With my great scheme crashing to a barbarous end—I could never look at a June bug again—I ran behind the nearest pine tree and promptly vomited.

- 26 On the ledge the birds are making a noise that sounds like contentment, like the purr of the ocean from a distance. I forget Vuk. I forget all thoughts of humans. I even forget about what I was searching for in the wall of drawers until, staring out at the sky, I don't forget anymore.
- 27 On December 12, 1901, Marconi sent a message across the sea. The message was simple. The message was the letter S. The message traveled from Cornwall, England, to Newfoundland, Canada. This S traveled on air, without wires, passing directly through mountains and buildings and trees, so that the world thought wonders might never cease. And it was true. It was a magnificent moment. Imagine, a letter across the ocean without wires.
- 28 But a more important date is October 1893, eight years earlier. The young Marconi was seated in a crowded café huddled over, intently reading a widely published and translated article written by me, Nikola Tesla. In the article I revealed in exacting detail my system for both wireless transmission of messages and the wireless transmission of energy. Marconi scribbled furiously.
- 29 I pet one bird to keep the chill from my hands. The skin of my knee is visible through my old suit. I am broke. I have given AC electricity to the world. I have given radar, remote control, and

radio to the world, and because I asked for nothing in return, nothing is exactly what I got. And yet Marconi took credit. Marconi surrounded himself with fame, strutting as if he owned the invisible waves circling the globe.

30 Quite honestly, radio is a nuisance. I know. I'm its father. I never listen to it. The radio is a distraction that keeps one from concentrating.

31 "HooEEehoo?"

32 There is no answer.

33 I'll have to go find her. It is getting dark and Bryant Park is not as close as it once was, but I won't rest tonight if I don't see her. Legs first, I reenter the hotel, and armed with a small bag of peanuts, I set off for the park where my love often lives.

34 The walk is a slow one, as the streets are beginning to fill with New Year's Eve revelers. I try to hurry, but the sidewalks are busy with booby traps. One gentleman stops to blow his nose into a filthy handkerchief, and I dodge to the left, where a woman tilts her head back in a laugh. Her pearl earrings catch my eye. Just the sight of those monstrous jewels sets my teeth on edge, as if my jaws were being ground down to dull nubs. Through this obstacle course I try to outrun thoughts of Marconi. I try to outrun the question that repeats and repeats in my head, paced to strike with every new square of sidewalk I step on. The question is this: "If they are your patents, Niko, why did Marconi get word—well, not word but letter—why did he get a letter across the ocean before you?" I walk quickly. I nearly run. Germs be damned. I glance over my shoulder to see if the question is following. I hope I have outpaced it.

35 New York's streets wend their way between the arched skyscrapers. Most of the street-level businesses have closed their doors for the evening. Barbizon Hosiery. Conte's Salumeria, where a huge tomcat protects the drying sausages. Santangelo's Stationery and Tobacco. Wasserstein's Shoes. Jung's Nautical Maps and Prints. The Wadesmith Department Store. All of them closed for the holiday. My heels click on the sidewalks, picking up speed, picking up a panic. I do not want this question to catch me, and worse, I do not want the answer to this question to catch me. I glance behind myself one more time. I have to find her tonight.

I do not want this question to catch me, and worse, I do not want the answer to this question to catch me.

- 36 I turn one corner and the question is there, waiting, smoking, reading the newspaper. I pass a lunch counter and see the question sitting alone, slurping from a bowl of chicken soup. “If they are your patents, Niko, why did Marconi send a wireless letter across the ocean before you?”
- 37 The question makes me itch. I decide to focus my thoughts on a new project, one that will distract me. As I head north, I develop an appendix of words that begin with the letter S, words that Marconi’s first wireless message stood for. 🐼

Comprehension Check

Complete the following items after you finish your first read. Review and clarify details with your group.

1. Where does Tesla live? In what country did he originally live?
2. What does Tesla use the ledge outside his window for?
3. For what reason is Tesla angry with Marconi?
4. What question does Tesla try to outrun?



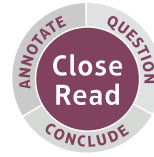
Notebook Confirm your understanding of the text by writing a short summary.

RESEARCH

Research to Clarify Choose at least one unfamiliar detail from the excerpt. Briefly research that detail. In what way does the information you learned shed light on an aspect of the story?

Close Read the Text

With your group, revisit sections of the text you marked during your first read. **Annotate** what you notice. What **questions** do you have? What can you **conclude**?



from THE INVENTION OF EVERYTHING ELSE

Analyze the Text

CITE TEXTUAL EVIDENCE to support your answers.

Notebook Complete the activities.

- 1. Review and Clarify** Reread paragraphs 21–25 of the excerpt. What is one of the first inventions Tesla made as a child? How does this **anecdote**, or short account, about his childhood experience with invention help to develop Tesla’s character? What does it reveal about the nature of inventions? Discuss with your group.
- 2. Present and Discuss** Discuss what you noticed in the selection, what questions you asked, and what conclusions you reached.
- 3. Essential Question: *Are inventions realized through inspiration or perspiration?*** What have you learned about invention from reading this selection?

TIP

GROUP DISCUSSION

As you work with your group, make sure each member has an opportunity to contribute to the discussion. Be sensitive to the amount of time you spend speaking.

LANGUAGE DEVELOPMENT

Concept Vocabulary

deficiencies **triumph** **revolutionized**

Why These Words? The three concept vocabulary words are related. With your group, determine what the words have in common. Write your ideas, and add at least one other word that fits the category.

Practice

Notebook Confirm your understanding of these words from the text by using each word in a sentence. Share your sentences with your group.

Word Study

Denotation and Connotation A word’s **denotation** is its dictionary meaning. Synonyms have nearly identical denotations. A word’s **connotation** is the idea or emotion associated with the word. Often, words have positive or negative connotations that affect how people respond to them. Synonyms often have different connotations. For example, the concept vocabulary word *triumph* and the word *win* are synonyms, but *triumph* has a more positive, stronger connotation than *win*, which is more neutral. With your group, find a synonym for each of the other concept vocabulary words, and discuss the connotations of each pair.

WORD NETWORK

Identify words from the selection that relate to the concept of invention. Add these words to your Word Network.

STANDARDS

- Language**
- Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.
 - Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
 - c. Distinguish among the connotations of words with similar denotations.



from THE INVENTION OF EVERYTHING ELSE

Analyze Craft and Structure

Word Choice: Figurative Language In *The Invention of Everything Else*, the author uses **figurative language**—language not meant to be taken literally—to describe and compare things in imaginative ways. The chart defines several **figures of speech**, or types of figurative language, and provides an example for each type.

TYPE OF FIGURATIVE LANGUAGE	DEFINITION	EXAMPLE FROM THE TEXT
personification	comparison in which a nonhuman subject is given human characteristics	<i>The storm said something muffled. . . .</i> (paragraph 1)
simile	compares two unlike things using the words <i>like</i> or <i>as</i>	<i>She had to come because the hotel where I live is like the sticky tongue of a frog jutting out high above Manhattan, collecting the city particle by wandering particle. . . .</i> (paragraph 2)
metaphor	compares two unlike things by saying that one thing is the other	<i>Years ago power lines would have stretched across the block in a mad cobweb, a net, . . .</i> (paragraph 10)

Practice

CITE TEXTUAL EVIDENCE to support your answers.

Reread the excerpt and find other examples of figurative language. Gather your examples in the chart. With your group, analyze the ways in which the examples you noted deepen your understanding of the text and its subject, Nikola Tesla.

TYPE OF FIGURATIVE LANGUAGE	EXAMPLE FROM THE TEXT
personification	
simile	
metaphor	

STANDARDS

Reading Literature

- Determine the meaning of words and phrases as they are used in a text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.

Language

Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.

- Interpret figures of speech in context.



Conventions

Comparative and Superlative Forms of Adjectives and Adverbs

Most adjectives and adverbs have three degrees of comparison, helping writers easily compare the qualities or conditions of their subjects.

- The **positive** degree is used when no comparison is made: Tesla was a *great* inventor.
- The **comparative** is used when two things are being compared: Some people believe that Tesla was a *greater* inventor than Edison.
- The **superlative** is used when three or more things are being compared: Perhaps, Tesla was the *greatest* inventor of all.

FORMING COMPARATIVE AND SUPERLATIVE ADJECTIVES AND ADVERBS

Use <i>-er</i> or <i>more</i> to form the comparative degree.	<i>taller, sooner, more inventive, more quietly</i>
Use <i>-est</i> or <i>most</i> to form the superlative degree.	<i>sharpest, fastest, most colorful, most creatively</i>


Irregular adjectives and adverbs have special forms that must be memorized. This chart shows some commonly used irregular adjectives and adverbs.

POSITIVE	COMPARATIVE	SUPERLATIVE
bad, badly	worse	worst
good, well	better	best
many, much	more	most
little (small amount of)	less	least

Read It

1. Identify the adjective or adverb in each sentence. Then, identify the degree of comparison it indicates: *positive*, *comparative*, or *superlative*.
 - a. Toward the end of his life, Tesla seemed happiest feeding pigeons.
 - b. Tesla's supporters were convinced he was doing the most exciting work ever in the field of electrical engineering.
 - c. Rather than admit he had dropped out of school, Tesla found it easier to pretend he had drowned.
2. Find three adjectives and adverbs in *The Invention of Everything Else* and indicate the degree of comparison each reflects.

Write It

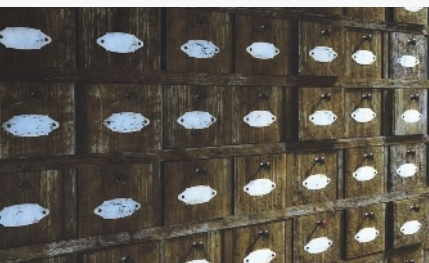
 **Notebook** Write a brief paragraph about Tesla's feelings toward Marconi. Your paragraph should have at least one adjective or adverb for each degree of comparison. Include at least one irregular adjective or adverb in your paragraph.

STANDARDS

Language
Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.



NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?



from THE INVENTION OF EVERYTHING ELSE

Writing to Compare

In this feature you read two selections about the inventor Nikola Tesla. In the biographical work “Nikola Tesla: The Greatest Inventor of All?,” you learned factual information about Tesla and his life. In *The Invention of Everything Else*, you read a historical fiction account in which the author, Samantha Hunt, uses her imagination in combination with historical facts to develop the character of Nikola Tesla.

Assignment

Write a **compare-and-contrast essay** in which you analyze the ways in which each text reveals an aspect of Tesla’s life and personality.

You will work with your group to analyze the texts and gather information to use in your essay. Then, you will write your essays individually.

Planning and Prewriting

Compare Text Details Work with your group to analyze the ways in which Nikola Tesla is portrayed in a nonfiction text and a work of fiction. Work as a group to fill in the chart with details from both texts.

DETAILS FROM THE TEXT	NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?	from THE INVENTION OF EVERYTHING ELSE
Events from Tesla’s life		
Tesla’s character traits and personality		
Details about important places in Tesla’s life		
Details about Tesla’s accomplishments		

Notebook Respond to these questions.

- Which did you enjoy reading more? Which text more effectively portrayed Tesla? Which text provided more biographical detail?

Drafting

Form a Thesis Focus your thoughts by creating a thesis statement that explains the point of your comparison. Here is a sentence starter to help you begin:

Thesis: When you compare and contrast these two treatments of Nikola Tesla's life, it becomes clear that

Organize Your Essay When you are satisfied with your thesis, determine how you should present the information. Develop an outline for your essay using the following strategies:

- Begin your essay by revealing your thesis and providing background for readers.
- Develop your comparison and contrast in one of two ways: Discuss one text and all its features in a series of paragraphs and then discuss the other text in the following paragraph. Alternatively, in each body paragraph, discuss one element as it is treated in both texts, and then discuss a second element, and so on.
- Create cohesion in your essay by using transitional words and phrases, such as *regardless*, *despite*, and *for this reason*, that connect your claims, reasons, and evidence.
- Conclude your essay with a paragraph in which you restate your thesis and summarize the main evidence that you presented in support of your thesis.

Review, Revise, and Edit

Add Details Review your draft and add supporting details where needed. Consider quoting materials from the texts as support. When you do so, be sure to use quotation marks and indicate the source of each quotation.

Use a Formal Style Once you are done drafting, review your essay to be sure you have maintained a formal style. Revise your writing to eliminate instances where you used informal language, such as contractions, slang, or clichés.

Proofread for Accuracy Carefully reread your essay. Fix spelling errors as well as any grammatical problems. Be sure to check all quoted material against the original source to be sure the quotes are accurate.

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you have learned from reading "Nikola Tesla: The Greatest Inventor of All?" and *The Invention of Everything Else*.

STANDARDS

Writing

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

- Draw evidence from literary or informational texts to support analysis, reflection, and research.



About the Author



Dennis Overbye (b. 1944) is a science writer specializing in physics and cosmology, the science of the origin and development of the universe. In 1998, he joined the staff of the *New York Times* as deputy science editor, then switched to full-time writing. His articles have appeared in *Time*, *Science*, the *Los Angeles Times*, and the *New York Times*, among others. In 2014, he was a finalist for the Pulitzer Prize for Explanatory Reporting. Overbye lives in New York City with his wife, daughter, and two cats.

25 Years Later, Hubble Sees Beyond Troubled Start

Concept Vocabulary

As you perform your first read of “25 Years Later, Hubble Sees Beyond Troubled Start,” you will encounter these words.

dismay

controversy

outrage

Context Clues Sometimes you need to infer the meaning of an unfamiliar word by looking for context clues in the surrounding words.

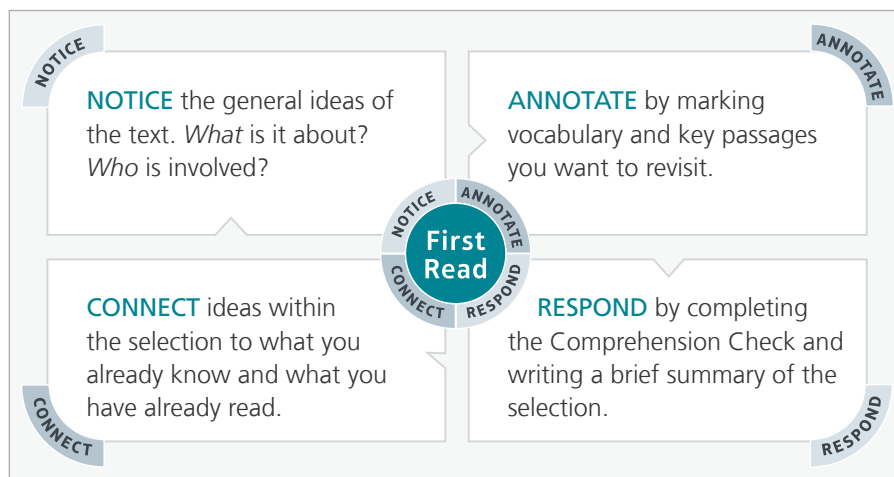
Example from the selection:

When the Hubble was finally deployed, NASA’s **spinmasters** were instantly at the top of their game, hailing it as the greatest advance in astronomy since Galileo.

If you didn’t know the meaning of the term *spinmasters*, you might infer from the underlined clues that *spinmasters* provide positive reviews to the public in order to boost the reputation of a business or organization.

First Read NONFICTION

Apply these strategies as you conduct your first read. You will have an opportunity to complete a close read after your first read.



STANDARDS

Reading Informational Text

By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.

Language

Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.

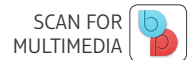
- a. Use context as a clue to the meaning of a word or phrase.

25 Years Later, Hubble Sees Beyond Troubled Start

Dennis Overbye

BACKGROUND

Lyman Spitzer Jr. (1914–1997), whose ideas inspired the creation of the Hubble Space Telescope, achieved great success as an astrophysicist. He studied space astronomy, star clusters, and the physics of stars. Not only did he propose the creation of a space telescope, he did so a decade before the first satellite had been launched.



- 1 **A**gainst all odds, it's 25 years in space and counting for the Hubble Space Telescope this month.¹
- 2 Few icons of science have had such a perilous existence, surviving political storms, physical calamities, and the simple passage of time in the service of cosmic exploration.
- 3 In 1946, the astronomer Lyman Spitzer, Jr., had a dream. A telescope in space, above the unruly atmosphere, would be able to see stars unaffected by the turbulence that blurs them and makes them twinkle. It would be able to see ultraviolet and infrared emissions that are blocked by the atmosphere and thus invisible to astronomers on the ground.
- 4 It took more than three decades for the rest of the astronomical community, NASA, and Congress to buy into this dream, partly as a way to showcase the capabilities of the space shuttle, still in development then, and the ability of astronauts to work routinely in space. By the time the telescope was launched into space from the space shuttle *Discovery* on April 25, 1990, it had been almost canceled at least twice and then delayed following the explosion of the shuttle *Challenger* in 1986.

NOTES

1. **this month** This article was published in April 2015.

Mark context clues or indicate another strategy you used that helped you determine meaning.

dismay (diss MAY) *n.*

MEANING:

- 5 When the Hubble was finally deployed, NASA’s spinmasters were instantly at the top of their game, hailing it as the greatest advance in astronomy since Galileo.²
- 6 And it might have been except for one problem: The telescope couldn’t be focused. Instead, within days it became a laughingstock—a “technoturkey,” in the words of some of its critics.
- 7 Designed using spy satellite technology, Hubble had an eight-foot mirror, just small enough to fit into the space shuttle cargo bay.
- 8 But because of a measuring error during a testing process that was hurried to save money, that big mirror wound up misshapen, polished four-millionths of an inch too flat, leaving the telescope with blurry vision. It was the kind of mistake, known as a spherical aberration, that an amateur astronomer might make, and it was a handful of astronomers who first recognized the flaw—to the disbelief and then the **dismay** of the engineers and contractors working for NASA.
- 9 For bright objects, astronomers could correct for the flaw with image processing software. But for the fainter parts of the universe, the Hubble needed glasses.
- 10 NASA scientists shrugged off their heartbreak and worked to figure out a way to provide corrective lenses.
- 11 Three years later, the space shuttle *Endeavour* and a repair crew led by Story Musgrave—astronaut, pilot, surgeon, spacewalker and Zen gardener—rode to the rescue.
- 12 In five tense days of spacewalks, they replaced the telescope’s main camera and installed tiny mirrors designed to correct the Hubble’s vision.
- 13 The rest of the universe snapped into crystalline focus. And NASA could stop holding its breath.
- 14 The Hubble was the first big-deal telescope of the Internet age, and its cosmic postcards captivated the world. Trained on a patch of sky known as the Hubble Ultra Deep Field in 2010, the telescope’s keen eye discerned swarms of baby galaxies crawling out of the primordial³ darkness as early as only 600 million years after the Big Bang.
- 15 And it took one of the first visible-light photos of a distant planet, Fomalhaut b, orbiting its star.
- 16 In perhaps its most iconic image, called “Pillars of Creation,” the Hubble recorded baby stars burning their way out of biblical-looking mountains of gas and dust in a stellar nursery known as the Eagle nebula.

2. **Galileo** Galileo Galilei (1564–1642) was an Italian scientist and scholar who was the first person to use a telescope to observe space.

3. **primordial** *adj.* ancient; from the beginning of time.

17 These postcards were not without **controversy**. The Hubble’s camera records in black and white, through filters that isolate the characteristic light from different atoms, such as sulfur, hydrogen, and oxygen. Then the different layers are assigned whatever colors look good to the eye and best show off the underlying astrophysics rather than their natural colors.

18 “Pillars of Creation,” for example, is presented in earth tones of green and brown and is oriented to look like a Turner landscape,⁴ while the natural emissions from the nebula are shades of red.

19 Technological hiccups have also continued. In 1999, four of the six gyroscopes that keep the telescope pointed failed, and the Hubble went into “safe mode.” A crew was hastily dispatched to replace the gyros. That was the first of what would be three trips to the telescope by John M. Grunsfeld, an astronaut, astronomer, and now NASA’s associate administrator for science, who would win the sobriquet “Hubble Repairman” for his feats.

20 The telescope has been reborn again and again over the years, thanks to the efforts of astronaut servicing crews. Astronauts wearing the equivalent of boxing gloves have gradually learned how to do things the telescope’s designers had never dared dream of, fiddling with its innards, replacing circuit boards and performing the equivalent of eye surgery and computer repairs in space.

21 The Hubble was hitting its stride, getting better and better, when the *Columbia* space shuttle disintegrated in 2003, killing all seven astronauts on board. That harkened the end of NASA’s space shuttle dreams.

22 The agency’s administrator, Sean O’Keefe, canceled what was to be the final Hubble servicing mission on the grounds that it was too risky. Without it, the telescope would be doomed to die in orbit within two or three years when its batteries and gyros failed again.

23 The decision was announced and defended by Dr. Grunsfeld, who was then NASA’s chief scientist. “Being an astronaut, there are not a lot of things that have really shocked me in my life,” Dr. Grunsfeld recalled later. “But I don’t think anybody could ever prepare themselves for, you know, trying to bury something that they have said, ‘Hey, this is worth risking my life for.’”

24 Mr. O’Keefe’s decision ignited a national **outcry**. Schoolchildren offered to send their pennies to NASA to help pay for the telescope.

NOTES

Mark context clues or indicate another strategy you used that helped you determine meaning.

controversy (KON truh vuhr see) *n.*

MEANING:

Mark context clues or indicate another strategy you used that helped you determine meaning.

outcry ((OWT kry) *n.*

MEANING:


4. **Turner landscape.** J.M.W Turner was an artist famed for his use of color.

- 25 Behind the scenes, however, Dr. Grunsfeld and other astronomers and NASA engineers were working on ways to save the Hubble, perhaps by sending robots to work on it.
- 26 The robotic approach was eventually rejected by a National Academy of Sciences panel, but it had served as a placeholder to keep the teams of engineers together. In the end, Mr. O’Keefe resigned, and his successor, Michael Griffin, reinstated a servicing mission.
- 27 In 2009, Dr. Grunsfeld led one last mission to the Hubble. He was the last human to touch the telescope, patting it as the shuttle *Atlantis* prepared to let it go again. But that does not mean the telescope has ceased to touch humanity. On the contrary, it continues to deliver news about this thing we are all part of—a universe—but barely understand.
- 28 Earlier this spring, astronomers announced that the Hubble had seen a sort of cosmic mirage known as an Einstein ring, in which they could view multiple reruns of a star that died in a stupendous supernova explosion more than nine billion years ago on the other side of the cosmos.
- 29 NASA is making a big deal of the Hubble anniversary, with a weeklong symposium⁵ in Baltimore, where the Space Telescope Science Institute is based.
- 30 “This is a celebration partly about the telescope and partly about NASA,” Dr. Grunsfeld said, “but much of it is a celebration of people doing science.”
- 31 The Hubble today is more powerful than its designers ever dreamed, and it has a good chance of living long enough to share the universe with its designated successor, the James Webb Space Telescope, due to be launched in 2018. The Hubble’s longevity is something few would have imagined 10 years ago, yet NASA is already planning a 30th-anniversary celebration in 2020, Dr. Grunsfeld said.
- 32 After a quarter-century, the telescope’s future and promise are still as big as the sky and our ignorance of what lies behind it. 🚀

5. **symposium** *n.* conference where experts discuss a certain topic.

Comprehension Check

Complete the following items after you finish your first read. Review and clarify details with your group.

1. When was the Hubble Space Telescope launched into space?
2. What advantage does a telescope in space have over one located on the ground?
3. A *laughingstock* is the subject of a joke or an object of ridicule. According to the article, what flaw made Hubble a “laughingstock”?
4. What is Hubble’s most recent image?
5.  **Notebook** Confirm your understanding of the article by writing a short summary.

RESEARCH

Research to Clarify Choose at least one unfamiliar detail from the text. Briefly research that detail. In what way does the information you learned shed light on an aspect of the article?

Research to Explore Conduct research on an aspect of the text you find interesting. For example, you may want to learn more about the Hubble’s designated successor, the James Webb Space Telescope, due to be launched in 2018.



25 YEARS LATER, HUBBLE SEES BEYOND TROUBLED START

TIP

GROUP DISCUSSION

Take time to review the meanings of unfamiliar words and technical terms before discussing the article with your group.

WORD NETWORK

Identify words from the article that relate to the concept of invention. Add these words to your Word Network.

STANDARDS

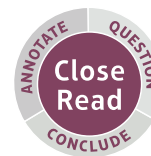
Language

Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on *grade 8 reading and content*, choosing flexibly from a range of strategies.

- b. Use common, grade-appropriate Greek or Latin affixes and roots as clues to the meaning of a word.
- c. Consult general and specialized reference materials, both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning or its part of speech.

Close Read the Text

With your group, revisit sections of the text you marked during your first read. **Annotate** what you notice. What **questions** do you have? What can you **conclude**?



Analyze the Text

CITE TEXTUAL EVIDENCE to support your answers.

Notebook Complete the activities.

- Review and Clarify** With your group, reread paragraphs 8–9 of the article. Discuss the specific problem that the Hubble had. What does this problem show about the nature of invention?
- Present and Discuss** Discuss what you noticed in the selection, what questions you asked, and what conclusions you reached.
- Essential Question: *Are inventions realized through inspiration or perspiration?*** What has this article taught you about invention? Discuss with your group.

LANGUAGE DEVELOPMENT

Concept Vocabulary

dismay controversy outcry

Why These Words? The concept vocabulary words from the text are related. With your group, determine what the words have in common. Write your ideas and add another word that fits the category.

Practice

Notebook Confirm your understanding of the concept vocabulary words by using each in a sentence. Provide context clues for the words.

Word Study

Latin Root: -vers- The word *controversy* contains the Latin root *-vers-* which means “to turn.” It also includes a variation of the Latin prefix *contra-*, which means “against” or “in opposition.” In the article, the author explains that the images from Hubble were the subject of a *controversy* because people had different opinions on their accuracy and usefulness. Based on the context and the Latin word parts, you can infer that a *controversy* is when people “turn against” each other. Use a dictionary to find the definitions of the following words that include the root *-vers-*: *reverse*, *subversive*, and *converse*. Briefly explain how the root *-vers-* contributes to the meaning of each word.

Analyze Craft and Structure

Author’s Purpose: Diction and Tone An author’s purpose for writing is the reason he or she writes. For example, an author may write to inform, to persuade, or to entertain. In “25 Years Later, Hubble Sees Beyond Troubled Start,” Dennis Overbye’s purpose for writing can be inferred by studying his diction and tone.

Diction, or word choice, has a great impact on readers. Writers choose what information to convey and how to say it. Examining diction can help you identify an author’s tone and purpose.

Tone is an author’s attitude toward his or her subject and audience. Tone is created by an author’s diction. Tone can usually be described using adjectives, such as *humorous*, *argumentative*, or *academic*. Identifying tone can also help you identify author’s purpose.

Here is an example of how to analyze diction and tone:

PASSAGE	ANALYSIS OF DICTION	ANALYSIS OF TONE
<i>The telescope has been reborn again and again over the years, thanks to the efforts of astronaut servicing crews.</i>	“reborn,” “thanks to the efforts” This passage conveys information but in an informal way.	grateful; positive

TIP

COLLABORATION

Some members of your group may have different ideas about the tone of the article. Reading a passage aloud may help you come to agreement.

STANDARDS

- Reading Informational Text
- Determine an author’s point of view or purpose in a text and analyze how the author acknowledges and responds to conflicting evidence or viewpoints.

Practice

CITE TEXTUAL EVIDENCE
to support your answers.

Use this chart to analyze Dennis Overbye’s diction and tone in “25 Years Later, Hubble Sees Beyond Troubled Start.” Then, share your analysis with your group, and work together to determine Overbye’s purpose for writing. The first row has been completed as an example.

PASSAGE	ANALYSIS OF DICTION	ANALYSIS OF TONE
Against all odds, it’s 25 years in space and counting for the Hubble Space Telescope this month. Few icons of science have had such a perilous existence, surviving political storms, physical calamities, and the simple passage of time in the service of cosmic exploration.	“it’s 25 years ... and counting” / “icons” / “service of” / “perilous” / “calamity” This passage uses contrasting language—informal words in Paragraph 1 and formal, difficult words in Paragraph 2.	dramatic; admiring
Paragraph 8		
Paragraphs 19 and 20		
Paragraph 31		
Author’s Purpose		



25 YEARS LATER, HUBBLE SEES BEYOND TROUBLED START

Conventions

Dashes and Ellipses

- An **ellipsis** (. . .) shows something is missing from a quoted passage. It can also show a pause or an interruption in speech.
- A **dash** (—) shows a strong, sudden break in thought or speech.

This chart shows some common reasons why authors use an ellipsis or a dash.


USE AN ELLIPSIS	EXAMPLES
to show the reader that you have chosen to leave out a word or words from a quoted passage	As the inscription on the Statue of Liberty says, "Give me your tired, your poor. . . ."
to indicate a pause or an interruption in speech	The scientist said, "When I saw the telescope's pictures, I . . . I couldn't speak."
USE A DASH	EXAMPLES
to show the reader that there is a strong, sudden interruption in thought or speech	"I can't believe—hey, look at the meteor!—how gorgeous the night sky is."
in place of <i>in other words</i> , <i>namely</i> , or <i>that is</i> before an explanation	The astronaut wanted one thing—to explore space in his lifetime.
to set off nonrestrictive elements (modifiers or other elements that are not essential to the meaning of the sentence) when there is a sudden break in thought	Albert Einstein—the physicist who developed the theory of relativity—became an American citizen in 1940.

Read It

Work with your group to complete each of the following items.

- The following quotations are passages from the news article. Use an ellipsis to omit a portion of each quotation without altering the meaning.
 - "Few icons of science have had such a perilous existence, surviving political storms, physical calamities, and the simple passage of time in the service of cosmic exploration."
 - "The telescope has been reborn again and again over the years, thanks to the efforts of astronaut servicing crews."
- Review the selection, and find at least two sentences in which the author uses dashes. Record the sentence, and determine the reason the author used dashes based on the information in the chart.

Write It

 **Notebook** Write a brief paragraph in which you explain what you learned from the news article about the Hubble Space Telescope. In your paragraph, use an ellipsis and a dash in at least three of the ways indicated in the chart.

STANDARDS

Language

Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.

- Use punctuation to indicate a pause or break.
- Use an ellipsis to indicate an omission.



Speaking and Listening

Assignment

With your group, conduct a **debate** in which you respond to one of the following propositions, or statements of opinion:

- Proposition 1:** Learning about the universe with a space telescope, such as Hubble, is a worthwhile pursuit that should be endorsed and well funded.
- Proposition 2:** The Hubble's flaws prevent it from providing humans with accurate and useful information about the universe.

Project Plan Decide which proposition your group will debate. With your group, determine which members will argue for the proposition and which members will argue against it. Choose a moderator to keep time and see that the debaters remain orderly and don't speak out of turn. Keep the following instructions in mind.

Preparing for the Debate

- Reread the article, and identify information from the selection that supports your proposition. Then, conduct research to find additional evidence to support your proposition, or argument.
- Analyze your evidence, and note specific details that support your proposition. Based on these notes, make logical connections between the evidence and your proposition. These connections are your reasons for arguing the position.
- Create a thesis, or statement of your position, from your notes. Present this thesis during your opening statement.
- Prior to the debate, prepare to address your opponents' arguments, or the **counterclaims** to your position, by thinking about the topic from the opposite perspective and considering the arguments that they might make.

Taking Part in the Debate

- During the debate, each participant should build on and respond to the arguments presented by the previous speaker.
- Use supporting evidence from the selection and from your research.
- Listen carefully to the opposing side during the debate so you can address their arguments and make counterclaims.
- Listen carefully and evaluate your opponents' arguments to see if they make sense. Identify when they do not present enough evidence to support their views or when the evidence they present is not well connected to their arguments.

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you learned from "25 Years Later, Hubble Sees Beyond Troubled Start."

STANDARDS

Speaking and Listening

- Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.
 - a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
 - b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
 - c. Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
 - d. Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.
- Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.



About the Musician

William Zeitler (b. 1954) earned his music degree from the California Institute of the Arts. He is a pianist, composer, and the author of a book on the history of the glass armonica. He is also one of the world's few professional armonica players and has released five albums of original armonica music.

Sounds of a Glass Armonica

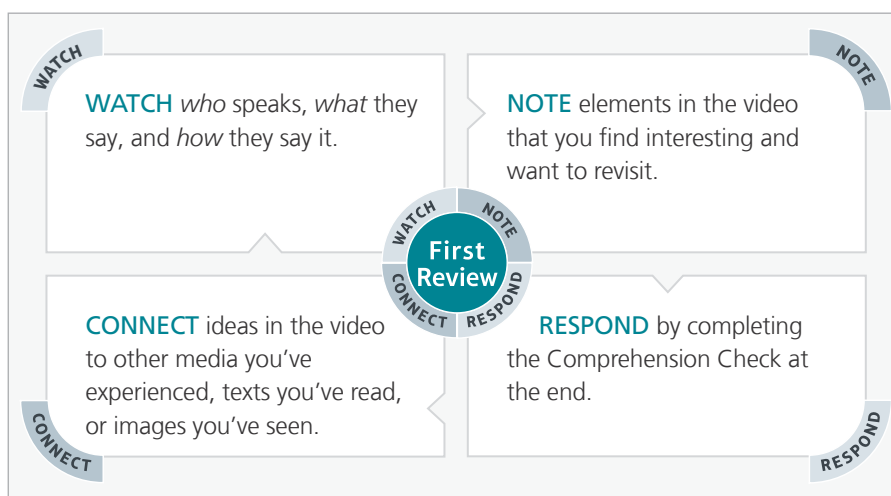
Media Vocabulary

The following words will be useful to you as you analyze, discuss, and write about the video.

zoom: enlarge, magnify, or close in on an image	<ul style="list-style-type: none"> • Elements within the lens create the camera's zoom effect. • Zooming in on an image emphasizes its importance.
video clip: a short video, often part of a larger recording, that can be used on a website	<ul style="list-style-type: none"> • The term "video clip" is used to mean any video shorter than the length of a traditional program. • A video clip can contain video, audio, animation, graphics, or any other content.
focus: to aim the camera so that it creates a distinct image	<ul style="list-style-type: none"> • A shot that is out of focus can seem mysterious and eerie. • Some photographers prefer sharply focused images and bright colors.

First Review MEDIA: VIDEO

Review the video using these strategies. Take note of time codes as you watch the video so that you can revisit sections you find interesting or important.



STANDARDS

Reading Informational Text

By the end of the year, read and comprehend literary nonfiction at the high end of the grades 6–8 text complexity band independently and proficiently.

Language

Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

Sounds of a Glass Armonica



BACKGROUND

Although Benjamin Franklin is well known for his role in the founding of the United States, he was also one of the era’s foremost scientists. Among his numerous inventions were the “Franklin stove,” the lightning rod, bifocals, the rocking chair, and a musical instrument called the armonica that premiered in 1762. At first Franklin named the instrument the “glassychord,” but he soon changed it to *armonica*—based on the Italian word *armonia*, which means “harmony.”

SCAN FOR MULTIMEDIA



NOTES



Comprehension Check

Complete the following items after you finish your first review. Review and clarify details with your group.

1. What produces sound in the glass armonica?

2. What is the purpose of the bowl of water shown in the video?

3. What famous composer wrote for the glass armonica?

MEDIA VOCABULARY

Use these words as you discuss and write about the video.

zoom
video clip
focus

WORD NETWORK

Identify words from the video that relate to the concept of invention. Add these words to your Word Network.

STANDARDS

Speaking and Listening
Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.

Close Review

Watch the video or parts of it again. Write any new observations that seem important. What **questions** do you have? What can you **conclude**?



Analyze the Media

CITE TEXTUAL EVIDENCE
to support your answers.

Complete the activities.

1. **Present and Discuss** Choose the section of the video you found most interesting or powerful. Share your choice with the group, and explain what you noticed in the video, the questions it raised for you, and the conclusions you reached about it.

2. **Review and Synthesize** With your group, review the whole video. What did you learn about how the armonica was invented? What do you think went into the design process?

3. **Essential Question: *Are inventions realized through inspiration or perspiration?*** What has this video revealed about whether inventions are realized through inspiration or perspiration? Discuss with your group.



Research

Assignment

Create a **multimedia presentation** highlighting a homemade or unusual musical instrument. Choose from the following topics:

- Research and present information on another unusual musical instrument, such as the steel drum, the zither, or the theremin.
- Research and present information on a “homemade” instrument, such as the comb kazoo, the chop choir, or the reed flute.

Set Project Goals Work with your group to form a plan for your presentation. Decide which instrument to focus on, what information and multimedia you will need, and the best way to present your information. Decide which group member will be responsible for each part of the presentation.

Conduct Research Begin the research process by finding details about the instrument your group chose—how it works, its origins, notable musicians who have played it, and memorable songs that feature it. Then, consider the types of multimedia that will best help your audience to visualize and understand how the instrument works and sounds. Since the presentation is about a musical instrument, you will need to include some audio components. For example, you might use audio or video recordings of the instrument being played, or you may choose to play the instrument yourself during the class presentation.

Organize Your Information It is important to sequence, or organize, your information effectively in a multimedia presentation. You must integrate text, visuals, and audio in a seamless, easy-to-follow manner. You will also have to consider the best time for information to be presented digitally, by a speaker, and through live performance. Once you have organized a sequence, rehearse your presentation with your group. Then, try rearranging the elements of your presentation, and practice presenting them in a different order. This will help you to determine whether you have selected the best organization for your presentation.

Use a chart like this to organize your ideas.

PRESENTER	SCRIPT	MEDIA



SOUNDS OF A GLASS ARMONICA

EVIDENCE LOG

Before moving on to a new selection, go to your Evidence Log and record what you learned from the video.

STANDARDS

Writing

Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

Speaking and Listening

Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.

a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.



SOURCES

- NIKOLA TESLA: THE GREATEST INVENTOR OF ALL?
- *from* THE INVENTION OF EVERYTHING ELSE
- 25 YEARS LATER, HUBBLE SEES BEYOND TROUBLED START
- SOUNDS OF A GLASS ARMONICA

Tool Kit

Collaboration Checklist

STANDARDS

Speaking and Listening

- Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.
 - a. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.
 - b. Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.
- Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.

Conduct a Debate

Assignment

The selections in this section have provided various perspectives on the subject of invention—the processes involved, the people behind them, and the inventions themselves. With your group, pair up with another group to conduct a **debate** in which each team takes a position on the Essential Question:

Are inventions realized through inspiration or perspiration?

Plan With Your Group

Support your position with evidence and examples from reading, viewing, and analyzing the selections in this part of the unit. Use the chart to list your ideas. For each selection, identify evidence that relates to whether inventions are realized through inspiration or perspiration. Use the evidence to begin planning the argument you will make in the debate.

TITLE	SUPPORTING EVIDENCE
Nikola Tesla: The Greatest Inventor of All?	
<i>from</i> The Invention of Everything Else	
25 Years Later, Hubble Sees Beyond Troubled Start	
Sounds of a Glass Armonica	

Gather Evidence and Media Examples As a group, discuss your notes and ideas. Identify specific examples from the selections to support your group's position. As a group, assess whether you have sufficient evidence to support your position.

Organize Your Ideas As a group, develop an outline for your argument. Clearly identify the claims you will make and the reasons and evidence that support them. Prepare for your opponents' arguments by considering their counterclaims to your position. Consider how you can respond, and have evidence ready to support your responses.

Set Debate Rules Assign one member of each group to moderate the debate and assign a designated time limit for each response. To show respect for your opponents, keep your responses within the designated time limit. Plan the discussion so you do not get cut off by the moderator when making a point.

Rehearse With Your Group

Practice With Your Group Within your group, practice delivering the points you will make in the debate. As each member practices his or her delivery, have other group members role-play as opponents. This will help you to identify places you need to strengthen your argument.

CONTENT	DEBATE TECHNIQUE	PRESENTATION TECHNIQUES
<input type="checkbox"/> Claims are presented clearly and supported by reasons and evidence. <input type="checkbox"/> Counterclaims are anticipated and addressed effectively.	<input type="checkbox"/> Each speaker keeps within the allotted time limit. <input type="checkbox"/> Points are clear and organized.	<input type="checkbox"/> Each speaker argues persuasively and confidently. <input type="checkbox"/> Each speaker speaks clearly and makes eye contact with the person he or she is addressing.

Fine-Tune the Content Review your evidence to be sure it supports your claims. If your claim is not fully supported, work with your group members to find information that better supports your claim.

Improve Your Debate Technique As you review your outline, consider whether you have connected all of your ideas in the clearest way possible. If you are concerned you might be missing a connection, ask your teacher for guidance on how to better connect your ideas.

Present and Evaluate

As you listen to other groups' debates, evaluate how well they meet the checklist requirements. After the debate, discuss whether other groups' claims were well supported by reasons and evidence. Then, discuss and reflect on any new information you gained from the process and whether it changed your initial views on the subject.

STANDARDS

Speaking and Listening

- Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.

- Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.
- Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

- Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.



ESSENTIAL QUESTION:

Are inventions realized through inspiration or perspiration?

There is a story behind every invention, and the ideas, knowledge, and experiences that contributed to each one are different. In this section, you will complete your study of invention by exploring an additional selection related to the topic. Then, you will share what you have learned with your classmates. To choose a text, follow these steps.

Look Back Think about the selections you have already read. What more do you want to know about the topic of invention?

Look Ahead Preview the selections by reading the descriptions. Which one seems most interesting and appealing to you?

Look Inside Take a few minutes to scan through the text you chose. Make another selection if this text doesn't meet your needs.

Independent Learning Strategies

Throughout your life, in school, in your community, and in your career, you will need to rely on yourself to learn and work on your own. Review these strategies and the actions you can take to practice them during Independent Learning. Add ideas of your own for each category.

STRATEGY	ACTION PLAN
Create a schedule	<ul style="list-style-type: none"> • Understand your goals and deadlines. • Make a plan for what to do each day. •
Practice what you have learned	<ul style="list-style-type: none"> • Use first-read and close-read strategies to deepen your understanding. • After you read, evaluate the usefulness of the evidence to help you understand the topic. • Consider the quality and reliability of the source. •
Take notes	<ul style="list-style-type: none"> • Record important ideas and information. • Review your notes before preparing to share with a group. •

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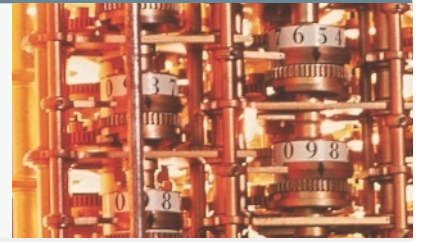
Choose one selection. Selections are available online only.

WEB ARTICLE

Ada Lovelace: A Science Legend

James Essinger

Why isn't the woman who wrote the first computer program—in the nineteenth century—famous?



WEB ARTICLE

Fermented Cow Dung Air Freshener Wins Two Students Top Science Prize

Kimberley Mok

Two Indonesian girls make something out of nothing by inventing a product using materials that nobody else wants.

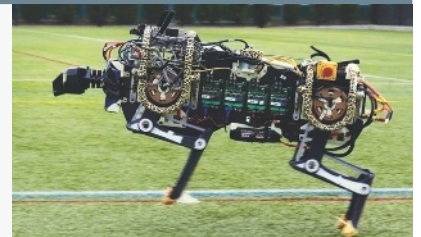


NEWS ARTICLE

Scientists Build Robot That Runs, Call It "Cheetah"

Rodrique Ngowi

When scientists can't beat the inventions of Mother Nature, they often are inspired to imitate them.



NOVEL EXCERPT

from *The Time Machine*

H. G. Wells

The destination of this inventor's vehicle isn't *where*—it's *when*.

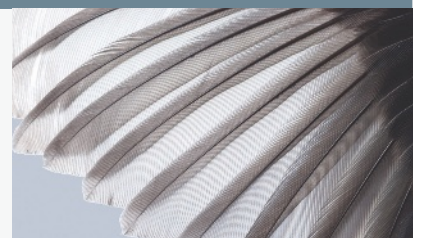


MYTH

Icarus and Daedalus

retold by Josephine Preston Peabody

Is an initial failure the basis for the future success of an invention?



PERFORMANCE-BASED ASSESSMENT PREP

Review Evidence for an Argument

Complete your Evidence Log for the unit by evaluating what you have learned and synthesizing the information you have recorded.



First-Read Guide



First-Read Guide and Model Annotation

Use this page to record your first-read ideas.

Selection Title: _____

NOTICE

NOTICE new information or ideas you learn about the unit topic as you first read this text.

ANNOTATE

ANNOTATE by marking vocabulary and key passages you want to revisit.



CONNECT ideas within the selection to other knowledge and the selections you have read.

RESPOND by writing a brief summary of the selection.


CONNECT

RESPOND

STANDARD

Reading Read and comprehend complex literary and informational texts independently and proficiently.

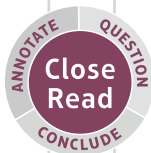
Close-Read Guide

 **Tool Kit**
Close-Read Guide and
Model Annotation

Use this page to record your close-read ideas.

Selection Title: _____


Close Read the Text	Analyze the Text
<p>Revisit sections of the text you marked during your first read. Read these sections closely and annotate what you notice. Ask yourself questions about the text. What can you conclude? Write down your ideas.</p>	<p>Think about the author's choices of patterns, structure, techniques, and ideas included in the text. Select one, and record your thoughts about what this choice conveys.</p>



QuickWrite

Pick a paragraph from the text that grabbed your interest. Explain the power of this passage.

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 **STANDARD**
Reading Read and comprehend complex literary and informational texts independently and proficiently.

Ada Lovelace: A Science Legend

James Essinger



SCAN FOR
MULTIMEDIA

About the Author



James Essinger (b. 1957) is a writer, editor, literary agent, public relations consultant, and competition-level chess player with a degree in Literature from Oxford University. His interest in the history of ideas led him to write *Jacquard's Web: How a Hand-Loom Led to the Birth of the Information Age*, which became one of the most popular science books of 2004. It was through writing this book that Essinger became interested in the relationship between Ada Lovelace and Charles Babbage.

BACKGROUND

The Industrial Revolution—which began in the United Kingdom in the mid-1700s and lasted until about 1840—was a major turning point in human history. Machines took over most of the manufacturing work, factories replaced artisans' workshops, and much of the population fled the countryside for jobs in the cities. Many important advances in technology occurred, influencing every aspect of daily life. Inventions such as the telegraph made communicating across the ocean easier and much faster.

- 1 Have you heard of Ada Lovelace yet?
- 2 When one's spent more than fifteen years, as I have, thinking about Ada probably most days and certainly every week, it's too easy to imagine that everybody else has heard of her too. But in fact, though Ada is better known to us today than in her own short lifetime—from 1815 to 1852—there are still many people who haven't heard of her. Indeed, I'm sure that most people haven't. But Ada really is someone you ought to consider adding to your repertoire of those people from the past who are worth knowing about.

NOTES

- 3 There was a sense in which externally her life wasn't especially interesting, despite the unusual nature of her origins—she was Lord Byron's¹ only legitimate daughter. She was born in comparative poverty at a time when Lord Byron and his wife, Lady Byron—formerly Annabella Milbanke—were permanently in debt because a dowry promised to Byron by Annabella's father didn't materialize.
- 4 After only about a year of living with Byron, Ada's mother couldn't stand his debts and infidelities and erratic, even often crazy behavior, anymore and she fled from him early one morning taking with her the infant Ada—who'd been born on December 10, 1815. Ada was only one month and five days old when Lady Byron left her husband.
- 5 Although there was some talk of the couple being reconciled, in fact Byron never saw Ada or his wife again. He died eight years later, an exile in Greece trying hard to encourage support for a Greek assault on the Turks to win Greek freedom. Ada herself was brought up with a rigorous education supplied by her mother who within a few years of Ada's birth was independently wealthy.
- 6 Ada went on to get married to a rather ineffectual, if handsome and kind, man, Lord Lovelace from whom she derives the name Ada Lovelace which she is nowadays called rather than Ada Byron. She had three children and she was a relatively good and devoted mother. In 1852, after several years of ill health and a couple of years of often terrible pain, she died a dreadfully painful death of uterine cancer.
- 7 A fairly typical nineteenth-century life of an aristocratic woman: a life that ended too soon and that did not, on the face of it, contain very much in the sense of achievement. Except that that really is only a very superficial take on Ada.
- 8 The truth of the matter was that she was a fascinatingly imaginative and intellectually unusual woman. Her education was largely mathematical, partly because her mother was anxious that Ada wouldn't follow in what Lady Byron regarded as Lord Byron's excessively imaginative footsteps; Lady Byron encouraged the tutors she hired for Ada to use mathematics to suppress Ada's imagination.
- 9 But all this was in vain: when Ada was only twelve or thirteen years old she made meticulous plans to build herself a large pair of wings and to try to fly. It is perhaps just as well for posterity that Lady Byron got to know of these plans and forbade Ada from taking them any further: fortuitous² for posterity because the lives of nineteenth century aviators were often brought to an abrupt halt by a nasty accident.

1. **Lord Byron** (1788–1824) English poet and a leading figure in the Romantic movement.

2. **fortuitous** (fawr TOO uh tuhs) adj. fortunate; lucky

- 10 Undaunted, when Ada was only seventeen years old, she became good friends with an eccentric but undoubtedly brilliant English mathematician and inventor called Charles Babbage. He was twenty-four years her senior when they met at a party in London on June 5, 1833. It's not known what they talked about when they met, alas, but what is clear is that Ada was fascinated from the start by Babbage's attempts to build a calculating machine called the Difference Engine from cogwheels.
- 11 The following year, Babbage started work on an even more ambitious type of cogwheel calculator which he christened the Analytical Engine. It made use of punched cards and many of the features of a modern computer.
- 12 In fact, neither the Difference Engine nor the Analytical Engine were completed during Babbage's lifetime—although there was a successful modern project to build a Difference Engine in 1991, using only materials and only levels of precision that Babbage himself could have achieved.
- 13 The 1991 machine worked perfectly, and today there are two working models in the world, thereby vindicating³ Babbage's dreams that his machine could be built. However, the Analytical Engine has not been built so far and may well never be. Even so, Babbage's plans for it are detailed and unquestionably show that he was trying to build a digital computer in the 1840s.
- 15 Ada became deeply interested in Babbage's work and translated from the original French a paper written about the Analytical Engine by an Italian scientist (in those days French was the European language of science whatever the nationality of the writer). Perhaps the most fascinating thing of all about Ada is this: she penned a lengthy essay about Babbage's Analytical Engine, which she appended to her translation. It is actually much longer than the translation itself: at around twenty thousand words, it essentially constitutes a short book that is one of the most exciting documents of the sparse prehistory of the computer.
- 16 What I found most interesting of all in my research on Ada is that it is beyond dispute nowadays (although for about twenty years male computer scientists avoided accepting this) that Ada had insights into the Analytical Engine that not even Babbage had. Ada saw that the machine was in fact a general-purpose machine that could be used to govern all sorts of processes, including, most exceptionally, music. In her paper she includes a succinct description of how the Analytical Engine would process music and this essentially is exactly what the modern digital friends we carry in our pockets and in our briefcases do for us whenever we want to listen to music.

3. **vindicating** (VIHN duh kay tihng) v. clearing someone of blame or suspicion.

- 17 Babbage, though, never saw his Analytical Engine as anything more than a machine for making calculations. Ada’s vision—and it really was a vision—went far beyond what Babbage could see. Ada called her thinking about mathematical and scientific subjects “poetical science,” by which she seems to have meant science infused with the imagination.
- 18 Of course, today, when computer manufacturers and smartphone manufacturers have to sell their products by the millions in a highly competitive marketplace, they do bring the imagination very much to the service of how their computers can be used and how they are promoted and what functions they offer their users. But Ada was breaking virgin ground in her own writing on the Analytical Engine.
- 19 Ada also realized that Babbage, who could be irascible⁴ (the first ever biography of him is called *The Irascible Genius*), grumpy and indifferent to the agenda of others, was not, to put it mildly, a very diplomatic man. Ada offered her help to him with all the management aspects of his attempts to put together a project to build an Analytical Engine.
- 20 But sadly, Babbage was too obtuse—and very possibly on that particular occasion too arrogant—to realize what a great asset her help could be to him. He abruptly rejected her offer of help. All the same, their friendship was strong enough to survive this rejection and the upset which Ada felt afterwards.
- 21 Ada didn’t only have an amazing vision for the future of computing. She also wrote what in many ways can be seen as the world’s first computer program, although that depends on what you actually mean by a computer program. That is basically Ada’s algorithm: a computer program she describes in her Notes and by which the Analytical Engine would have been able to carry out a particular mathematical function.
- 22 Ada was indeed amazing. Yet this aristocratic Victorian housewife, whose achievement in writing her essay, known today as “Ada’s Notes,” was almost completely forgotten from around the 1850s until the 1970s. (With one notable exception: the British computer pioneer Alan Turing was aware of her work.) In the 1970s, when Babbage’s work was rediscovered, a new spotlight was put on Ada’s own work. She is today seen as one of the most insightful and visionary women in the history of science. What Ada referred to fondly as her “poetical science” made her one of the most far-sighted women not only of the nineteenth century, but of all time. 🍷

4. **irascible** (ih RAS uh buhl) *adj.* showing a tendency to be easily angered.

Fermented Cow Dung Air Freshener Wins Two Students Top Science Prize

Kimberley Mok



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About the Author

Based in Montreal, Quebec, **Kimberley Mok** is a writer, graphic artist, and designer who covers arts and culture for publications such as *TreeHugger*, *the New Stack*, and *the Huffington Post*. Mok has also worked in conventional and sustainable design firms in New York City, Toronto, and India on projects ranging from residential high-rises and storm-resistant homes to compressed earth-block structures.

BACKGROUND

Air fresheners are commonplace in many homes and offices, promoting an image of cleanliness and health. But many of these products contain phthalates—hazardous chemicals suspected to cause hormonal abnormalities, birth defects, and reproductive problems. Out of 14 common air fresheners, phthalates showed up in 86 percent of them, including those claiming to be “all natural.” According to the U.S. Centers for Disease Control, the majority of people in the United States are exposed to at least five different phthalates on a regular basis.

NOTES

- 1 **C**onventional air fresheners are known for their toxic soup of chemicals that may be linked with asthma, reproductive disorders, and even lung disease. While there’s no shortage of environmentally friendly and human-healthy air fresheners on the market, two Indonesian science students are behind a rather bizarre concoction that you may be seeing soon: an affordable air freshener made from cow dung.
- 2 Yes, cow dung—as weird as it sounds, the formulation actually has a pleasant herbal smell, and has won Dwi Nailul Izzah and Rintya Aprianti Miki a gold medal at Indonesia’s Science Project Olympiad (ISPO). According to Oddity Central, the young women overcame 1,000 other competitors with their surprising freshener,

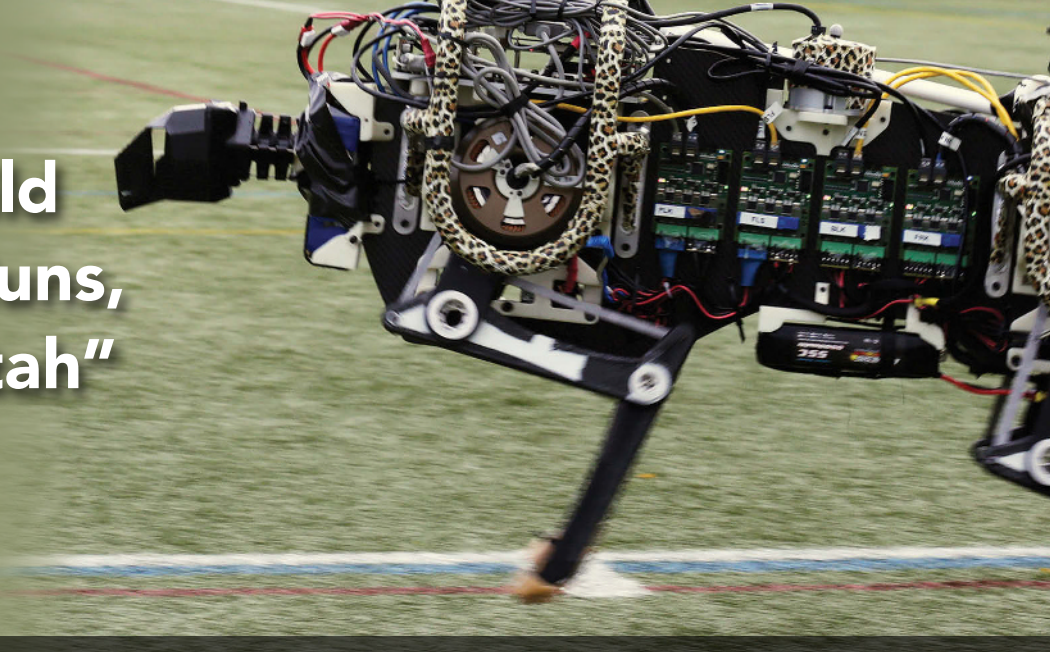
which was painstakingly created by collecting unused cow manure from a cattle farm and fermenting¹ it for three days:

- 3 Then they extracted² the water from the fermented manure and mixed it with coconut water. Finally, they distilled³ the liquid to eliminate all impurities. The whole process took seven days, which is pretty long, but in the end they obtained what they were looking for—a liquid air freshener with an herbal aroma from digested cow food.
- 4 The high schoolers will be filing a patent for their ingenious creation, which will not only cost half the price of similar products (\$21,000 rupiah or US \$2 for 225 grams), but is also healthier, explains Dwi Nailul Izzah:
- 5 Our air freshener is not supplemented with chemicals to smell fragrant, it's pure and smells like the natural plants fed to cows. It's also healthier because it doesn't contain harmful ingredients such as benzo acetan, like most other air-fresheners on the market.
- 6 The pair will be bringing their cow poop air freshener to compete at the International Environment Project Olympiad (INEPO), held in Istanbul, Turkey, during May. 🐾

1. **fermenting** (fuhr MEHN tihng) v. breaking down a substance into its constituent elements, thus converting sugars to ethyl alcohol.
2. **extracted** (ehk STRAK tihd) v. obtained a substance or resource from something using a special method.
3. **distilled** (dihs TIHLd) v. purified a liquid substance through vaporization and condensation.

Scientists Build Robot That Runs, Call It “Cheetah”

Rodrique Ngowi



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About the Author

Rodrique Ngowi is a video journalist and video storyteller who regularly works for the *Associated Press*, coordinating and supervising coverage of breaking news in Massachusetts, Connecticut, and Rhode Island.

BACKGROUND

The word robot is derived from the Czech word *robota*, meaning “servitude.” It was first used in 1921 by the playwright Karel Capek, in his play *R.U.R.* (Rossum’s Universal Robots). Robots made appearances in numerous science fiction stories and movies, and in 1939 the first robot that could actually walk was built. Technology in the twenty-first century has moved so fast that robots that can accomplish simple tasks are already commercially available.

NOTES

- 1 **I**t’s a robot unlike any other: inspired by the world’s fastest land animal, controlled by video game technology and packing nifty sensors—including one used to maneuver drones, satellites, and ballistic missiles.
- 2 The robot, called the cheetah, can run on batteries at speeds of more than 10 mph, jump about 16 inches high, land safely and continue galloping for at least 15 minutes, all while using less power than a microwave oven.
- 3 It’s the creation of researchers at the Massachusetts Institute of Technology in Cambridge, who had to design key elements from scratch.
- 4 That includes powerful, lightweight motors, electronics that control power for its 12 motors, and an algorithm that determines the amount of force a leg should exert during the split second that it spends on the ground while running. It’s the key to helping the robot maintain balance and forward momentum. An

onboard computer organizes data from various sensors and sends commands to each motor.

- 5 “This is kind of a Ferrari in the robotics world, like, we have to put all the expensive components and make it really that instinctive,” said MIT professor Sangbae Kim, who leads the school’s Biomimetic Robotics Lab that designed the robot. “That’s the only way to get that speed.”
- 6 Insight gleaned from the design of their prototype¹ could have real-world applications, including the design of revolutionary prosthetics,² wearable technologies, and all-terrain wheelchairs and vehicles that can travel efficiently in rough terrain much like animals do, Kim said. There are hopes the robot will be able to be used in search and rescue operations in hazardous or hostile environments where it’s too risky to send a human rescuer.
- 7 “When the robot is running, at every step, we calculate the appropriate amount of the force to the legs so that the robot can balance itself,” said MIT research scientist Hae-Won Park, who wrote the complex algorithm used to control the cheetah, which weighs around 70 pounds—about the same as one of its female feline counterparts.
- 8 Sensors inside the robot measure the angle of the leg and that information is sent to an onboard computer that also organizes data from the Inertial Measurement Unit, or IMU, which is also used to maneuver drones and ballistic missiles, Park said.
- 9 The project is funded by the U.S. Department of Defense’s Defense Advanced Research Projects Agency. The military research arm is also funding a similar robot being developed by Boston Dynamics. The company says its version is powered by an offboard hydraulic pump and uses a boom-like device to keep it running in the center of the treadmill.
- 10 Crafting the cheetah robot took five years of designing, testing, tweaking, and plenty of confidence to ignore those who said electric motors aren’t strong enough to propel a running mechanical cheetah powered by batteries.
- 11 Researchers had to exercise a lot of patience during test runs. The robot broke dozens of legs manufactured by 3D printers and reinforced with Kevlar strips and carbon fiber.
- 12 The results?
- 13 Strong, lightweight components that made untethered³ running possible, including a carbon fiber-and-foam sandwich frame that can absorb the forces generated by running and jumping.

1. **prototype** (PROH tuh typ) *n.* a first model of something, especially a machine.

2. **prosthetics** (pros THEHT ihks) *n.* artificial body parts.

3. **untethered** (uhn TEHTH uhrd) *adj.* released or untied.

- 14 Some off-the-shelf components, including an Xbox controller for maneuvering the robot and wireless Internet communications for sending commands to the mechanical cheetah, also came in handy.
- 15 Each leg is propelled by three motors that can generate powerful forces at slow speeds.
- 16 Still, researchers continue to tweak their prototype, looking to add additional sensors that would eventually make the robot autonomous.⁴
- 17 “In the next ten years, our goal is we are trying to make this robot to save a life,” Kim said. 🐾

4. **autonomous** (aw TON uh muhs) *adj.* acting independently or having the freedom to do so.

from The Time Machine

H. G. Wells

About the Author



Herbert George Wells (1866–1946), known primarily as **H. G. Wells**, was an English writer, sociologist, and historian. Called “the father of science fiction,” he is best known for his visionary novels *The Time Machine*, *War of the Worlds*, and *The Island of Dr. Moreau*. Wells also wrote in other genres, including history, social commentary, politics, contemporary novels, and

textbooks.

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BACKGROUND

Although it was not the first instance of time travel in literature, *The Time Machine* was the novel that really brought the concept to public consciousness. Wells not only invented the term “time machine,” he was the first to come up with the idea of a machine that allows a person to go back and forth in time purposefully, rather than randomly. First published in 1895 to instant acclaim, the novel follows the adventures of a hypothetical Time Traveler who journeys into the future to find that humanity has evolved into two races: one peace-loving, the other predatory.

- 1 **T**he thing the Time Traveler held in his hand was a glittering metallic framework, scarcely larger than a small clock, and very delicately made. There was ivory in it, and some transparent crystalline substance. And now I must be explicit, for this that follows—unless his explanation is to be accepted—is an absolutely unaccountable thing. He took one of the small octagonal tables that were scattered about the room, and set it in front of the fire, with two legs on the hearthrug. On this table he placed the mechanism. Then he drew up a chair, and sat down. The only other object on the table was a small shaded lamp, the bright light

NOTES

of which fell upon the model. There were also perhaps a dozen candles about, two in brass candlesticks upon the mantel and several in sconces, so that the room was brilliantly illuminated. I sat in a low arm-chair nearest the fire, and I drew this forward so as to be almost between the Time Traveler and the fireplace. Filby sat behind him, looking over his shoulder. The Medical Man and the Provincial Mayor watched him in profile from the right, the Psychologist from the left. The Very Young Man stood behind the Psychologist. We were all on the alert. It appears incredible to me that any kind of trick, however subtly conceived and however adroitly¹ done, could have been played upon us under these conditions.

- 2 The Time Traveler looked at us, and then at the mechanism. "Well?" said the Psychologist.
- 3 "This little affair," said the Time Traveler, resting his elbows upon the table and pressing his hands together above the apparatus, "is only a model. It is my plan for a machine to travel through time. You will notice that it looks singularly askew, and that there is an odd twinkling appearance about this bar, as though it was in some way unreal." He pointed to the part with his finger. "Also, here is one little white lever, and here is another."
- 4 The Medical Man got up out of his chair and peered into the thing.
- 5 "It's beautifully made," he said.
- 6 "It took two years to make," retorted the Time Traveler. Then, when we had all imitated the action of the Medical Man, he said: "Now I want you clearly to understand that this lever, being pressed over, sends the machine gliding into the future, and this other reverses the motion. This saddle represents the seat of a time traveler. Presently I am going to press the lever, and off the machine will go. It will vanish, pass into future Time, and disappear. Have a good look at the thing. Look at the table too, and satisfy yourselves there is no trickery. I don't want to waste this model, and then be told I'm a quack."
- 7 There was a minute's pause perhaps. The Psychologist seemed about to speak to me, but changed his mind. Then the Time Traveler put forth his finger towards the lever. "No," he said suddenly. "Lend me your hand." And turning to the Psychologist, he took that individual's hand in his own and told him to put out his forefinger. So that it was the Psychologist himself who sent forth the model Time Machine on its interminable² voyage. We all saw the lever turn. I am absolutely certain there was no trickery. There was a breath of wind, and the lamp flame jumped. One of the candles on the mantel was blown out, and the little machine

1. **adroitly** (uh DROYT lee) *adv.* cleverly, carefully.

2. **interminable** (ihn TUR muh nuh buhl) *adj.* endless.

suddenly swung round, became indistinct, was seen as a ghost for a second perhaps, as an eddy of faintly glittering brass and ivory; and it was gone—vanished! Save for the lamp the table was bare.

8 Everyone was silent for a minute. Then Filby said he was damned.

9 The Psychologist recovered from his stupor, and suddenly looked under the table. At that the Time Traveler laughed cheerfully. “Well?” he said, with a reminiscence of the Psychologist. Then, getting up, he went to the tobacco jar on the mantel, and with his back to us began to fill his pipe.

10 We stared at each other. “Look here,” said the Medical Man, “are you in earnest about this? Do you seriously believe that that machine has traveled into time?”

11 “Certainly,” said the Time Traveler, stooping to light a spill at the fire. Then he turned, lighting his pipe, to look at the Psychologist’s face. (The Psychologist, to show that he was not unhinged, helped himself to a cigar and tried to light it uncut.) “What is more, I have a big machine nearly finished in there”—he indicated the laboratory—“and when that is put together I mean to have a journey on my own account.”

12 “You mean to say that that machine has traveled into the future?” said Filby.

13 “Into the future or the past—I don’t, for certain, know which.”

14 After an interval the Psychologist had an inspiration. “It must have gone into the past if it has gone anywhere,” he said.

15 “Why?” said the Time Traveler.

16 “Because I presume that it has not moved in space, and if it traveled into the future it would still be here all this time, since it must have traveled through this time.”

17 “But,” I said, “If it traveled into the past it would have been visible when we came first into this room; and last Thursday when we were here; and the Thursday before that; and so forth!”

18 “Serious objections,” remarked the Provincial Mayor, with an air of impartiality,³ turning towards the Time Traveler.

19 “Not a bit,” said the Time Traveler, and, to the Psychologist: “You think. You can explain that. It’s presentation below the threshold, you know, diluted presentation.”

20 “Of course,” said the Psychologist, and reassured us. “That’s a simple point of psychology. I should have thought of it. It’s plain enough, and helps the paradox⁴ delightfully. We cannot see it, nor can we appreciate this machine, any more than we can the spoke of a wheel spinning, or a bullet flying through the air. If it is traveling through time fifty times or a hundred times faster than

3. **impartiality** (ihm pahr shee AL uh tee) *n.* fairness, justice, not taking sides.

4. **paradox** (PAR uh doks) *n.* statement that seems to say two opposite things, but may be true.

we are, if it gets through a minute while we get through a second, the impression it creates will of course be only one-fiftieth or one-hundredth of what it would make if it were not travelling in time. That's plain enough." He passed his hand through the space in which the machine had been. You see?" he said, laughing.

21 We sat and stared at the vacant table for a minute or so. Then the Time Traveler asked us what we thought of it all.

22 "It sounds plausible enough tonight," said the Medical Man; "but wait until tomorrow. Wait for the common sense of the morning."

23 "Would you like to see the Time Machine itself?" asked the Time Traveler. And therewith, taking the lamp in his hand, he led the way down the long, draughty corridor to his laboratory. I remember vividly the flickering light, his queer, broad head in silhouette, the dance of the shadows, how we all followed him, puzzled but incredulous, and how there in the laboratory we beheld a larger edition of the little mechanism which we had seen vanish from before our eyes. Parts were of nickel, parts of ivory, parts had certainly been filed or sawn out of rock crystal. The thing was generally complete, but the twisted crystalline bars lay unfinished upon the bench beside some sheets of drawings, and I took one up for a better look at it. Quartz it seemed to be.

24 "Look here," said the Medical Man, "are you perfectly serious? Or is this a trick—like that ghost you showed us last Christmas?"

25 "Upon that machine," said the Time Traveler, holding the lamp aloft, "I intend to explore time. Is that plain? I was never more serious in my life."

26 None of us quite knew how to take it.

27 I caught Filby's eye over the shoulder of the Medical Man, and he winked at me solemnly. ❧

Icarus and Daedalus

retold by
Josephine Preston Peabody

About the Author

Josephine Preston Peabody (1874–1922) was an American poet and dramatist born in Brooklyn, New York. Peabody was educated at the Girls' Latin School, Boston, and at Radcliffe College. Her first published work was a poem that appeared in the *Woman's Journal* in 1888, when she was 14 years old; she went on to write verse dramas and poems to wide critical acclaim.

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BACKGROUND

In ancient Greece, stories about gods, goddesses, heroes, and monsters were interwoven into the fabric of everyday life. These myths explained everything from death to the weather, and gave meaning to the world and its mysterious workings. They were part of an oral tradition; there is no “original text” introducing the characters. Listeners and readers, having heard these myths all their lives, would not need such information.

- 1 **A**mong all those mortals who grew so wise that they learned the secrets of the gods, none was more cunning¹ than Daedalus.
- 2 He once built, for King Minos of Crete,² a wonderful labyrinth³ of winding ways so cunningly tangled up and twisted around that, once inside, you could never find your way out again without a magic clue. But the king's favor veered⁴ with the wind, and one day he had his master architect imprisoned in a tower. Daedalus managed to escape from his cell; but it seemed

NOTES

1. **cunning** *adj.* skillful; clever.
2. **King Minos** (MEE nuhs) **of Crete** (kreet) King Minos was a son of the god Zeus. Crete is a Greek island in the eastern Mediterranean Sea.
3. **labyrinth** (LAB uh rihnth) *n.* maze.
4. **veered** *v.* changed directions.

impossible to leave the island, since every ship that came or went was well guarded by order of the king.

- 3 At length, watching the seagulls in the air—the only creatures that were sure of liberty—he thought of a plan for himself and his young son Icarus, who was captive with him.
- 4 Little by little, he gathered a store of feathers great and small. He fastened these together with thread, molded them in with wax, and so fashioned two great wings like those of a bird. When they were done, Daedalus fitted them to his own shoulders, and after one or two efforts, he found that by waving his arms he could winnow⁵ the air and cleave it, as a swimmer does the sea. He held himself aloft, wavered this way and that with the wind, and at last, like a great fledgling,⁶ he learned to fly.
- 5 Without delay, he fell to work on a pair of wings for the boy Icarus, and taught him carefully how to use them, bidding him beware of rash adventures among the stars. “Remember,” said the father, “never to fly very low or very high, for the fogs about the earth would weigh you down, but the blaze of the sun will surely melt your feathers apart if you go too near.”
- 6 For Icarus, these cautions went in at one ear and out by the other. Who could remember to be careful when he was to fly for the first time? Are birds careful? Not they! And not an idea remained in the boy’s head but the one joy of escape.
- 7 The day came, and the fair wind that was to set them free. The father bird put on his wings, and, while the light urged them to be gone, he waited to see that all was well with Icarus, for the two could not fly hand in hand. Up they rose, the boy after his father. The hateful ground of Crete sank beneath them; and the country folk, who caught a glimpse of them when they were high above the treetops, took it for a vision of the gods—Apollo,⁷ perhaps, with Cupid⁸ after him.
- 8 At first there was a terror in the joy. The wide vacancy of the air dazed them— a glance downward made their brains reel.
- 9 But when a great wind filled their wings, and Icarus felt himself sustained, like a halcyon-bird⁹ in the hollow of a wave, like a child uplifted by his mother, he forgot everything in the world but joy. He forgot Crete and the other islands that he had passed over: he saw but vaguely that winged thing in the distance before him that was his father Daedalus. He longed for one draft of flight to quench the thirst of his captivity: he stretched out his arms to the sky and made towards the highest heavens.

5. **winnow** *v.* to blow away, by making an air current.

6. **fledgling** *n.* young bird.

7. **Apollo** (uh POL oh) Greek god of music, poetry, and medicine; identified with the sun.

8. **Cupid** in Roman mythology, the god of love, son of Venus.

9. **halcyon** (HAL see uhn) **bird** legendary sea bird, which the ancient Greeks believed could calm the sea by nesting on it

- 10 Alas for him! Warmer and warmer grew the air. Those arms, that had seemed to uphold him, relaxed. His wings wavered, drooped. He fluttered his young hands vainly—he was falling—and in that terror he remembered. The heat of the sun had melted the wax from his wings; the feathers were falling, one by one, like snowflakes; and there was none to help.
- 11 He fell like a leaf tossed down the wind, down, down, with one cry that overtook Daedalus far away. When he returned, and sought high and low for the poor boy, he saw nothing but the birdlike feathers afloat on the water, and he knew that Icarus was drowned.
- 12 The nearest island he named Icaria, in memory of the child; but he, in heavy grief, went to the temple of Apollo in Sicily, and there hung up his wings as an offering. Never again did he attempt to fly. 🐼



EVIDENCE LOG

Go to your Evidence Log and record what you learned from the text you read.

Share Your Independent Learning

Prepare to Share

Are inventions realized through inspiration or perspiration?

Even when you read something independently, your understanding continues to grow when you share what you have learned with others. Reflect on the text you explored independently and write notes about its connection to the unit. In your notes, consider why this text belongs in this unit.

Learn From Your Classmates

Discuss It Share your ideas about the text you explored on your own. As you talk with your classmates, jot down ideas that you learn from them.

Reflect

Review your notes, and mark the most important insight you gained from these writing and discussion activities. Explain how this idea adds to your understanding of the topic of invention.

STANDARDS

Speaking and Listening

Engage effectively in a range of collaborative discussions with diverse partners on *grade 8 topics, texts, and issues*, building on others' ideas and expressing their own clearly.



Review Evidence for an Argument

At the beginning of this unit you took a position on the following question:

Which invention described in this unit has had the biggest impact on humanity?

EVIDENCE LOG

Review your Evidence Log and your QuickWrite from the beginning of the unit. Has your position changed?

<input type="checkbox"/> YES	<input type="checkbox"/> NO
Identify at least three pieces of evidence that convinced you to change your mind.	Identify at least three new pieces of evidence that reinforced your initial position.
1.	1.
2.	2.
3.	3.

State your position now: _____

Identify a possible counterclaim: _____

Evaluate the Strength of Your Evidence Consider your argument. Do you have enough evidence to support your claim? Do you have enough evidence to refute a counterargument? If not, make a plan.

- Do more research
- Reread a selection
- Other: _____
- Talk with my classmates
- Ask an expert

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- a. Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
- b. Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.



SOURCES

- WHOLE-CLASS SELECTIONS
- SMALL-GROUP SELECTIONS
- INDEPENDENT-LEARNING SELECTION

PART 1

Writing to Sources: Argument

In this unit, you read about various inventors and inventions, real and imaginary. In some cases, the inventors described seem like uniquely gifted individuals who also work hard. In other cases, inventors are presented as workers presented with a challenge who use what they know to solve practical problems.

Assignment

Write an **argument** in which you state and defend a claim about the following question:

Which invention described in this unit has had the biggest impact on humanity?

Take a position on this question based on the knowledge you gained from reading and analyzing the selections in the unit. Use examples from the selections you read and viewed to support your claim, and organize your ideas so that they flow logically and are easy to follow. Address and refute counterclaims to limit dissent and ensure your argument is well received. Use an appropriately formal tone.

WORD NETWORK

As you write and revise your argument, use your Word Network to help vary your word choices.

STANDARDS

Writing

Write arguments to support claims with clear reasons and relevant evidence.

- Introduce claim(s), acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically.
- Support claim(s) with logical reasoning and relevant evidence, using accurate, credible sources and demonstrating an understanding of the topic or text.
- Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence.
- Establish and maintain a formal style.
- Provide a concluding statement or section that follows from and supports the argument presented.

Reread the Assignment Review the assignment to be sure you fully understand it. The task may reference some of the academic words presented at the beginning of the unit. Be sure you understand each of the words given below to complete the assignment correctly.

Academic Vocabulary

- opponent
- contradict
- dissent
- position
- legitimate

Review the Elements of Effective Argument Before you begin writing, read the Argument Rubric. Once you have completed your first draft, check it against the rubric. If one or more of the elements is missing or not as strong as it could be, revise your essay to add or strengthen that element.

Argument Rubric

	Focus and Organization	Evidence and Elaboration	Conventions
4	<p>The introduction engages the reader and establishes a position in a compelling way.</p> <p>The position is supported by logical reasons and relevant evidence, and opposing claims are addressed.</p> <p>The reasons and evidence are organized logically so that the argument is easy to follow.</p> <p>Transitions clearly show the relationships among ideas.</p> <p>The conclusion follows from and supports the rest of the argument.</p>	<p>The sources of evidence are relevant and credible.</p> <p>The tone of the argument is formal and objective.</p> <p>Words are carefully chosen and suited to the audience and purpose.</p>	<p>The argument consistently uses standard English conventions of usage and mechanics.</p>
3	<p>The introduction is somewhat engaging and states the position clearly.</p> <p>The claim is supported by reasons and evidence, and opposing claims are acknowledged.</p> <p>Reasons and evidence are organized so that the argument is easy to follow.</p> <p>Transitions show the relationships among ideas.</p> <p>The conclusion restates the claim.</p>	<p>The sources are relevant.</p> <p>The tone of the argument is mostly formal and objective.</p> <p>Words are generally suited to the audience and purpose.</p>	<p>The argument demonstrates general accuracy in standard English conventions of usage and mechanics.</p>
2	<p>The introduction states a claim.</p> <p>The claim is supported by some reasons and evidence, and opposing claims may be briefly acknowledged.</p> <p>Reasons and evidence are organized somewhat logically.</p> <p>A few sentence transitions are used to orient readers.</p> <p>The conclusion relates to the claim.</p>	<p>Some sources are relevant.</p> <p>The tone of the argument is occasionally formal and objective.</p> <p>Words are somewhat suited to the audience and purpose.</p>	<p>The argument demonstrates some accuracy in standard English conventions of usage and mechanics.</p>
1	<p>The claim is not clearly stated.</p> <p>The claim is not supported by reasons and evidence, and opposing claims are not addressed.</p> <p>Reasons and evidence are disorganized and the argument is difficult to follow.</p> <p>No transitions are used.</p> <p>The conclusion does not restate the claim.</p>	<p>Reliable and relevant evidence is not included.</p> <p>The tone of the argument is informal.</p> <p>The vocabulary is ineffective.</p>	<p>The argument contains mistakes in standard English conventions of usage and mechanics.</p>



PART 2

Speaking and Listening: Speech

Assignment

After completing the final draft of your argument, use it as the foundation for a three- to five-minute **speech**.

STANDARDS

Speaking and Listening

- Delineate a speaker’s argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.

Take the following steps to make your speech lively and engaging.

- Go back to your argument and annotate the most important claims and supporting details.
- Refer to your annotated text to guide your speech and keep it focused.
- Use appropriate eye contact, adequate volume, and clear pronunciation when speaking.
- Deliver your speech with conviction.

Review the Rubric Before you deliver your speech, check the rubric. If one or more of the elements is weak, revise your presentation.

	Content	Organization	Presentation Techniques
3	<p>The introduction engages the reader and establishes a claim in a compelling way.</p> <p>The presentation has strong, valid reasons and evidence to support the claim and answers counterclaims.</p> <p>The conclusion follows from and supports the rest of the argument.</p>	<p>Ideas progress logically, with clear transitions among ideas so that listeners can easily follow the argument.</p>	<p>The speaker maintains effective eye contact and speaks clearly and with adequate volume.</p> <p>The speaker presents with strong conviction and energy.</p>
2	<p>The introduction establishes a claim.</p> <p>The presentation includes some valid reasons and evidence to support the claim and acknowledges counterclaims.</p> <p>The conclusion offers some insight into the claim and restates important information.</p>	<p>Ideas progress logically with some transitions between ideas. Listeners can mostly follow the speaker’s argument.</p>	<p>The speaker sometimes maintains effective eye contact and speaks somewhat clearly and with adequate volume.</p> <p>The speaker presents with some conviction and energy.</p>
1	<p>The introduction does not clearly state a claim.</p> <p>The presentation does not include reasons or evidence to support a claim or acknowledge counterclaims.</p> <p>The conclusion does not restate important information about a claim.</p>	<p>Ideas do not progress logically. Listeners have difficulty following the argument.</p>	<p>The speaker does not maintain effective eye contact or speak clearly with adequate volume.</p> <p>The speaker presents without conviction or energy.</p>


Reflect on the Unit

Now that you've completed the unit, take a few moments to reflect on your learning. Use the questions below to think about where you succeeded, what skills and strategies helped you, and where you can continue to grow in the future.

Reflect on the Unit Goals

Look back at the goals at the beginning of the unit. Use a different colored pen to rate yourself again. Think about readings and activities that contributed the most to the growth of your understanding. Record your thoughts.

Reflect on the Learning Strategies

 **Discuss It** Write a reflection on whether you were able to improve your learning based on your Action Plans. Think about what worked, what didn't, and what you might do to keep working on these strategies. Record your ideas before a class discussion.

Reflect on the Text

Choose a selection that you found challenging, and explain what made it difficult.

Describe something that surprised you about a text in the unit.

Which activity taught you the most about invention? What did you learn?