| Grade | Course |
|---|---|
| **8** | **ELA** |

**Unit Focus**

**Students will conduct a close read of "To Fly." Students will analyze how the author organizes his ideas and how specific word choice impacts text. Students will compose a brief text related argument essay.**

**Standard(s)**

| | |
|---|---|
| **8.RI.KID.1**<br>**8.RI.KID.3**<br>**8.RI.KID.4**<br>**8.RI.CS.5** | **8.W.1** |

**Resource(s)**

**Texts: "To Fly" by Neil DeGrasse Tyson**

**Task(s)**

**Day 1 – Read "To Fly" and complete comprehension tasks**
**Day 2 – Close Read Analysis Questions**
**Day 3 – Analyze Craft and Structure – Text Structure: Expository Writing**
**Day 4 – Concept Vocabulary**
**Day 5 – Writing Task**

**Expected Outcomes**

**After completing the tasks outlined above, students will demonstrate a deeper understanding of how ideas within a text are put together and how that organization impacts the text as a whole. Students will also write a brief argument essay that will prepare them for more extended argumentative tasks.**

**Additional Instructional Resources**

**All Rutherford County 6-8 grade students now have access to iReady ELA lessons. These lessons can be accessed via Clever. The following lessons are now available to 8th grade students:**

- Understanding Relationships Between Words
- Analyzing Differing Points of View in Literature
- Analyzing Point of View and Purpose in Informational Text
- Analyzing Author's Point of View
- Evaluating Arguments in Informational Texts
- Evaluating Arguments
- Analyzing Persuasive Techniques
- Analyzing Traditional Elements in Modern Fiction
- Analyzing Conflicting Information

## Day One – "To Fly"

**Step One –** Read the text.

### 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.*

1 In 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)

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, 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 claptrap 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 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 insular 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 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 Curtains 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 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 ballistically 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.

**Step Two** – Comprehension Activities

*Questions*: Complete the following questions using textual evidence to support your answers.

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? Why does he believe this?

*Task*: Timeline

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.

*Extension*: Research Ideas

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? (Use the table below to record your findings).

| Detail (Research Topic) | Findings | Website Used | How do your findings help you to better understand the essay? |
|---|---|---|---|
| | | | |

## Day Two – Close Read

**Step One –** Review the text and work you completed yesterday.

**Step Two** – Answer the following questions. Be sure to answer in complete sentences and use textual evidence to support your responses.

1. In paragraph 1, the author recounts key details from the myth of Icarus and Daedalus.
    - Why does the author choose to begin his essay with an allusion to this myth?
    - How does the allusion to this myth set the stage for the rest of the essay?

2. 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.
    - Why does the author present such a strong contrast between walking and flying?
    - What point do these descriptive details emphasize?

3. In paragraph 11, mark the word the author uses to refer to the writer of the passage quoted in paragraph 10.
    - Why does the author use this informal term?
    - What is the effect of this casual language?

4. In paragraph 16, mark the point at which the author stops using scientific words and phrases and begins to use poetic, emotional language.
    - Why does the language change so dramatically at this point?
    - What is the effect of this change, especially in a concluding paragraph?

5. What is the author's attitude toward the achievements he describes? Explain your interpretation.

6. 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.

## Day 3 – Analyze Craft and Structure

**Step One** – Review the information about Expository Text Structure Below:

*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.

**Step Two** – Questions over Craft and Structure

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?

## Day 4 - Concept Vocabulary

**Step One –** Read each of the concept vocabulary words in context and the definition that follows. Underline/Record words and/or phrases within the excerpt that provide hints to the words meaning.

**Words: enable foresight prescient myopic naivete seminal**

**enable** – "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." (paragraph 9)

*Definition* - v. make possible

**foresight** – "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**." (paragraph 6)

*Definition* - n. knowledge or insight gained by looking toward the future

**prescient** – "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…" (paragraph 9)

*Definition* - adj. having knowledge of things before they happen

**myopic** - "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." (paragraph 5)

*Definition* - adj. nearsighted; unable to see clearly; showing a lack of understanding

**naivete** – "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." (paragraph 7)

*Definition* - n. quality of innocent simplicity

**seminal** – "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…" (paragraph 13)

*Definition* - adj. being the first of something that is later recognized as important

**Step Two –** Practice with Words

**Why These Words?**

These concept words help to show the contrast between *innovative* (innovative - introducing new ideas; original and creative in thinking) and *conventional* (conventional - based on or in accordance with what is generally done or believed 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. Divide the concept vocabulary words into two categories: innovative thinking and conventional thinking. Explain why you placed each word in its category. Create a chart like the one below to record your thinking (add additional rows as needed).

| **Innovative Thinking** | **Conventional Thinking** |
|---|---|
| Word: _____<br><br>Explanation: | Word: _____<br><br>Explanation: |
| Word: _____<br><br>Explanation: | Word: _____<br><br>Explanation: |

2. How does the concept vocabulary help the reader better understand the author's attitude toward invention and the future?

3. What other words in the selection connect to innovative or conventional thinking? Try to find at least two of each. Record them below with an explanation of why you chose these words.

| **Innovative Thinking** | **Conventional Thinking** |
|---|---|
| Word: _____<br><br>Explanation: | Word: _____<br><br>Explanation: |
| Word: _____<br><br>Explanation: | Word: _____<br><br>Explanation: |

4. 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.

## Day 5 – Writing Task

**Step One –** Writing Task

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.

**Step Two –** Use the graphic organizer below to help plan your essay.