

GRADE 11

**ENGLISH LANGUAGE ARTS/
LITERACY**

Today you will read an excerpt from “Drifting Home” and the poem “The Song My Paddle Sings.” As you read these passages, you will answer questions and write an essay.

from Drifting Home: A Family’s Voyage of Discovery Down the Wild Yukon River

by Pierre Berton

In the 1970s, a family travels down a river on two rafts. One raft is called The Slush Box; the other is called The Pig. They are about to enter an area of the river called “Five Fingers,” which is upstream from the “Rink.”

- 1 This morning we are to face Five Finger Rapids. They lie just around the first bend in the river downstream from our camp and they have been the main subject of discussion during breakfast. My father scarcely mentioned them in his 1898 diary. “Shipped about three bucketsful of water in Five Fingers but none in Rink,” he wrote laconically. Like everybody else he kept to the right-hand channel.
- 2 In the old days the steamboats on the downstream run used to slip through this channel and over the ledge of rock in a few moments, but the struggle upriver, especially in low water, was a different matter. It took hours to winch the boat through, a tedious experience for the captain though a genuine adventure for the passengers. Sometimes, struggling against the ten-mile current, the boat scarcely seemed to be making any headway and we would spend the day out on the deck, with the boat caught in the racing waters and the rocks towering on either side.
- 3 For me, as a boy of five, the rapids were as wonderful an experience as the chute-the-chute¹. We catapulted through at locomotive speed, my father steering with the paddle and my mother clutching both her children grimly for fear we might topple into the foam. Then, as soon as we were into the calm, I asked my father if we could go back and do it again.
- 4 Now, as we drift past more seams of coal, the rapids come into view. Here the river is caught between two cliffs, its passage apparently barred by a wall of broken rock. Through this barrier, the water has torn five narrow channels or “fingers.” The rock itself is a conglomerate, composed of various small shales, forced together like bricks by the pressure of time. These four rocky pinnacles,

¹chute-the-chute—a slide or roller coaster

jagged and misshapen, are rendered more grotesque by trees and shrubs that grow out in several directions. Between and around these flower pot islands, the water races savagely. We can see the foam and the spray and hear the river roaring as we approach. To the right, above the steamboat channel, is the remains of the old winching house, long in disuse.

- 5 “Whaddya say we take a chance on the fun channel on the left?” Skip suggests. “The water’s high enough and it’s not really all that dangerous.”
- 6 In the interests of adventure, we agree to ignore the safe channel and attempt the risky one.
- 7 “We’ll try it without motors,” Skip says. “Keep well closed up.”
- 8 Robert and Penny are with me in The Slush Box, both making pictures, Penny with the movie camera and Robert taking color stills for a magazine article. They take the stern seat, next to the motor, so they can photograph all of our boat and Skip’s boat ahead and then swivel around to show The Pig following behind.
- 9 We drift faster and faster towards the frothing channel that squeezes between the two pinnacles of rock on the left. A moment later we are into it, the boat bucking, the spray lashing our faces. I paddle fiercely but I can’t hold our boat on course. The current is driving us straight at the great rock on our left.
- 10 Patsie, in the lead boat, describes in the log what happens next:
- 11 “We started floating down, maneuvering our craft with paddles, Skip and me in the front. Skip realizes it’s not as easy as he thinks. A second of panic flashes across his face, tension mounts, we drop the paddles and he hollers: ‘USE THE MOTORS!’ *Arg!* We thought we were ‘cruisin’ for a bruisin’,’ as we swiftly but definitely began to near the huge, gouged rocks, jutting from the center of the rapids. Mummy, I’m sure, thought it was her last stand, her face racked with fear. . . .”
- 12 In our boat, Robert hears Skip’s cry, drops his camera and begins pulling on the cord. More panic! The motor coughs, then dies. The lead boat now has its motor going and has veered off the approaching rocks but we are headed directly for them. The Pig is under power, too, and is swinging over to the right. Just before we strike the rock Robert yanks again on the motor and it sputters to life. He brings The Slush Box hard to starboard and we slip past the jagged edges and under the overhang. And all this time Penny, calmly filming the entire scene, does not take her eyes from the viewfinder.
- 13 A few minutes later we are in smoother water and everybody is laughing with relief and shouting from boat to boat. Now nothing will do but that we go back

and make the run again under power on the excuse that Robert has not got his pictures. And when that is done (I think again of the chute-the-chute at Hastings Park), we explore the steamboat channel, remarkably tame by comparison. Then we head off towards Rink Rapids, five miles farther downstream. . . .

- 14 We expect to make Fort Selkirk by evening, and are planning to spend two nights there to give everybody a free day to relax, clean up and explore the most interesting of the old river towns. At Selkirk, I inform the assembly, we will organize a big campfire, at which everyone must perform. There is a chorus of spurious complaints:
- 15 “Aw, Dad, come *on*! Do we *have* to?”
- 16 But almost immediately there is a great deal of whispering and giggling and plotting as the party breaks up into individual theatrical groups. As we float off down the river again, I notice Cheri and Penny in our boat with their heads together and behind me, in The Pig, I see Patsie and the Deaners chuckling away in secret and I sense we are going to have a memorable campfire.

From DRIFTING HOME: A FAMILY’S VOYAGE OF DISCOVERY DOWN THE YUKON RIVER by Pierre Berton, Douglas & McIntyre, 2002. Used by permission.

1. This question has two parts.

Part A

How do paragraphs 1–3 **mainly** contribute to the excerpt from “Drifting Home”?

- A. By describing the narrator’s past relationship to the setting
- B. By explaining how boaters traveled up and down the waterway
- C. By recounting the experience the narrator’s parents had in the area
- D. By explaining where the group is camped in relation to the rapids

Part B

Which details from the excerpt **best** support the answer to Part A? Select **two** correct answers.

- A. “They lie just around the first bend in the river downstream from our camp.” (paragraph 1)
- B. “My father scarcely mentioned them in his 1898 diary.” (paragraph 1)
- C. “a genuine adventure for the passengers” (paragraph 2)
- D. “For me, as a boy of five, the rapids were as wonderful an experience as the chute-the-chute.” (paragraph 3)
- E. “my mother clutching both her children grimly for fear we might topple into the foam” (paragraph 3)

2. This question has two parts.

Part A

How does the author of the excerpt from “Drifting Home” mainly structure paragraphs 9-12 to create suspense?

- A. The author uses a problem-solution format and describes reactions to problems the group faces.
- B. The author uses a cause-and-effect format to emphasize the emotions of different characters.
- C. The author uses a sequential structure to detail the rapidly changing direction of the boat.
- D. The author uses imagery and sensory language to describe the changing river conditions.

Part B

Which details from the excerpt **best** support the answer to Part A? Select **two** correct answers.

- A. “the boat bucking, the spray lashing our faces” (paragraph 9)
- B. “I paddle fiercely but I can’t hold our boat on course.” (paragraph 9)
- C. “We started floating down, maneuvering our craft with paddles.” (paragraph 11)
- D. “huge, gouged rocks, jutting from the center of the rapids” (paragraph 11)
- E. “begins pulling on the cord. More panic! The motor coughs, then dies.” (paragraph 12)
- F. “does not take her eyes from the viewfinder” (paragraph 12)

3. This question has two parts.

Part A

What is the meaning of spurious as it is used in paragraph 14?

- A. Agreed to with disappointment
- B. Anxiously secretive
- C. Loudly expressed
- D. Not genuine

Part B

Which detail from the excerpt **best** supports the answer to Part A?

- A. "At Selkirk, I inform the assembly, we will organize a big campfire" (paragraph 14)
- B. " 'Aw, Dad, come *on*! Do we *have* to?' " (paragraph 15)
- C. "But almost immediately there is a great deal of whispering and giggling and plotting" (paragraph 16)
- D. "I sense we are going to have a memorable campfire." (paragraph 16)

The Song My Paddle Sings

by Emily Pauline Johnson

West wind, blow from your prairie nest,
Blow from the mountains, blow from the west
The sail is idle, the sailor too;
O! wind of the west, we wait for you.

5 Blow, blow!

I have wooed you so,
But never a favor you bestow.
You rock your cradle the hills between,
But scorn to notice my white lateen¹.

10 I stow the sail, unship the mast:

I wooed you long but my wooing's past;
My paddle will lull you into rest.
O! drowsy wind of the drowsy west,
Sleep, sleep,

15 By your mountain steep,

Or down where the prairie grasses sweep!
Now fold in slumber your laggard wings,
For soft is the song my paddle sings.

August is laughing across the sky,

20 Laughing while paddle, canoe and I,
Drift, drift,
Where the hills uplift
On either side of the current swift.

The river rolls in its rocky bed;

25 My paddle is plying its way ahead;
Dip, dip,
While the waters flip
In foam as over their breast we slip.

And oh, the river runs swifter now;

30 The eddies circle about my bow.
Swirl, swirl!

¹lateen—a type of sail

How the ripples curl
In many a dangerous pool awhirl!

And forward far the rapids roar,
35 Fretting their margin for evermore.
Dash, dash,
With a mighty crash,
They seethe, and boil, and bound, and splash.

Be strong, O paddle! be brave, canoe!
40 The reckless waves you must plunge into.
Reel, reel.
On your trembling keel,
But never a fear my craft will feel.

We've raced the rapid, we're far ahead!
45 The river slips through its silent bed.
Sway, sway,
As the bubbles spray
And fall in tinkling tunes away.

And up on the hills against the sky,
50 A fir tree rocking its lullaby,
Swings, swings,
Its emerald wings,
Swelling the song that my paddle sings.

"The Song My Paddle Sings" by Emily Pauline Johnson—Public Domain

4. This question has two parts.

Part A

How does the speaker's point of view concerning the river conditions change from stanzas 1–3 to stanzas 4–9 in “The Song My Paddle Sings”?

- A. In stanzas 1–3, the speaker is anxiously waiting for the weather to change on the river. In stanzas 4–9, the speaker is joyous that the journey has finally changed for the better.
- B. In stanzas 1–3, the speaker is enjoying the peacefulness of the river. In stanzas 4–9, the speaker is terrified by the ferocity of the river.
- C. In stanzas 1–3, the speaker worries about reaching the end of the river. In stanzas 4–9, the speaker worries about the hazards presented by the river.
- D. In stanzas 1–3, the speaker is about to give up trying to propel the boat by wind. In stanzas 4–9, the speaker is exhilarated by experiencing the rapids.

Part B

Which details from the poem **best** support the answer to Part A? Select one answer from **each** set of stanzas for a total of **two** correct answers.

- A. “You rock your cradle the hills between,” (line 8, stanza 1)
- B. “I wooed you long but my wooing’s past;” (line 11, stanza 2)
- C. “Now fold in slumber your laggard wings,” (line 17, stanza 2)
- D. “And oh, the river runs swifter now;” (line 29, stanza 5)
- E. “Fretting their margin for evermore.” (line 35, stanza 7)
- F. “We’ve raced the rapid, we’re far ahead!” (line 44, stanza 8)

5. This question has two parts.

Part A

Which quality **best** characterizes both the narrator in the excerpt from “Drifting Home” and the speaker in “The Song My Paddle Sings”?

- A. Both enjoy exploring.
- B. Both relish adventure.
- C. Both take safety precautions.
- D. Both are knowledgeable about their boats.

Part B

Which quotations from the excerpt and the poem **best** support the answer to Part A? Select **one** answer from **each** passage for a total of **two** correct answers.

- A. “Like everybody else he kept to the right-hand channel.” (paragraph 1, “Drifting Home”)
- B. “I paddle fiercely but I can’t hold our boat on course.” (paragraph 9, “Drifting Home”)
- C. “Now nothing will do but that we go back and make the run again under power.” (paragraph 13, “Drifting Home”)
- D. “I stow the sail, unship the mast:” (line 10, “The Song My Paddle Sings”)
- E. “How the ripples curl / In many a dangerous pool awhirl!” (lines 32–33, “The Song My Paddle Sings”)
- F. “But never a fear my craft will feel. / We’ve raced the rapid, we’re far ahead!” (lines 43–44, “The Song My Paddle Sings”)

6. This question has two parts.

Part A

How do the author of the excerpt from “Drifting Home” and the poet of “The Song My Paddle Sings” create the tone of each passage?

- A. The author of the excerpt from “Drifting Home” primarily uses sarcasm to create a humorous tone. The poet of “The Song My Paddle Sings” primarily uses rhythm to create an endearing tone.
- B. The author of the excerpt from “Drifting Home” primarily uses satire to create a humorous tone. The poet of “The Song My Paddle Sings” primarily uses alliteration to create an endearing tone.
- C. The author of the excerpt from “Drifting Home” primarily uses surprise to create a humorous tone. The poet of “The Song My Paddle Sings” primarily uses personification to create an endearing tone.
- D. The author of the excerpt from “Drifting Home” primarily uses irony to create a humorous tone. The poet of “The Song My Paddle Sings” primarily uses rhyme to create an endearing tone.

Part B

Which quotations from the excerpt and the poem **best** support the answer to Part A? Select one answer from **each** passage for a total of **two** correct answers.

- A. “Then, as soon as we were into the calm, I asked my father if we could go back and do it again.” (paragraph 3, “Drifting Home”)
- B. “ ‘Aw, Dad, come on! Do we have to?’ ” (paragraph 15, “Drifting Home”)
- C. “I see Patsie and the Deaners chuckling away in secret and I sense we are going to have a memorable campfire.” (paragraph 16, “Drifting Home”)
- D. “The sail is idle, the sailor too;” (line 3, “The Song My Paddle Sings”)
- E. “For soft is the song my paddle sings.” (line 18, “The Song My Paddle Sings”)
- F. “Swirl, swirl! / How the ripples curl / In many a dangerous pool awirl!” (lines 31–33, “The Song My Paddle Sings”)

7. You have read the excerpt from “Drifting Home” and the poem “The Song My Paddle Sings.”

Write an essay in which you explain the differences and similarities in the perspective on nature of the narrator in “Drifting Home” and the speaker in “The Song My Paddle Sings.” Use details from both the passage and the poem to support your essay.

Read “Naturally Chill Music” and answer the questions.

Naturally Chill Music

- 1 Every year, Norway welcomes musicians and travelers from all over the world to a music festival that is a genuinely “cool” experience. The Ice Music Festival takes its name from the fact that every tune is performed on instruments made of ice. Ice music is an emerging genre that challenges artists’ musical creativity and spotlights humans’ relationships with nature.
- 2 The founder and director of Norway’s Ice Music Festival is percussionist Terje Isungset, one of the pioneers of the genre. Isungset’s journey into ice music began in 1999, when he was playing more traditional instruments at a music festival held behind a frozen waterfall in Norway. Having previously explored the percussive possibilities of other natural materials, including stone and wood, Isungset experimented with striking the motionless waterfall. The ethereal, crystalline sounds it made inspired him to investigate additional ways to use ice as a medium for creating music.
- 3 In the ensuing years, Isungset and a growing community of musicians and artists have crafted and played a huge variety of “ice-struments,” as they are sometimes called, even equipping entire ice orchestras. Some instruments are carved entirely of ice: ice horns, ice drums, ice organs, and even a xylophone-like “iceophone.” Others, particularly string instruments, such as violins or banjos, are hybrids of ice and other materials. One of the first modern ice instruments, for example, was a stand-up bass created in 1998 by ice sculptor Tim Linhart that combined a body carved from ice with metal strings.
- 4 The process of carving functional musical instruments from chunks of frozen water is a delicate one, requiring precision, patience, and a deep understanding of the physical properties of ice. Some of the preeminent builders of ice-struments, including Linhart, began their careers as visual artists, creating ice sculptures. Linhart says his sculpture work allowed him to “observe the forces at work and the behavior of the ice under stress.” Moving from sculptures, appreciated primarily visually, to sound-producing instruments involved some trial and error, as well as a few instruments that “exploded,” Linhart says. Along the way, he has amassed a collection of hundreds of tools he describes as “everything from drinking straws to chainsaws” to coax ice and snow into the forms he envisions.

- 5 The final products share similarities and differences with traditional instruments. Unlike, say, wooden violins that might make beautiful music for hundreds of years, instruments made of ice are, by nature and often by design, short-lived, sometimes used for only one festival before being allowed to melt.
- 6 For both traditional and ice instruments, however, high-quality materials are important. For ice-instruments, the density and purity of the ice influence an instrument's final tonality. Isungset insists on using natural ice harvested from pure, frozen lakes and rivers. "If you have factory ice, I can guarantee you there will be no sound," he said in a 2021 interview with the Canadian radio network CBC. "You don't get it at the grocery store."
- 7 Isungset regards nature as the undisputed star of ice music, and he is both humbled and challenged by nature's influence. "It is very inspiring to make music out of [the] world's most important resource: water," he told *WIRED* magazine. However, he has also acknowledged, "Ice limits what you can actually do. . . . Nature decides everything somehow."
- 8 Nature's decisive role demands that musicians adapt performances to their frosty medium. To prevent ice-instruments from melting as they are played, performers take steps such as wearing parkas or gloves while playing, switching instruments throughout a concert, or cooling their instruments with dry ice between numbers. They must also be ready to improvise in both a musical and general sense. Because the instruments are so delicate, musicians cannot practice with them before a performance. In addition, Isungset notes, "The tuning will change with time or with temperature change," and the constant shifts require "some logistics" to figure out. Some musicians, however, consider the instability of ice instruments to be their primary appeal rather than a drawback. "It's in the realm of the ephemeral—music that can be made in one place, one way, and never again," cellist and stand-up bass player Lindsey Verrill told the *Wall Street Journal*. "I kind of like that."
- 9 Musicians are not the only ones who need to be adaptable. Venues must also be adjusted, or even built from scratch, to suit the instruments. During some early experiences, the combined body heat of a few hundred audience members quickly brought instruments to their melting points. In response, leading ice-music artisans, including Linhart and Isungset, now build not only instruments but also igloo-like concert halls out of ice. Major festivals are often held in frigid areas of the globe where temperatures inside the structures can be kept in the range of -5 to -10 degrees Celsius (about 23 to 14 degrees Fahrenheit).

- 10 Audiences, in turn, then adapt to the concert environment. They might travel hundreds of miles in winter to remote locations. They watch performances while bundled in parkas and perched on thick rugs that not only protect the audience from the frozen bleachers but also insulate the ice-carved seats from the audience's heat. It seems that, for many, such extreme efforts are worthwhile to experience a performance that Tim Linhart has described as almost magical: "unbelievable but happening."

8. This question has two parts.

Part A

In paragraphs 5 and 6, how does the author's use of a compare-and-contrast structure help clarify a key point of the article?

- A. It shows how musicians shift from traditional to ice instruments.
- B. It describes the primary source of frustration for ice musicians.
- C. It explains the high quality of ice-music performances.
- D. It highlights how the physical properties of the materials affect the music.

Part B

Which evidence from paragraphs 5 and 6 **best** supports the answer to Part A? Select **two** correct answers.

- A. "final products share similarities and differences with traditional instruments" (paragraph 5)
- B. "instruments made of ice are, by nature and often by design, short-lived, sometimes used for only one festival before being allowed to melt" (paragraph 5)
- C. "For both traditional and ice instruments, however, high-quality materials are important." (paragraph 6)
- D. "the density and purity of the ice influence an instrument's final tonality" (paragraph 6)
- E. " 'If you have factory ice, I can guarantee you there will be no sound.' " (paragraph 6)

9. This question has two parts.

Part A

What did **both** Terje Isungset and Tim Linhart learn over the course of their ice-music careers?

- A. An appreciation of how ice reacts to a variety of conditions
- B. A grasp of the basic principles of ice sculpture
- C. A familiarity with ice-producing locations in the world
- D. An awareness of the preferences of ice-music audiences

Part B

Which evidence from the article **best** supports the answer to Part A?

- A. "his sculpture work allowed him to 'observe the forces at work' " (paragraph 4)
- B. " 'You don't get it at the grocery store.' " (paragraph 6)
- C. " 'The tuning will change with time or with temperature change.' " (paragraph 8)
- D. "for many, such extreme efforts are worthwhile to experience a performance" (paragraph 10)

10. This question has two parts.

Part A

In paragraph 8, the author’s use of the word logistics means Isungset must be —

- A.** among the best in his field
- B.** a versatile problem solver
- C.** famous and popular
- D.** precise and demanding

Part B

Which phrase from paragraph 8 **best** supports the answer to Part A?

- A.** “switching instruments throughout a concert”
- B.** “ready to improvise in both a musical and general sense”
- C.** “ ‘music that can be made in one place, one way, and never again’ ”
- D.** “player Lindsey Verrill told the *Wall Street Journal*”

11. This question has two parts.

Part A

Which statement expresses the author’s **most likely** opinion about “ice-struments”?

- A.** The artistry and ingenuity required to craft ice-struments is more important than the quality of the music produced.
- B.** A primary appeal of many ice-struments is their similarity to traditional instruments.
- C.** The multiple considerations needed to play an ice-instrument at a concert add to the excitement of the experience.
- D.** Ice-struments attract an outdoor-loving niche audience drawn to the novelty of the instruments.

Part B

Which evidence from the article **best** supports the answer to Part A?

- A.** “instruments are carved entirely of ice: ice horns, ice drums, ice organs, and even a xylophone-like ‘iceophone’ ” (paragraph 3)
- B.** “he has amassed a collection of hundreds of tools he describes as ‘everything from drinking straws to chainsaws’ to coax ice and snow into the forms he envisions” (paragraph 4)
- C.** “ ‘It’s in the realm of the ephemeral—music that can be made in one place, one way, and never again.’ ” (paragraph 8)
- D.** “They might travel hundreds of miles in winter to remote locations.” (paragraph 10)

Today you will read about exploration of the planet Mars. You will read an excerpt from “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life” and read a transcript of the video “*Perseverance* Rover Zooms In on Ancient Mars River.” Then you will read “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission.” As you review these sources, you will answer questions and write a response.

from NASA Rover Perseverance Lands on Mars in Mission to Search for Past Life

This 2021 article from the Washington Post describes the mission and landing of the remote-controlled Mars rover Perseverance.

- 1 NASA rover *Perseverance* landed safely Thursday on Mars to begin an ambitious mission to search for signs of past Martian life and obtain samples of soil and rock that could someday be hauled back to Earth for study in laboratories. . . .
- 2 *Perseverance*, the first multibillion-dollar NASA mission to Mars in nine years, quickly produced two low-resolution images of the landing site—a forlorn landscape pocked with small craters. Dust kicked up by the landing covered the glass shields on the cameras. The pair of photos showed the rover casting a shadow on the Martian landscape.
- 3 *Perseverance* used its autonomous guidance system to avoid hazardous terrain in the target area, an ancient lake bed known as Jezero Crater. The touchdown followed the “seven minutes of terror”—in homage to the emotional state of engineers rooting for success. Mars is a notoriously difficult place to land a spacecraft.
- 4 Going back more than half a century, about half of all robotic missions to the planet have failed, although NASA appears to have mastered the feat over the past two decades. The rover *Curiosity*, which landed in 2012 far to the east of *Perseverance*’s location, remains operational. *Perseverance* is similar in scale but is slightly heavier and has about 50 percent more scientific instrumentation, according to NASA.
- 5 The vehicle carrying *Perseverance* entered the Martian atmosphere at 12,000 mph, used a heat shield to avoid burning up, then deployed a 70-foot-diameter parachute while still going nearly twice the speed of sound. Finally, the craft used rocket thrusters to slow down further and then a system known as a sky crane to lower the rover the final distance to the surface.

- 6 The landing on rough terrain is the most hazardous phase of the mission. The entry, descent and landing had to be accomplished entirely autonomously. Mars is too far from Earth to permit technicians to joystick the landing; a signal between the spacecraft and Pasadena¹ takes 11 minutes at the speed of light.
- 7 For that reason, the spacecraft was loaded with navigation software to guide it to a safe spot in an area that features 200-foot cliffs, gullies, boulders and sand-filled craters that could potentially immobilize it.
- 8 The rover touched down in a relatively rugged area, about a mile southeast of the center of its target. In this treacherous environment, the autonomous navigation system proved “absolutely essential,” entry, descent and landing lead Allen Chen said at a news conference Thursday evening.
- 9 “We found the parking lot and hit it,” Chen said, avoiding dangerous terrain that was all but certain to doom the rover. The vehicle is almost level, tilted only a matter of a degree.
- 10 Project scientist Ken Farley said the site is on the boundary between rock regions representing two important moments in Mars’s geologic history. Off in the distance, images seem to show the cliffs of the river delta.
- 11 “This is a great place to be,” he said.
- 12 But there is still a “ripple field”—sand dunes—between the rover and the delta that scientists want to explore. The rover may have to drive around those sand dunes to get to the delta formation.

From “NASA Rover Perseverance Lands on Mars in Mission to Search for Past Life,” The Washington Post, February 18, 2021. Used by permission.

¹Pasadena—NASA’s Jet Propulsion Laboratory is located in Pasadena, California.

12. This question has two parts.

Part A

Which statement describes the central ideas developed in the excerpt from “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life”?

- A. Engineering for space missions is challenging, and many robotic missions to Mars have been unsuccessful.
- B. Mars is a difficult planet to explore, but engineers have found ways to make exploration of its terrain possible.
- C. Obtaining clear images of the landscape of Mars is important, and engineers have identified the best places for spaceships to explore.
- D. The surface of Mars has a long history of transformation, and locations for investigating its history have been identified.

Part B

Which details from the excerpt **best** support the answer to Part A? Select **two** correct answers.

- A. “Dust kicked up by the landing covered the glass shields on the cameras.” (paragraph 2)
- B. “*Perseverance* used its autonomous guidance system to avoid hazardous terrain in the target area.” (paragraph 3)
- C. “an area that features 200-foot cliffs, gullies, boulders and sand-filled craters that could potentially immobilize it” (paragraph 7)
- D. “ ‘We found the parking lot and hit it.’ ” (paragraph 9)
- E. “the site is on the boundary between rock regions representing two important moments in Mars’s geologic history” (paragraph 10)

13. This question has two parts.

Part A

What is the meaning of autonomously in paragraph 6 of the excerpt from “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life”?

- A.** Independently
- B.** Carefully
- C.** Distantly
- D.** Smoothly

Part B

Which detail from paragraph 6 **best** supports the answer to Part A?

- A.** “landing on rough terrain”
- B.** “the most hazardous phase of the mission”
- C.** “too far from Earth to permit technicians to joystick the landing”
- D.** “a signal between the spacecraft and Pasadena”

Perseverance Rover Zooms In on Ancient Mars River

This is a transcript of a video about scientists investigating a region of Mars, known as Jezero Crater, to look for evidence of ancient life recorded in the rocks.

- 1 After a thousand sunrises on Mars, here's where NASA's *Perseverance* rover is exploring now: a river environment, billions of years old, that tells a dynamic story of the forces that shaped it. Let's take a tour of this area and see where we'll send the rover next.
- 2 *Perseverance* is exploring Jezero Crater, where an ancient lake and river system once existed. If microbes ever lived here, signs of them could be preserved in these rocks.
- 3 About 3.5 billion years ago, a river carved a canyon through the crater rim, filling the crater with water and depositing sand and rocks that formed a delta. On Earth, the record of such an ancient river and lake would have been erased long ago. That's why sending a robotic explorer like *Perseverance* is so valuable: Mars is a special place that preserves a unique record of things that happened in the first billion years of the solar system.
- 4 In this area, different rock layers record different parts of the crater's history. The flat, light-colored rocks were deposited on the banks of a river flowing slowly across the landscape.
- 5 The boulders in the distance were deposited later, in what was likely a raging torrent.
- 6 And if this peculiar outcrop caught your attention, it did ours as well. It doesn't look like sediment at all—perhaps it's a remnant of a lava flow, now mostly eroded away. Lab equipment on Earth can accurately measure when a volcanic rock was formed, so if we can return a sample of this lava to Earth in the future, we may know when and for how long water flowed into Jezero.
- 7 From here, *Perseverance* will continue west. In the distance you can trace the tops of the natural levees that formed at the near and far banks of the river. The rover will pass this area on its way upstream, continuing toward this spot where the river carved through the crater wall. You can see the canyon on the horizon here.
- 8 From there, *Perseverance* will be well positioned to head south and ascend this natural ramp that leads up and out of the crater. We're lucky to have a route the rover can safely drive up the rim right where we need it.

- 9 Starting the climb would mark a new and exciting phase of the mission: exploring rocks far older than those in Jezero and produced in an entirely different way. One tempting target are these light-colored rocks partway up the rim. They may have interacted with hot water in a hydrothermal environment—another exciting place to hunt for evidence of past life.
- 10 Since finishing its study of the crater floor, *Perseverance* has been climbing the delta and piecing together the history of this once-watery environment. We’ve come a long way in nearly three years of exploring and collecting samples. But there’s still so much more to investigate.

NASA/JPL-Caltech/ASU/MSSS; ESA/DLR/FU-Berlin

14. This question has two parts.

Part A

Which statement **best** summarizes the transcript of the video “*Perseverance Rover Zooms In on Ancient Mars River*”?

- A.** The environment on Mars preserves geologic history not available on Earth, so Jezero Crater could provide new data about the solar system.
- B.** The Mars rover has been successful at obtaining information and is moving into the next phase of exploration.
- C.** Mars once had living creatures in hydrothermal environments, which has led scientists to search for evidence of microbes on Mars.
- D.** The terrain of Mars is varied, so scientists have carefully planned the route of the rover exploring it.

Part B

Which details from the transcript **best** support the answer to Part A? Select **two** correct answers.

- A.** “the record of such an ancient river and lake would have been erased long ago” (paragraph 3)
- B.** “different rock layers record different parts of the crater’s history” (paragraph 4)
- C.** “It doesn’t look like sediment at all—perhaps it’s a remnant of a lava flow, now mostly eroded away.” (paragraph 6)
- D.** “We’re lucky to have a route the rover can safely drive up” (paragraph 8)
- E.** “We’ve come a long way in nearly three years of exploring and collecting samples.” (paragraph 10)

15. This question has two parts.

Part A

How is the information organized in the transcript of the video “*Perseverance Rover Zooms In on Ancient Mars River*”?

- A.** As a list of problems that the rover must surmount
- B.** In order of when geologic events occurred on Mars
- C.** In order of what the rover transmits as it views the land
- D.** As a series of steps necessary to understand the history of Mars

Part B

Which detail from the transcript **best** supports the answer to Part A?

- A.** “take a tour of this area and see where we’ll send the rover”
(paragraph 1)
- B.** “carved a canyon through the crater rim, filling the crater with water”
(paragraph 3)
- C.** “we can return a sample of this lava to Earth in the future” (paragraph 6)
- D.** “well positioned to head south and ascend this natural ramp”
(paragraph 8)

from Ingenuity, the NASA Helicopter Flying over Mars, Ends Its Mission

by Kenneth Chang

- 1 *Ingenuity*, the little Mars helicopter that could, can't anymore.
- 2 At least one rotor broke during the robotic flying machine's most recent flight last week, NASA officials announced on Thursday. *Ingenuity* remains in contact with its companion, the *Perseverance* rover, which has been exploring a dried-up riverbed for signs of extinct Martian life.
- 3 *Ingenuity* will now be left behind.
- 4 "It is bittersweet that I must announce that *Ingenuity*, the little helicopter that could—and it kept saying, 'I think I can, I think I can'—well, it has now taken its last flight on Mars," Bill Nelson, the NASA administrator, announced in a video message posted on X.
- 5 *Ingenuity* arrived on Mars in the undercarriage of the *Perseverance* rover in February 2021. The helicopter was a late addition to the mission, a low-cost, high-risk, high-reward technology demonstration using many off-the-shelf components, providing important lessons for future mission designers during its 72 flights through the planet's thin atmosphere.
- 6 "They can rely on what we've accomplished," Theodore Tzanetos, the *Ingenuity* project manager, said in a news conference. . . . "They can point to the fact that a cellphone processor from 2015 can survive the radiation environment on Mars for two and a half years. Lithium-ion battery cells that are commercial, off the shelf, can survive for two and a half years. Those are massive victories for engineers around NASA."
- 7 On April 19, 2021, *Ingenuity* became the first plane or helicopter to take off on another planet, the aircraft's rotors spinning 2,400 times a minute to generate sufficient lift in an atmosphere that is only one one-hundredth as dense as Earth's. NASA officials called the flight a "Wright brothers moment" for planetary exploration.
- 8 The plan then was to conduct a demonstration of the novel technology: five flights in 30 days.
- 9 *Perseverance* was then to leave *Ingenuity* behind and begin studying ancient sedimentary rocks along the rim of Jezero Crater, which held a lake of water several billion years ago.

- 10 *Ingenuity* aced the five flights, and it worked so well that mission managers decided to bring the helicopter along to scout the terrain ahead of the rover. Over the next thousand days, *Ingenuity* continued to go up and down, up and down, up and down. It experienced glitches along the way, making three emergency landings. It survived dust storms and the cold Martian winter, which the aircraft was not designed for. Engineers upgraded its software so that *Ingenuity* could choose its own landing sites.
- 11 “It’s almost an understatement to say that it has surpassed expectations,” said Lori Glaze, director of the planetary science division at NASA.
- 12 In an interview, MiMi Aung, who shepherded the helicopter project from early out-of-control experiments on Earth through *Ingenuity*’s first flights on Mars, said she felt “A little sad, but, I must say, mostly super proud of the whole team.” She recalled how *Ingenuity*’s first flight was delayed by a software glitch. Back then, she and her colleagues took meticulous care to ensure that a fix did not cause more serious problems.
- 13 “*Ingenuity* could die any day,” she said. “Before or right after the first flight.”
- 14 The helicopter team had prepared for what they described as a 30-day sprint. “Seventy-two flights was not in our imagination,” said Ms. Aung, who left NASA in mid-2021 to work on Project Kuiper, Amazon’s effort to beam internet from space.
- 15 The mission instead turned into an open-ended marathon. Mr. Tzanetos said that in the back of their minds, team members knew that each passing day could be the last day for *Ingenuity*. But the helicopter seemed to always bounce back from any challenge.
- 16 Other than one nonessential sensor that had failed, “The rest of the subsystems, from the solar panels to the battery, have been aging remarkably well,” Mr. Tzanetos said. “Our electronics, avionics, processor all seem to be doing just fine.”
- 17 On Jan. 18, during its 72nd flight, *Ingenuity* fell out of touch with *Perseverance* while descending. Communications were re-established the next day, but then a shadow in a photo sent back a few days later revealed that about one-quarter of one of the rotor blades had broken off.
- 18 “There was the initial moment, obviously, of sadness seeing that photo come down and pop onscreen, which gives a certainty of what occurred,” Mr. Tzanetos said. “But that’s very quickly replaced with happiness and pride and a feeling of celebration for what we pulled off.”

- 19 Mr. Tzanetos noted that on Thursday evening, it would be 1,000 Martian days, known also as sols, since *Ingenuity* had been dropped onto the surface of Mars by *Perseverance*.
- 20 “She picked a very fitting time to come to the end of the mission here,” he said. . . .
- 21 “*Ingenuity* was based off of theories,” Mr. Tzanetos said. “We now have facts, and future aircraft designs are going to rely on all the data we’ve collected from *Ingenuity*.”

From “Ingenuity, the NASA Helicopter Flying over Mars, Ends Its Mission” by Kenneth Chang, The New York Times, January 25, 2024. Used by permission.

16. This question has two parts.

Part A

In the excerpt from “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission,” the author uses paragraphs 1–4 to convey —

- A. the purpose of equipment used in outer space
- B. the affection scientists had for a certain device
- C. the importance of optimistic thinking for space engineers
- D. the problem of abandoning machinery that has broken

Part B

Which detail from the article **best** supports the answer to Part A?

- A. “At least one rotor broke during the robotic flying machine’s most recent flight.” (paragraph 2)
- B. “remains in contact with its companion” (paragraph 2)
- C. “ ‘It is bittersweet that I must announce.’ ” (paragraph 4)
- D. “ ‘it has now taken its last flight on Mars’ ” (paragraph 4)

17. This question has two parts.

Part A

In paragraph 7 of the excerpt from “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission,” the author refers to the flight of *Ingenuity* as a “Wright brothers moment for planetary exploration” because the helicopter —

- A. could maintain flight for only a short time
- B. used the same principles used in early airplanes
- C. represented a major advance in aerospace technology
- D. eventually broke in a way that could not be repaired remotely

Part B

Which detail from the article **best** supports the answer to Part A?

- A.** "It survived dust storms and the cold Martian winter." (paragraph 10)
- B.** " '*Ingenuity* could die any day,' she said." (paragraph 13)
- C.** "about one-quarter of one of the rotor blades had broken off" (paragraph 17)
- D.** " 'future aircraft designs are going to rely on all the data we've collected' " (paragraph 21)

18. This question has two parts.

Part A

How do the excerpt from “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life” and the transcript of the video “*Perseverance* Rover Zooms In on Ancient Mars River” differ in the ideas they develop?

- A. The excerpt describes the initial landing, while the transcript describes the process of exploring the surface.
- B. The excerpt retells the history of past attempts to reach Mars, while the transcript relates present-day successes.
- C. The excerpt focuses on Martian geology, while the transcript focuses on water sources that may have supported life on Mars.
- D. The excerpt develops ideas of interest to scientists, while the transcript develops ideas of interest to the general public.

Part B

Which details from the passages **best** support the answer to Part A? Select one answer from **each** passage for a total of **two** correct answers.

- A. “ambitious mission to search for signs of past Martian life” (paragraph 1, “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life”)
- B. “appears to have mastered the feat over the past two decades” (paragraph 4, “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life”)
- C. “system known as a sky crane to lower the rover the final distance” (paragraph 5, “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life”)
- D. “rover will pass this area on its way upstream” (paragraph 7, “*Perseverance* Rover Zooms In on Ancient Mars River”)
- E. “tempting target are these light-colored rocks partway up the rim” (paragraph 9, “*Perseverance* Rover Zooms In on Ancient Mars River”)

19. This question has two parts.

Part A

Both the transcript of the video “*Perseverance* Rover Zooms In on Ancient Mars River” and the excerpt from “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission” discuss the importance of the Jezero Crater to Mars exploration. What is one aspect of the mission to the crater that can be understood only by reading both passages?

- A. Radiation shielding technology has performed better than expected on Mars.
- B. The robots have found both sedimentary and volcanic rock near the surface.
- C. There is evidence of ancient water and possible signs of life in the crater.
- D. The rover will explore the surface of Mars longer than the helicopter will.

Part B

Which details from the passages **best** support the answer to Part A? Select one answer from **each** passage for a total of **two** correct answers.

- A. “depositing sand and rocks that formed a delta” (paragraph 3, “*Perseverance* Rover Zooms In on Ancient Mars River”)
- B. “can trace the tops of the natural levees that formed” (paragraph 7, “*Perseverance* Rover Zooms In on Ancient Mars River”)
- C. “the climb would mark a new and exciting phase” (paragraph 9, “*Perseverance* Rover Zooms In on Ancient Mars River”)
- D. “will now be left behind” (paragraph 3, “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission”)
- E. “can survive the radiation environment on Mars for two and a half years” (paragraph 6, “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission”)

- 20.** You have read the excerpt from “NASA Rover *Perseverance* Lands on Mars in Mission to Search for Past Life,” the transcript of the video “*Perseverance* Rover Zooms In on Ancient Mars River,” and the excerpt from “*Ingenuity*, the NASA Helicopter Flying over Mars, Ends Its Mission.”

Write an essay in which you describe the engineering challenges scientists face when exploring Mars and how they have overcome these challenges. Use details from all **three** sources to support your essay.





Please let your teacher know that you have completed your test.



