



5TH GRADE **ELA**

# Student Materials

## **Alternate Unit 4** *Exploring Mars: Spirit and Opportunity*



# Daily Lesson Materials

Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 1 - 7.

1. How does the author use text features to reveal to readers the topic of this book?

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2. Based on the image on pages 2-3, what challenges might robots visiting Mars encounter?

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3. Why does the author start by asking questions? What impact do the author's questions have on the reader?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

microscopic
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What was the goal of the Mars Exploration Rover Mission? Why was it an important mission?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 8 - 13.

1. Why does the author include details about Steven Squyres's childhood and early career?

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2. Describe scientists' initial efforts to explore Mars. Were the missions successful? Why or why not?

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3. What is the last paragraph of page 12 mostly about? Why would the author include this description?

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4. Steve says that he is stubborn and that being stubborn pays off. Why does he believe this? What other words could be used to describe Steve and his team?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

devoted geologist

How were Steve's mission proposals different from previous missions to Mars? What problem was he trying to solve with his proposals?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 14 – 19.

1. According to the text and the diagram on page 14, why do launch windows to Mars only come every twenty-six months? What could happen if a launch doesn't occur at the right time?

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2. Read the quote from Steve on page 18. "I love the process of creation and being part of such an extraordinary team, the sense of shared struggle as we pulled together this incredible mission. It was so complicated that not a single one of us fully understood what was going on. But somehow as a group we understood it completely." Why does the author include this quote from Steve? What does it show about Steve, the team, and the work they were doing?

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3. The rovers were equipped with lots of scientific instruments and special features. Describe some of these and explain why each was important.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

malfunctioned

Why did it take three years for Steve's team to create the rovers? Describe some of the key steps the team took and the obstacles they faced trying to ensure the rover was ready for a trip to Mars.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 20 - 23.

1. Why were the rovers named Spirit and Opportunity?

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2. Why did Steve refer to the six months of flight as the "scariest stages of a mission"? What evidence does the author include to support this statement?

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3. The author uses a strategy of asking questions. Identify a place in the text where the author asks questions. What effect does it have on the reader? Why does the author use this strategy?

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Date: \_\_\_\_\_

**Writing Prompt**

fare

Read the quote from page 22:

"We had done our best to prepare her for the dangers she would face, but had we done enough?"

Explain what the team did to prepare Spirit for the trip. Despite their preparations, why were they worried?

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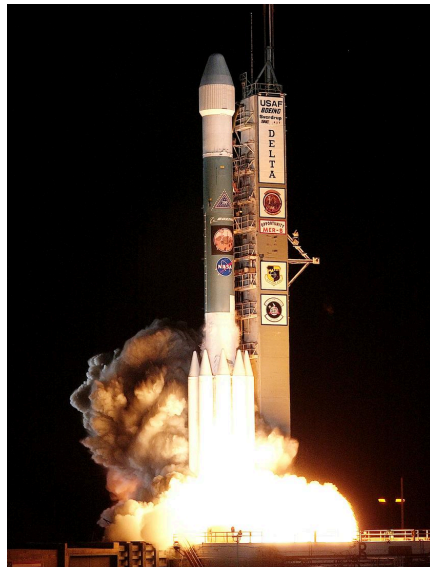
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## Caption This!

Imagine you are an author writing a new scientific text about the exploration of Mars. Caption each photograph using the perfect tense to show precisely when the event occurred.



<https://scitechdaily.com/space-history-is-made-in-this-nasa-jet-propulsion-laboratory-robot-factory/>



<https://images.nasa.gov/details/KSC-03pd2092>



<https://images.nasa.gov/details/PIA11996>

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<https://images.nasa.gov/details/KSC-03pd1851>

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Date: \_\_\_\_\_

**Writing Prompt**

You're stepping into the shoes of a scientist, looking back at this powerful photograph from the building of the Mars rovers. Write a one to two-sentence caption using the perfect tense to show how this event connects to what had already happened or what people have experienced since.



<https://images.nasa.gov/details/PIA04835>

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 24 – 29 – skip page 28.

1. The author says that many things could go "fatally wrong." Explain what the author means by this statement.

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2. How did the team at Mission Control feel when they finally got a signal from Spirit? How do you know? Did this feeling last? Why or why not?

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3. Why was maneuvering Spirit a complicated process?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

fatally
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Explain the steps necessary for Spirit's landing and operation. Explain the importance of each step and the potential complications.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* – pages 28 and 30  
How We Landed on Mars with NASA Spirit.

1. Determine a main idea of the section "Naming Names." How is the main idea supported by key details?

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2. Determine a main idea of the section "How to Drive a Rover." How is the main idea supported by key details?

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3. Determine a main idea of the section "Chatting with the Rovers." How is the main idea supported by key details?

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Date: \_\_\_\_\_

Writing Prompt

Use details from the sidebars to revise your Target Task from Lesson 6. What additional information did you learn about the steps necessary for Spirit's landing and operation?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 29 – 33.

1. Compare and contrast the description of Opportunity's landing to Spirit's landing.

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2. Why were Steve and his team excited to see rock layers? How do rock layers on Mars compare with rock layers on Earth?

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3. What did Steve and his team see on the images they received from Opportunity? What inferences did they make based on the images?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

pondered

Describe where Opportunity landed. What did Opportunity find? How did the team respond to Opportunity's findings? Why did they respond this way?

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

Record details from the text that make science feel like an adventure. Then identify the two strongest strategies used by the author.

Detail	Writing Strategy Used

The two strongest strategies used to make science feel like an adventure are

\_\_\_\_\_ and \_\_\_\_\_.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
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### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

Record details from the text that make science feel like an adventure. Then identify the two strongest strategies used by the author.

Detail	Writing Strategy Used
<ul style="list-style-type: none"> <li>● Photograph of the building process (p. 15)</li> </ul>	Text features- photograph
<ul style="list-style-type: none"> <li>● Steve's concern about timeline (p. 15)</li> <li>● Steve reacts to rover construction (p. 19)</li> </ul>	First-person perspective
<ul style="list-style-type: none"> <li>● Steve describes first image of Mars (p. 26)</li> </ul>	First-person perspective
<ul style="list-style-type: none"> <li>● "Then everything stopped. The signal was lost. The room went silent again. A long minute." (p. 26)</li> </ul>	Sentence structure- short sentences
<ul style="list-style-type: none"> <li>● "BOUNCE... way up high... BOUNCE... high to the sky again... BOUNCE... plummeting down and rebounding up again... BOUNCE... and again... BOUNCE... and again!" (p. 31)</li> </ul>	Sentence structure
<ul style="list-style-type: none"> <li>● Photograph: Steve/team celebrating (p. 31)</li> </ul>	Text features- photograph

The two strongest strategies used to make science feel like an adventure are

*first-person perspective* and *sentence structure*.

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

### Paragraph 1

Topic Sentence: *What does Elizabeth Rusch help readers experience by telling the story through Steve Squyres's eyes?*

- Detail: *Challenge of timeline*
- Detail: *Emotional- rover progress/construction*
- Detail: *Reactions to rovers landing*

Concluding Sentence: *By taking the reader through the ups and downs of Steve's emotions and reactions, the reader goes on an adventure with Steve as they learn about the Mars rover mission.*

### Paragraph 2

Topic Sentence: *Rusch also chooses to use short sentences and phrasing in some parts of the text to add suspense and emotion to the story.*

- Detail: *"Then everything stopped. The signal was lost. The room went silent again. A long minute." (p. 26)*
- Detail: *"BOUNCE... way up high... BOUNCE... high to the sky again... BOUNCE... plummeting down and rebounding up again... BOUNCE... and again... BOUNCE... and again!" (p. 31)*

Concluding Sentence: *The short sentences build suspense in the adventure of Spirit and Opportunity.*

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Elizabeth Rusch's writing style makes science, particularly the Mars missions, feel like an adventure.

What strategies does she use to create this feeling? Make sure to explain and give examples of at least two strategies.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 1

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## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
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- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
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### Paragraph 2

Topic Sentence: \_\_\_\_\_  
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- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Brainstorming Page 1

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

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### Paragraph 2

Topic Sentence: *Rusch also chooses to use short sentences and phrasing in some parts of the text to add suspense and emotion to the story.*

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- Detail: *"BOUNCE... way up high... BOUNCE... high to the sky again... BOUNCE... plummeting down and rebounding up again... BOUNCE... and again... BOUNCE... and again!" (p. 31)*

Concluding Sentence: *The short sentences build suspense in the adventure of Spirit and Opportunity.*

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Brainstorm by gathering details that relate to the Target Task prompt using [Brainstorming Page 1 \(G5, Alt U4, L9\)](#). Then, complete a [Two Paragraph Outline](#) that includes topic sentences, supporting details, and concluding sentences. Craft an engaging topic sentence by varying the sentence type to best match the purpose and tone of the project.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 1

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
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### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Use your completed outline to draft both body paragraphs. Include at least one piece of direct quotation that clarifies, supports, or emphasizes the main idea in each paragraph.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 34 – 39 – skip page 38.

1. Spirit's team had trouble communicating with Spirit. Why? What steps did they take to overcome the problem?

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2. What did Spirit find in Gusev Crater? Was it the discovery the team was hoping for? Why or why not?

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3. Why did the team decide to send Spirit to the Columbia Hills? Why was the **quest** risky?

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4. Compare and contrast Spirit and Opportunity's journeys away from their landing spots

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

quest    parameter    audacious

Spirit and Opportunity both accomplished a lot in their first few months. Describe the different accomplishments. What made the accomplishments possible?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* – page 28 and sidebar on page 39  
Spacecraft: Surface Operations: Instruments.

1. Determine a main idea of the section "Living on Martian Time." How is the main idea supported by key details?

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2. Why does the author include the image on page 38? How does it help a reader better understand how a mini-TES works?

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3. Determine a main idea of the section "Driving Without a Driver." How is the main idea supported by key details?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Use details from the sidebars to revise your Target Task from the previous lesson. What additional information did you learn about Spirit and Opportunity's accomplishments and what made them possible?

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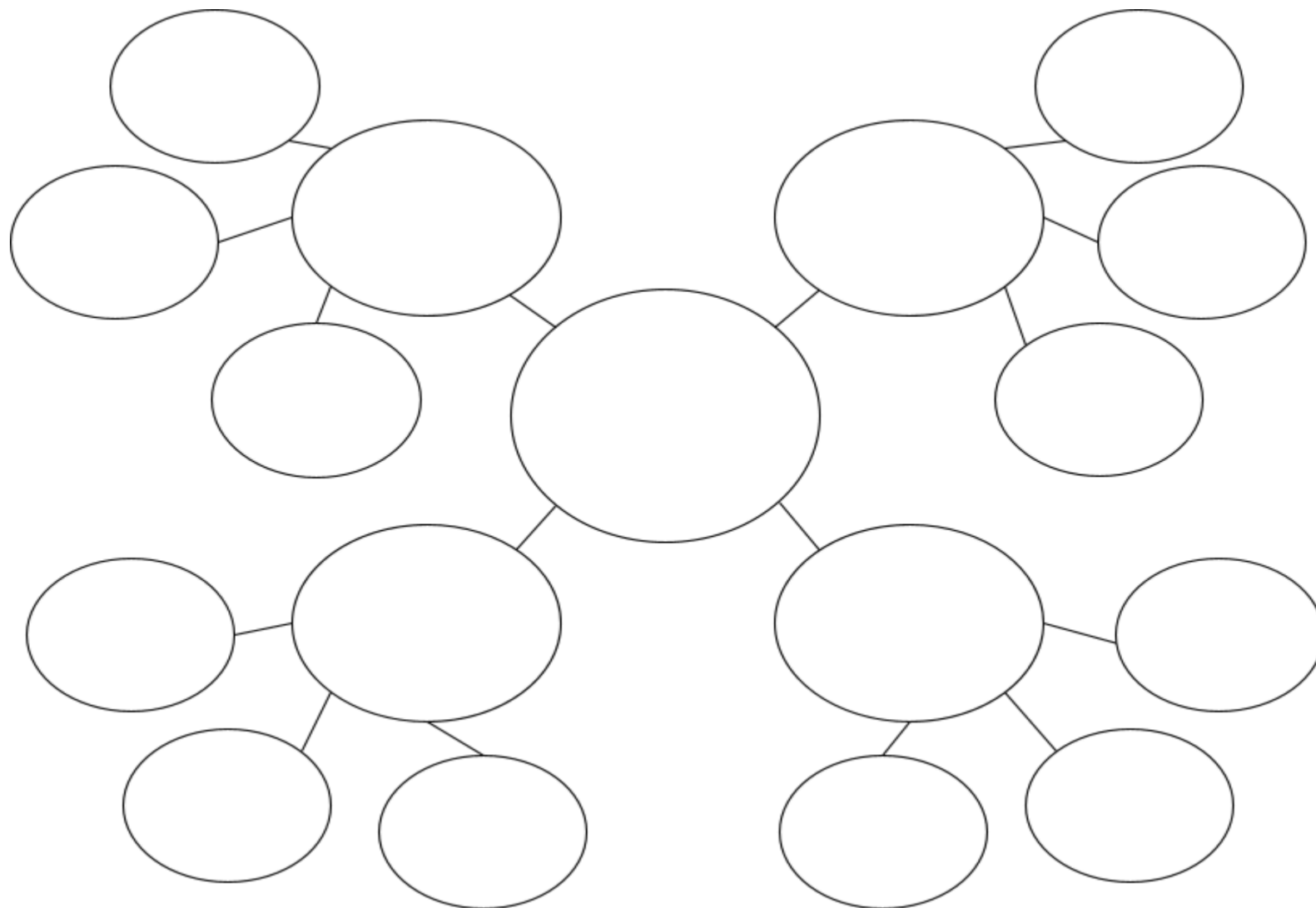
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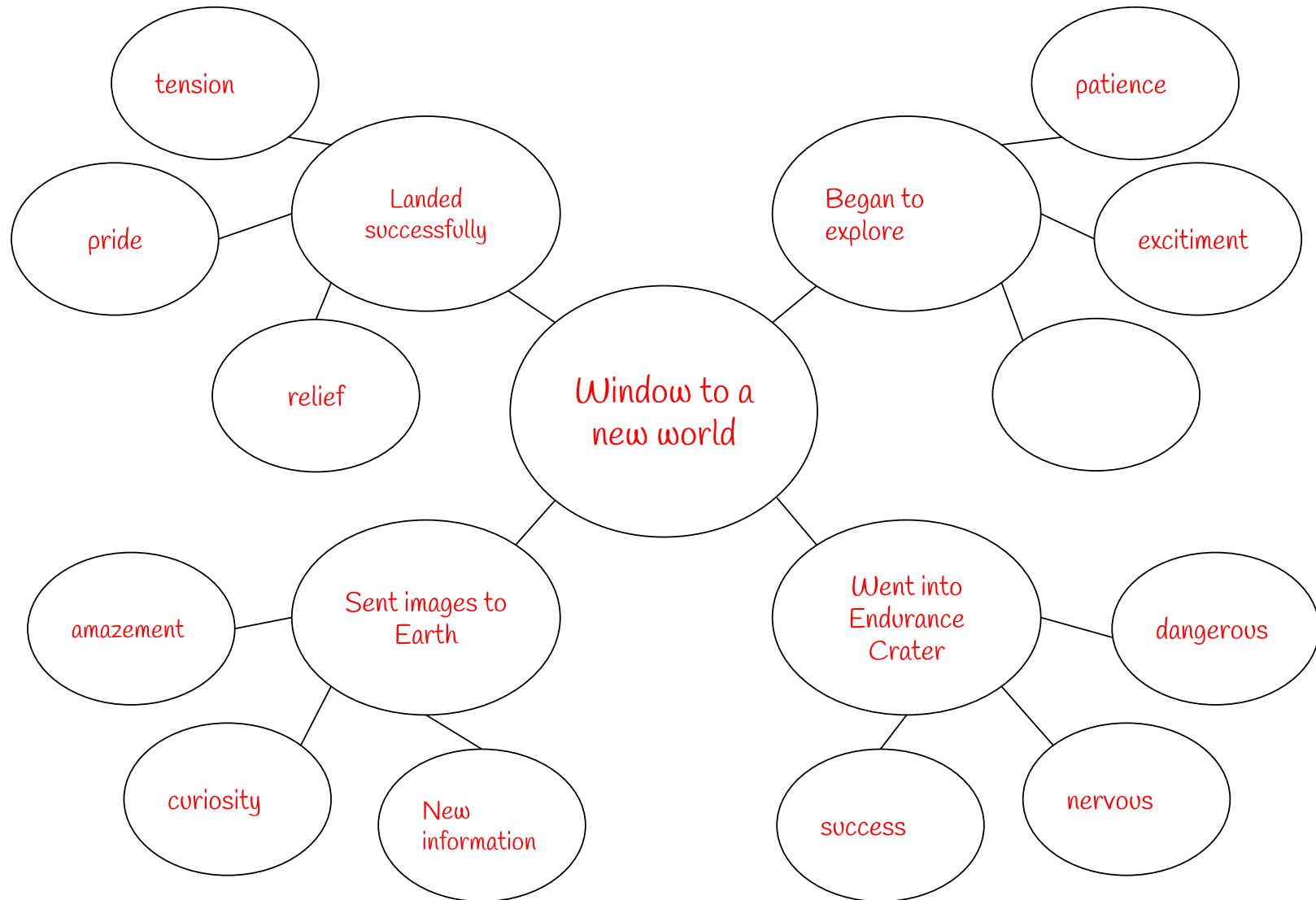
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## Poetry Brainstorm



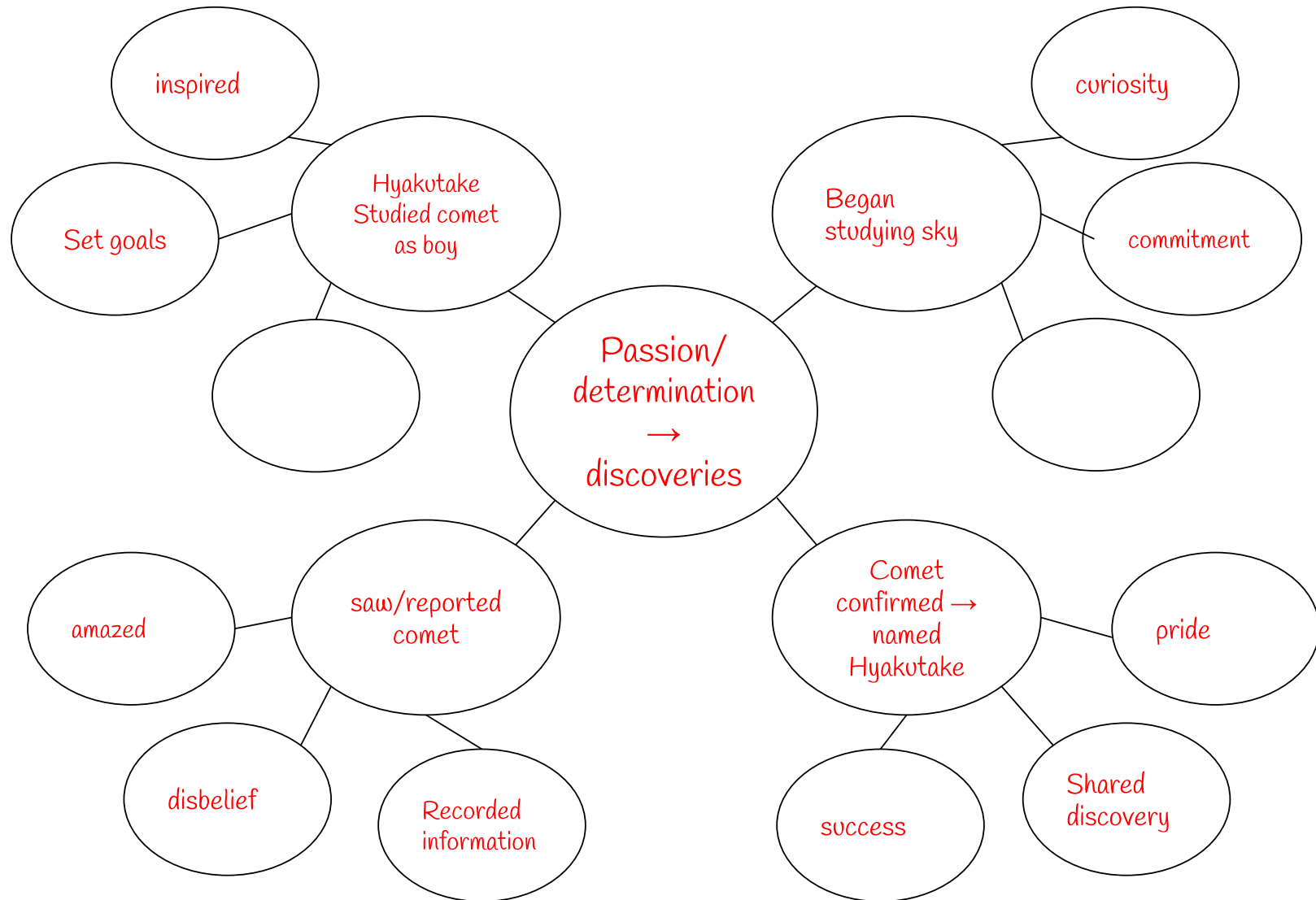
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# Poetry Brainstorm



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Poetry Brainstorm



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Some poems are used to tell a narrative story. Write a poem that tells the story of landing on and exploring Mars from the perspective of Spirit or Opportunity. Imagine that one of the rovers is a character, and the story tells the experience of exploring a new planet through their eyes.

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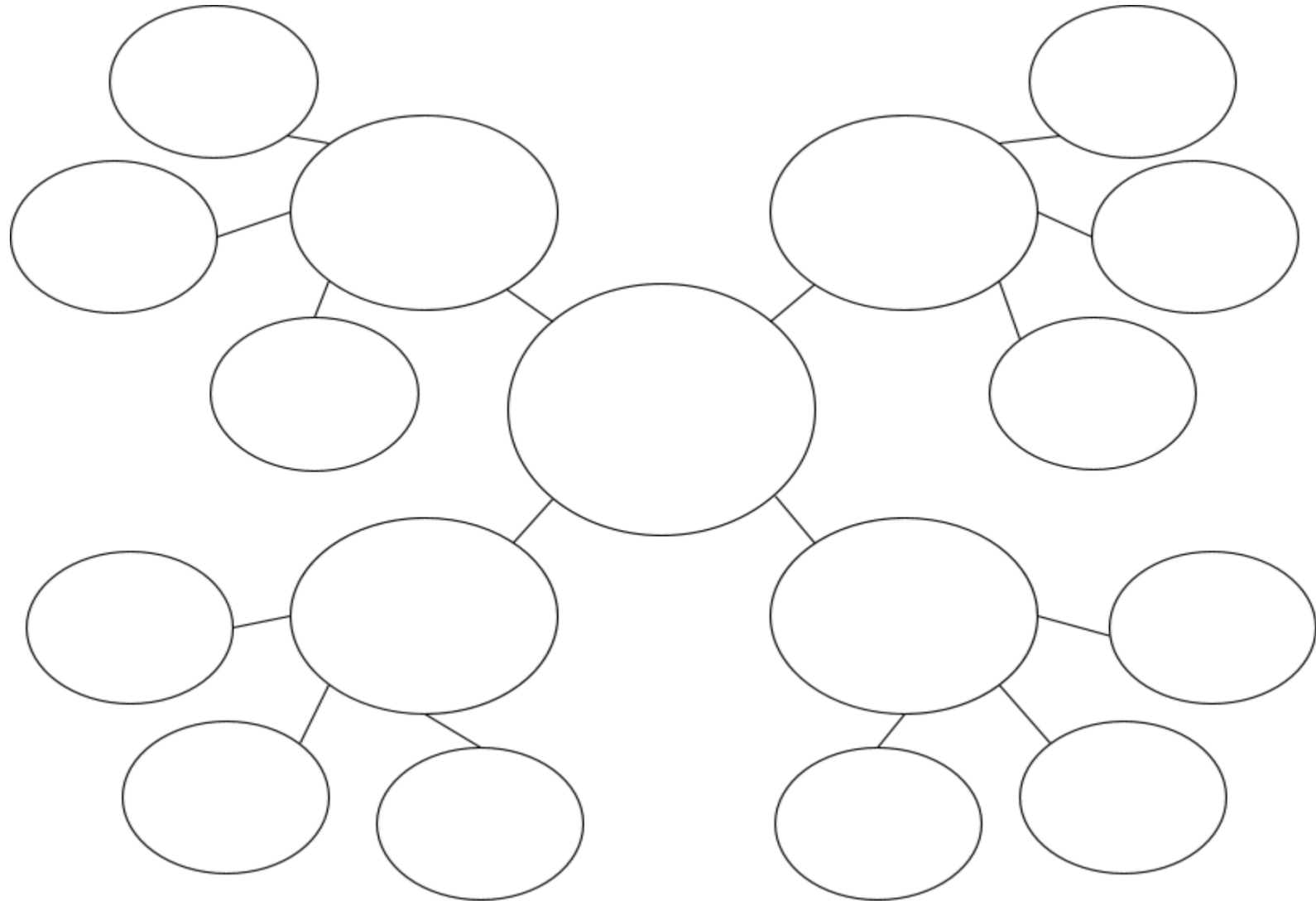
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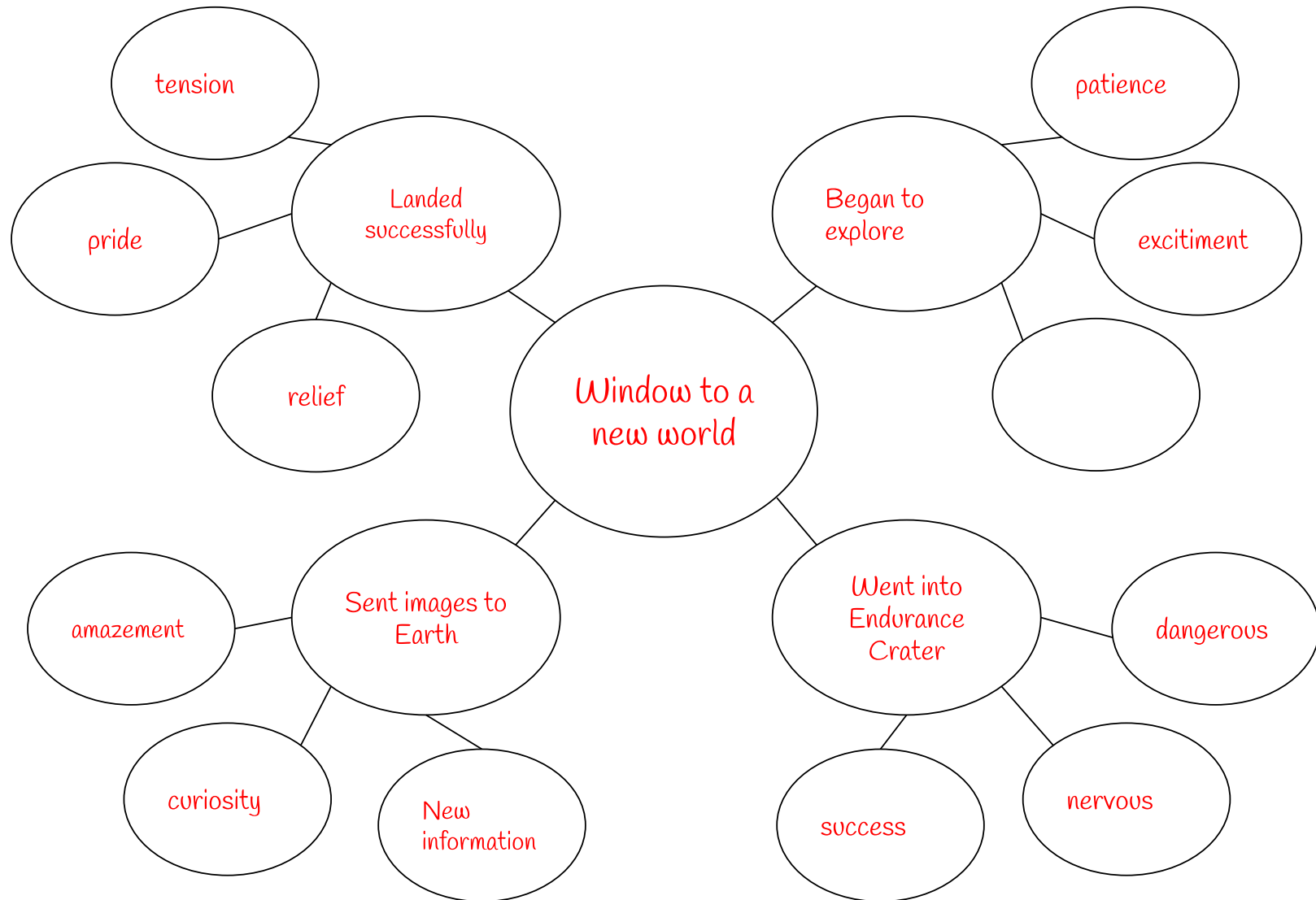
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## Poetry Brainstorm



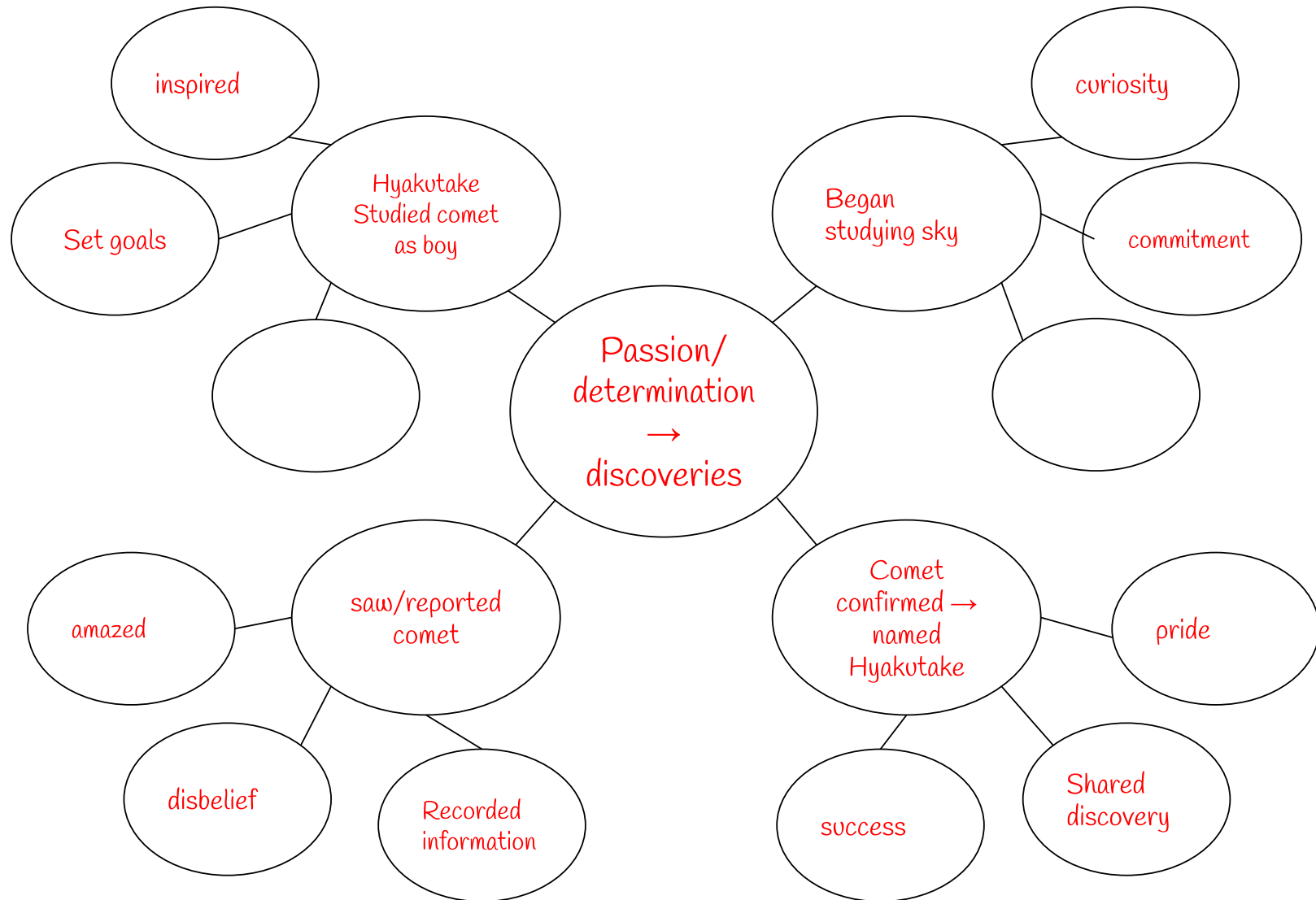
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# Poetry Brainstorm



Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Poetry Brainstorm



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Brainstorm the big ideas for your poem by completing a [Poetry Brainstorming Template \(G5, Alt U4, L12\)](#). Your brainstorm should include a clear theme, as well as the key events that support that theme and powerful words that convey the tone and message of the theme.

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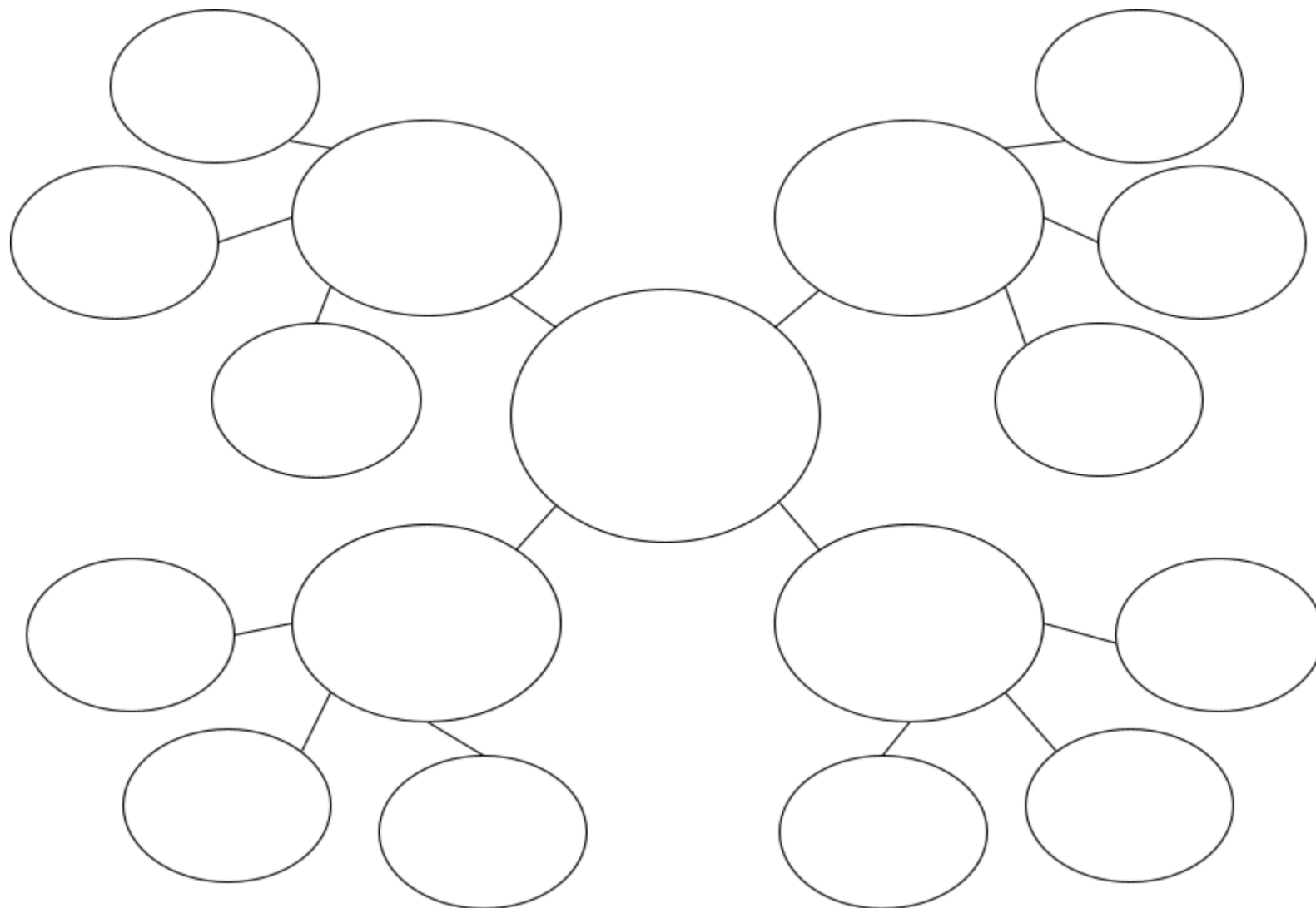
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Poetry Brainstorm



Name: \_\_\_\_\_

**Writing Prompt**

Draft a poem that describes the experience of one of the Mars rovers.

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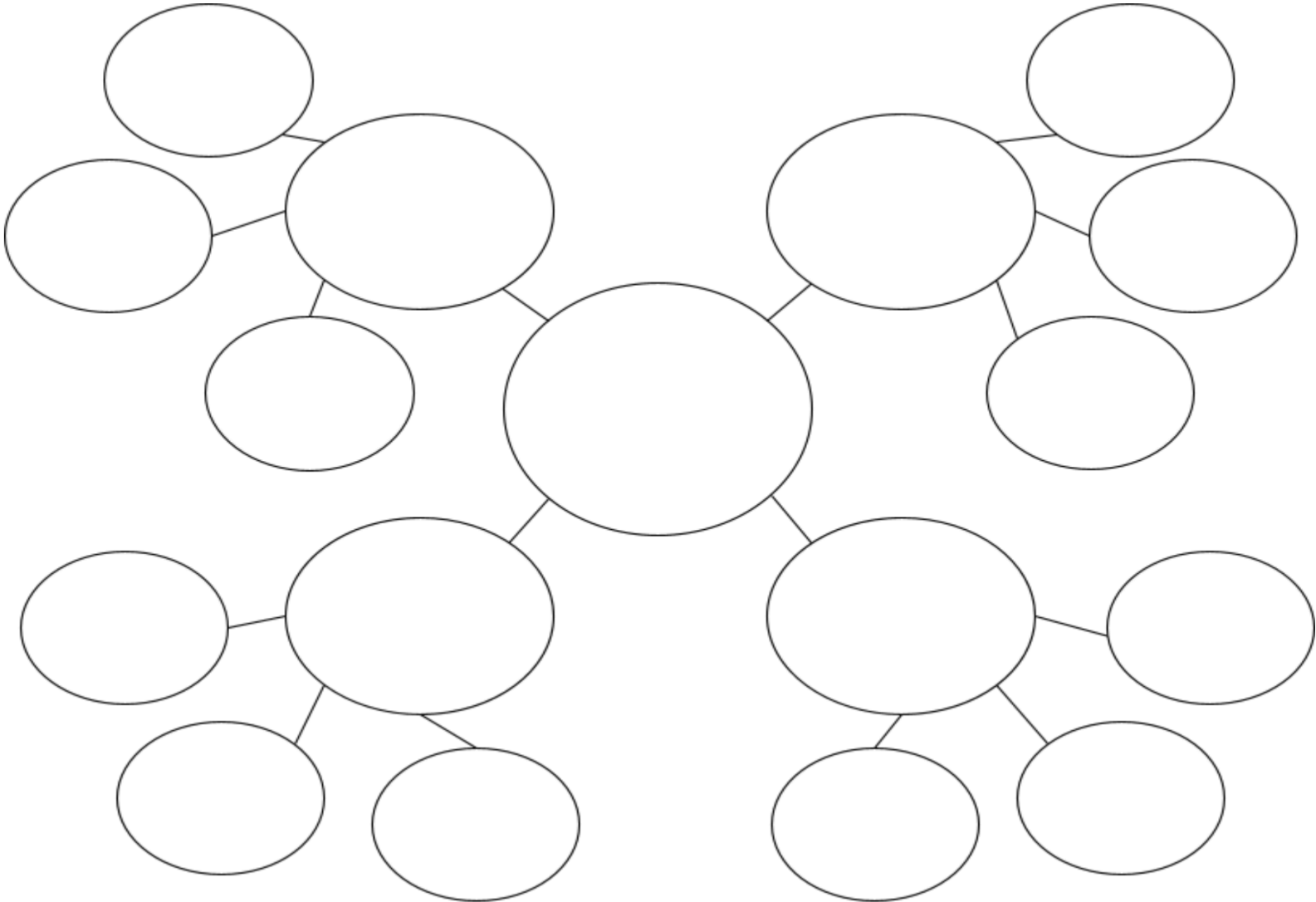
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Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Poetry Brainstorm



Name: \_\_\_\_\_

**Writing Prompt**

Finish drafting your poem. Underline at least one example of figurative language that creates imagery to add meaning, tone, or beauty to the poem.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Revise your writing by adding, changing, or moving punctuation to create or support the rhythm and meaning of your poem.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity* pg. 40 - 44.

1. Describe Endurance Crater. What challenge did Opportunity face when he reached Endurance Crater?

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2. In order to make a decision, scientists and engineers debated the worth of science compared to the risk to the rover. What arguments did they have for each side? What decision did they ultimately make? Why?

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3. The team created a **replica** of both the rover and the Martian slope. What were the **parameters** of their investigation? How did scientists and engineers use what they learned from the investigation to inform what they did with Opportunity?

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4. What did Opportunity find when he entered the crater? Why did it feel like the mission had "started all over?"

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

enormity    replica    treachery

What evidence does the author include to support the idea that math is a critical component of space exploration and engineering?

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Time Traveler Activity Cards

Cut and use the following cards to challenge students to write time-specific sentences using different tenses. Brainstorm additional verb/action ideas to add to the blank cards.

After cutting out, separate the different card categories so that students can easily select one from each group.

<b>Simple Tense</b>	<i>Past</i>	Walking the dog
<b>Progressive Tense</b>	<i>Present</i>	Cleaning your room
<b>Perfect Tense</b>	<i>Future</i>	Cooking with your parents

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Explain what verb tense is used in the underlined phrase and why it is appropriate in this excerpt:

Many people dream about going to space and exploring other planets. Steve Squyres has worked for most of his life to accomplish this dream. Through perseverance and creativity, Squyres helped build rovers that traveled to Mars and captured incredible images of the planet.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses
<ul style="list-style-type: none"> <li>● Slow travel- long wait sending/receiving messages, sent commands one/day</li> <li>● Signal from rovers inconsistent</li> <li>● Low battery</li> <li>● Difficult terrain→ travel was hard</li> <li>● Not finding helpful rocks</li> </ul>	<ul style="list-style-type: none"> <li>● Carefully planned out commands each day - required patience</li> <li>● Worked together, analyzed data, brainstormed ideas, tried new solutions.</li> <li>● traveled slowly and carefully, ran tests on Earth → predict possible navigation of certain areas</li> <li>● sent the rovers to new locations, kept looking</li> </ul>

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_

\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_

\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_

\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_

\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_

\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

### Paragraph 1

Topic Sentence: *What challenges did the rovers face after landing on Mars?*

- Detail: *challenging terrain → difficult travel*
- Detail: *technical problems: lost signals, low batteries*
- Detail: *not finding helpful rocks/discoveries*

Conclusion Sentence: *Mars was a difficult place to explore because the land was rough, and scientists had to solve technical problems from afar.*

### Paragraph 2

Topic Sentence: *Even with these problems, the scientists and the rovers persisted by working together and trying new ideas!*

- Detail: *teams analyzed problems/data → tried new solutions*
- Detail: *experiments to predict outcomes*
- Detail: *never gave up*

Conclusion Sentence: *Because both the scientists and the rovers showed determination and creativity, they were able to keep exploring Mars and make important discoveries.*



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses
<ul style="list-style-type: none"> <li>● Slow travel- long wait sending/receiving messages, sent commands one/day</li> <li>● Signal from rovers inconsistent</li> <li>● Low battery</li> <li>● Difficult terrain→ travel was hard</li> <li>● Not finding helpful rocks</li> </ul>	<ul style="list-style-type: none"> <li>● Carefully planned out commands each day - required patience</li> <li>● Worked together, analyzed data, brainstormed ideas, tried new solutions.</li> <li>● traveled slowly and carefully, ran tests on Earth → predict possible navigation of certain areas</li> <li>● sent the rovers to new locations, kept looking</li> </ul>

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

### Paragraph 1

Topic Sentence: *What challenges did the rovers face after landing on Mars?*

- Detail: *challenging terrain → difficult travel*
- Detail: *technical problems: lost signals, low batteries*
- Detail: *not finding helpful rocks/discoveries*

Conclusion Sentence: *Mars was a difficult place to explore because the land was rough, and scientists had to solve technical problems from afar.*

### Paragraph 2

Topic Sentence: *Even with these problems, the scientists and the rovers persisted by working together and trying new ideas!*

- Detail: *teams analyzed problems/data → tried new solutions*
- Detail: *experiments to predict outcomes*
- Detail: *never gave up*

Conclusion Sentence: *Because both the scientists and the rovers showed determination and creativity, they were able to keep exploring Mars and make important discoveries.*



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_

\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_

\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_

\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_

\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 1

Gather details from the unit text to help answer the following prompt:

What challenges did the rovers face on Mars? How did scientists and the rovers respond?

Challenges	Responses
<ul style="list-style-type: none"> <li>● Slow travel- long wait sending/receiving messages, sent commands one/day</li> <li>● Signal from rovers inconsistent</li> <li>● Low battery</li> <li>● Difficult terrain→ travel was hard</li> <li>● Not finding helpful rocks</li> </ul>	<ul style="list-style-type: none"> <li>● Carefully planned out commands each day - required patience</li> <li>● Worked together, analyzed data, brainstormed ideas, tried new solutions.</li> <li>● traveled slowly and carefully, ran tests on Earth → predict possible navigation of certain areas</li> <li>● sent the rovers to new locations, kept looking</li> </ul>



Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 46 - 51.

1. On page 47, scientists discovered a rock they named "Pot of Gold." What was significant about this rock? How does the image on page 47 help a reader better understand the find?

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2. Determine a main idea of the section "Sucked into Science." How is the main idea supported by key details?

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3. Compare and contrast the dust on Opportunity with the dust on Spirit. Why was the dust significant?

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4. Look at both images on page 49. How did the team use data from maps to determine Spirit's route?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [Mars Rovers Advance Understanding of the Red Planet](#).

1. Compare and contrast Spirit and Opportunity at the time of the press release.

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2. How were the rovers complementing other missions to collect more information about Mars?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 52 - 55.

1. What **audacious** choice did Steve and his team make on page 53? Why?

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2. Steve noted that his team started to get "a little cocky," which means they were arrogant, self-assertive, or conceited. Do you agree with Steve? Why or why not?

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3. What lesson did the team and drivers learn from the experience?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [Rover Team Tests Mars Moves on Earth](#)[NASA's Opportunity Rover Rolls Free on Mars](#).

1. Summarize "Rover Team Tests Mars Moves on Earth."

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2. Summarize "NASA's Opportunity Rover Rolls Free on Mars."

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 56 - 59.

1. On page 57, Steve described the history of early Mars on the Columbia Hills as a "violent place, a place bombarded by meteors and ripped apart by volcanic explosions." What reasons and evidence does the author include to support this point?

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2. Analyze the photographs and their captions on page 57. How do they help a reader better understand the rover's discoveries?

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3. What problem did Spirit encounter? How did the team diagnose the problem? How did they solve the problem?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

bewildering

Elizabeth Rusch's writing style makes science feel like an adventure.

What strategies does she use in "A Broken Spirit" to create this feeling? Make sure to explain and give examples for at least one strategy.

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 60 – 61 [Mars Rover Spirit Unearths Surprise Evidence of Wetter Past](#).

1. How does the photograph on page 60 of *The Mighty Mars Rovers* help a reader understand Spirit's discovery?

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2. What does the press release add to your understanding of what Spirit found and how the scientists and engineers responded?

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3. How does the point of view from which each text is written influence the type of information each author includes?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 62 – 65 [NASA Mars Rovers Braving Severe Dust Storms](#).

1. On pages 62–63 of *The Mighty Mars Rovers*, how does the author display the newspaper headings? What does this show about the author's point of view?

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2. What mood does the author create on pages 64–65 of *The Mighty Mars Rovers*? What strategies does the author use to develop the mood?

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3. What does the press release add to your understanding about Opportunity's situation and how scientists and engineers responded?

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4. How does the point of view from which each text is written influence the type of information each author includes?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 68 – 71 [Now a Stationary Research Platform, NASA's Mars Rover Spirit Starts a New Chapter in Red Planet Scientific Studies](#).

1. Close read the following section of text from page 69: "So the team put Spirit through her paces. They tried to ...Drive forward spinning the wheels at different speeds. No good. Drive forward steering the wheels back and forth. No progress. Drive forward with the wheels turning sharply. Nothing." How does Elizabeth Rusch use sentence structure to build suspense?

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2. Summarize what happened with Spirit and why she needed to be freed.

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3. In *The Mighty Mars Rovers*, Elizabeth Rusch describes what happened with Spirit through Steve's point of view. What mood does this create?

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4. What does the press release add to your understanding about Spirit's situation and how the scientists and engineers responded?

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Name: \_\_\_\_\_

Date: \_\_\_\_\_

Today's reading was [The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity](#) pg. 72 - 76.

1. Summarize Spirit and Opportunity's accomplishments.

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2. Why does the author end page 73 with the statement, "Maybe they will be yours"?

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3. Determine a main idea of the section "Curiosity Continues." What details support the main idea?

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4. Why does the author include the Mission Update on page 76?

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 2

Gather details from the unit text to help answer the following prompt:

What goals did scientists have for the rover expeditions? Were the goals met?

Goals	Were they met?



Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 2

Gather details from the unit text to help answer the following prompt:

What goals did scientists have for the rover expeditions? Were the goals met?

Goals	Were they met?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

### Paragraph 1

Topic Sentence: *What were scientists hoping to find when they sent the rovers to Mars? Water!*

- Detail: *rock layers/salt = water (p. 26)*
- Detail: *rocks/crystals Endurance Crater (p. 45)*
- Detail: *silica (p. 61)*

Conclusion Sentence: *Discovering so much evidence that Mars once had water excited scientists by opening up possibilities about life on other planets.*

### Paragraph 2

Topic Sentence: *Another important goal was for the rovers to explore the surface of Mars and collect new information about the planet's geology.*

- Detail: *built instruments to analyze rocks*
- Detail: *sent rovers to new places*
- Detail: *found new/unique rocks*

Conclusion Sentence: *Because of their hard work, scientists learned far more about the surface of Mars than they had hoped to.*

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

What goals did scientists have for the rover expeditions? Were the goals met?

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 2

Gather details from the unit text to help answer the following prompt:

What goals did scientists have for the rover expeditions? Were the goals met?

Goals	Were they met?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

### Paragraph 1

Topic Sentence: *What were scientists hoping to find when they sent the rovers to Mars? Water!*

- Detail: *rock layers/salt = water (p. 26)*
- Detail: *rocks/crystals Endurance Crater (p. 45)*
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Conclusion Sentence: *Discovering so much evidence that Mars once had water excited scientists by opening up possibilities about life on other planets.*

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- Detail: *built instruments to analyze rocks*
- Detail: *sent rovers to new places*
- Detail: *found new/unique rocks*

Conclusion Sentence: *Because of their hard work, scientists learned far more about the surface of Mars than they had hoped to.*

Name: \_\_\_\_\_

**Writing Prompt**

Using your brainstorming page from Lesson 26, complete a [Two Paragraph Outline](#) in response to the Target Task prompt. Craft two engaging topic sentences by varying the sentence type to best match the tone and purpose of each paragraph.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Discussion Brainstorming Page 2

Gather details from the unit text to help answer the following prompt:

What goals did scientists have for the rover expeditions? Were the goals met?

Goals	Were they met?

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Topic:** \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 1

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_  
\_\_\_\_\_

- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_
- Detail: \_\_\_\_\_

Concluding Sentence: \_\_\_\_\_  
\_\_\_\_\_

Name: \_\_\_\_\_

**Writing Prompt**

Use your completed [Two Paragraph Outline](#) to draft a written response. Include at least two direct quotations from the unit texts to support the main ideas.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Introduction Sentence:** \_\_\_\_\_

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### Paragraph 1

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_

**Conclusion Sentence:** \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Two Paragraph Outline

**Introduction Sentence:** *Mars fascinates scientists because it holds important clues about life that once lived there.*

### Paragraph 1

Topic Sentence: *NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.*

- Detail: *Mariner 9- 1st to orbit another planet, mapped most of Mars*
- Detail: *Vikings 1 and 2: 1st U.S. mission landed safely on Mars*
- Detail: *Rovers- Spirit, Opportunity, Curiosity*

### Paragraph 2

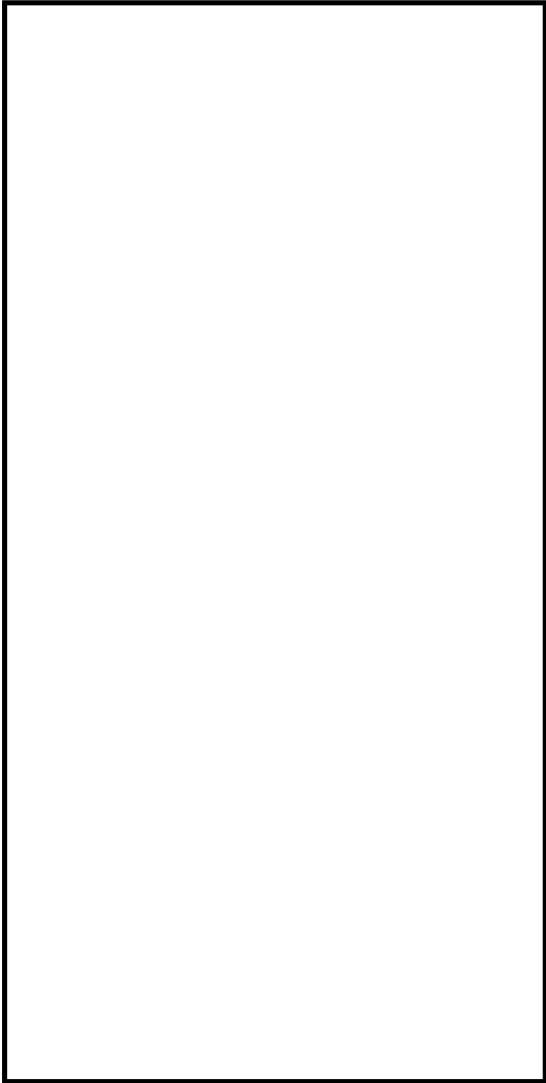
Topic Sentence: *Scientists are particularly interested in Mars because it shows promising signs that it once held life.*

- Detail: *signs of water presence*
- Detail: *magnetic fields*
- Detail: *studying weather/climate*

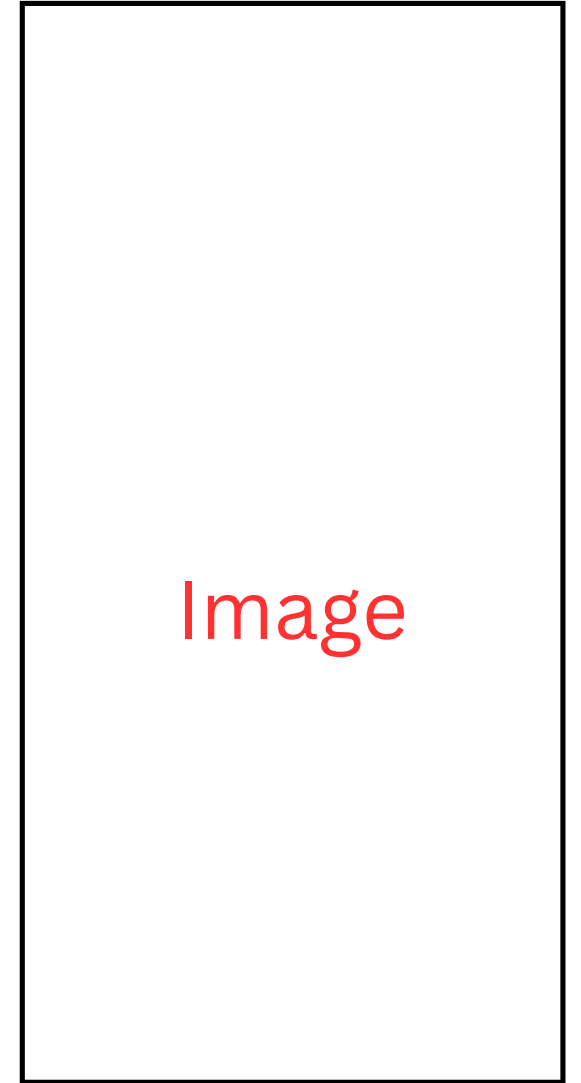
**Conclusion Sentence:** \_\_\_\_\_

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Conclusion



PLANET NAME



By: \_\_\_\_\_

Introduction

Heading 1

Heading 2

Image

Caption

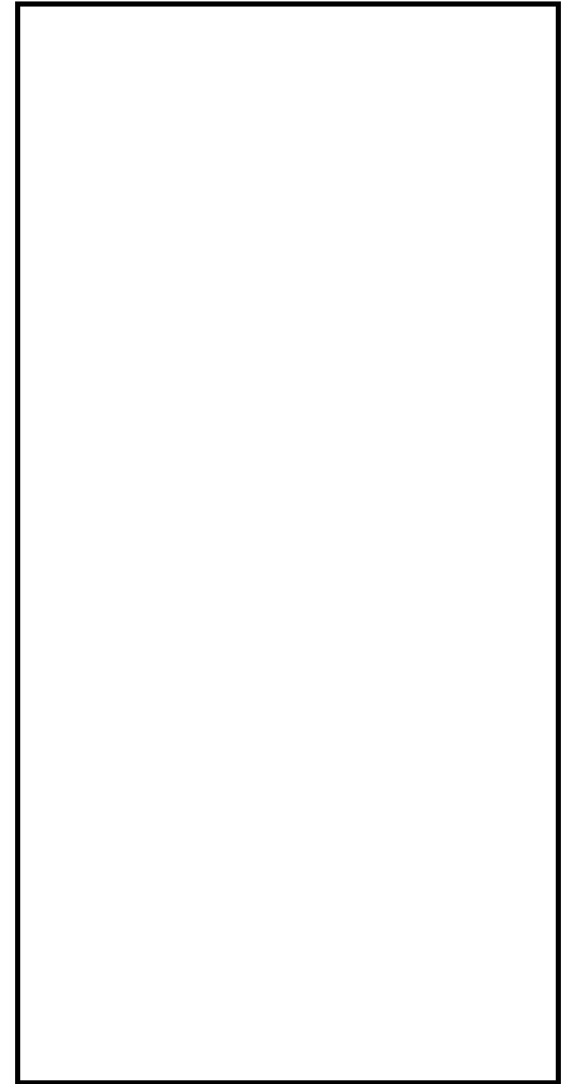
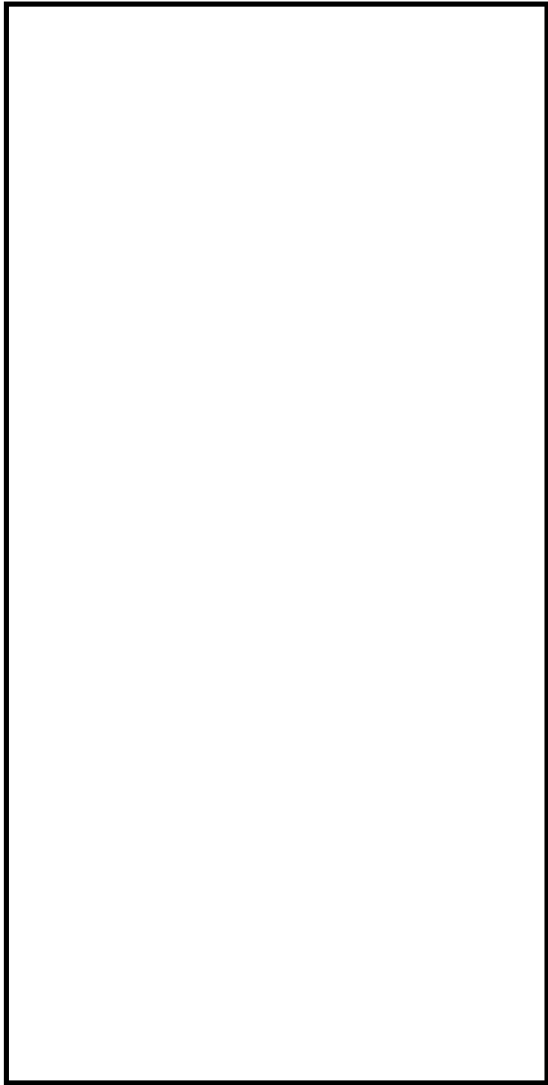
Text

Introduction

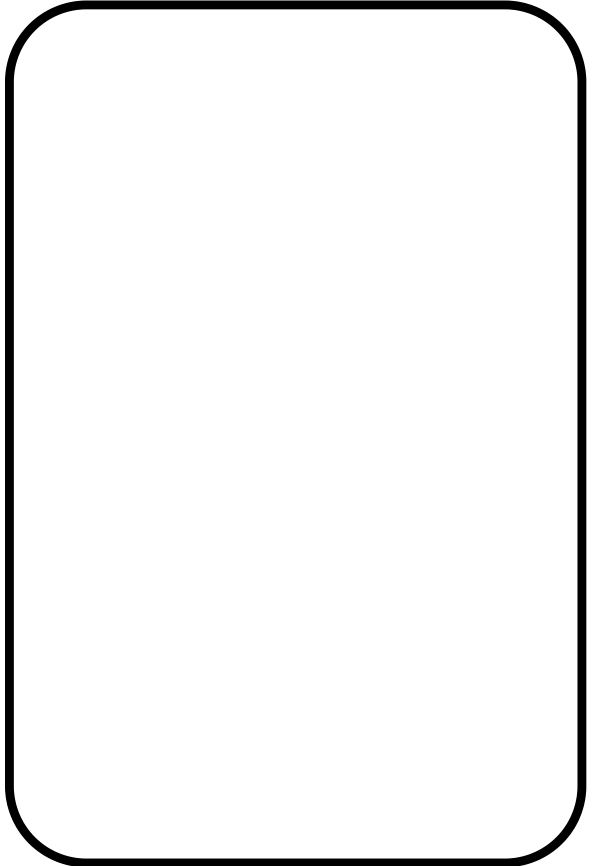
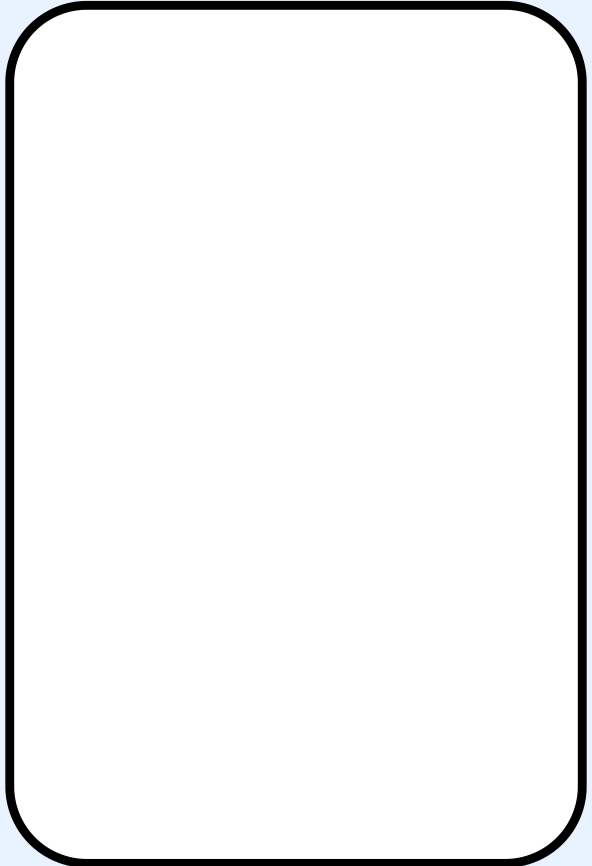
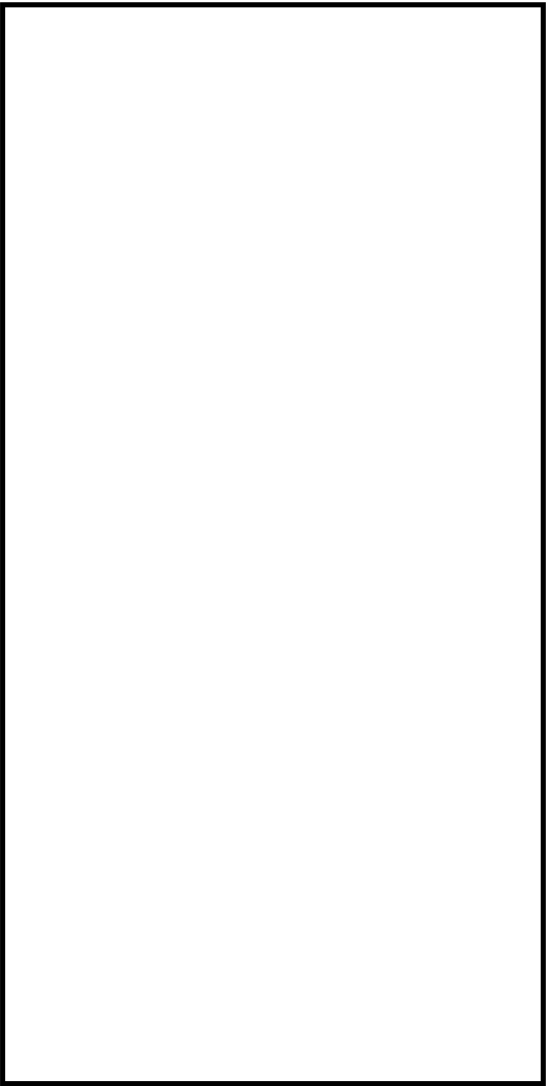
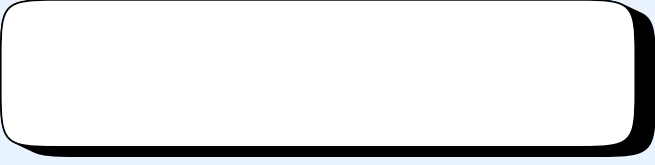
Text

Image

Caption



By: \_\_\_\_\_





By: \_\_\_\_\_



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: _____	
Basic Information	
Exploration	
Important Questions/Findings	

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

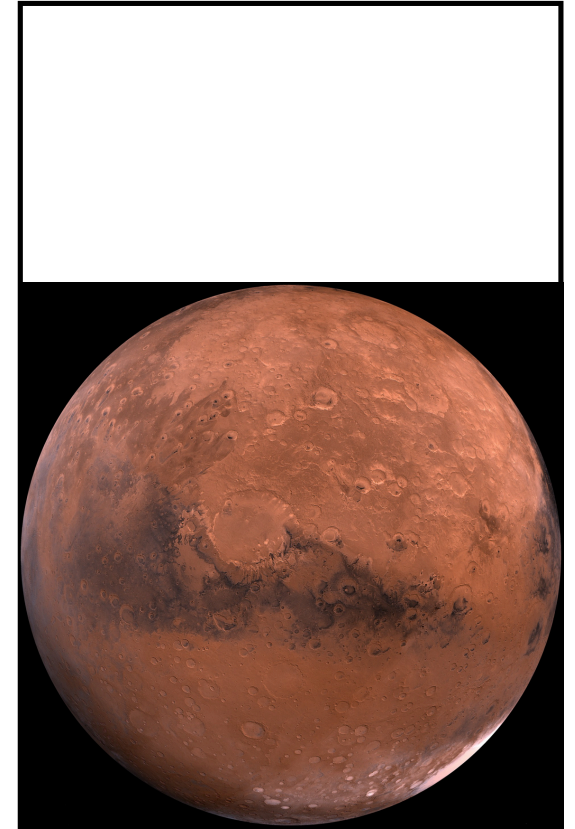
Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: <u>Mars</u>	
Basic Information	<p><u>Mars Facts</u></p> <ul style="list-style-type: none"> <li>● Half the size of Earth</li> <li>● 142 million miles from the sun</li> <li>● 1 day = Sol (solar day) = 24.6 hours</li> <li>● Has seasons: longer than Earth, not equal length</li> <li>● 2 moons– Phobos and Deimos</li> <li>● Oxidizing iron makes surface look red</li> <li>● Surface has canyons, craters, volcanoes</li> <li>● Thin atmosphere– temperature can get very cold</li> <li>● Winds create strong dust storms</li> </ul>
Exploration	<ul style="list-style-type: none"> <li>● Only planet inhabited by robots (<i>Mars Exploration</i>)</li> <li>● Mariner 9– first to orbit another planet, mapped most of Mars (<i>Mariner Missions to Mars</i>)</li> <li>● Vikings 1 and 2: first US mission to land safely on Mars, sent back picture (<i>Viking Project</i>)</li> <li>● Spirit, Opportunity, Curiosity have explored Mars (<i>Mars Exploration Rovers: Spirit and Opportunity</i>)</li> </ul>
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# Conclusion

Scientists will likely continue to focus their efforts on exploring Mars for years to come. As people think more about the possibility of life on other planets, they look to Mars due to the likelihood that it held water and life at some point in the past. Who knows what new discoveries and mysteries may become clear in future missions!

# MARS



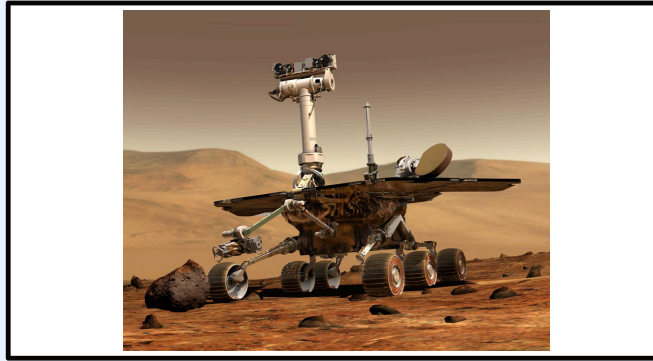
<https://www.publicdomainpictures.net/pictures/90000/velka/mars.jpg>

By: \_\_\_\_\_

# Introduction

Mars fascinates scientists because it holds important clues about life that once lived there. This unique planet is about half the size of Earth, and has a similar length of day and seasonal weather changes. The surface of Mars appears red, which has gained it the nickname 'the Red Planet'. It has two moons, which scientists believe to be captured asteroids. Despite all that scientists have already learned about Mars, they are eager to explore and discover even more about this planet.

# Exploring Mars



A rover explores Mars

<https://images-assets.nasa.gov/image/PIA04413/PIA04413-medium.jpg>

NASA has sent several rovers to Mars, the only planet inhabited entirely by robots. In 1971, the Mariner 9 spacecraft was launched, and it successfully reached Mars, orbited around the planet, and photographed and mapped the entire surface of the planet. Later, the spacecrafts Viking 1 and Viking 2 were launched. They successfully landed on Mars in 1976, explored the surface, and collected and tested soil samples. More recently, scientists sent rovers called Spirit and Opportunity to Mars, where they used more advanced equipment to study rocks and look for signs of water. Over the years, these missions and many others have helped scientists learn more about the Red Planet!

# Why is Mars Important?

Scientists are particularly interested in Mars because it shows promising signs that it once held life. Learning more about life on Mars may help scientists understand where or how humans might be able to live on another planet, so they continue to explore and study it. During the many missions to Mars, scientists have found rocks and landscape features that appear to have been formed or impacted by water, which led to the idea that Mars may once have had rivers or lakes. It has also been discovered that Mars' may have once had a magnetic field similar to Earth's, which would have shielded any life on the planet from harmful radiation. Scientists study the weather and climate of Mars, because this information might help them understand what the planet was like in the past. Together, these findings bring scientists closer to understanding whether Mars could have once supported life.



Could humans someday live on Mars?

<https://images-assets.nasa.gov/image/Moon%20to%20Mars%20Infrastructure/Moon%20to%20Mars%20Infrastructure-medium.jpg>

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Revision Handout

### Rearranging Details

#### Example #1: Teacher Model

1	NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.
2	Recently, scientists sent rovers called Spirit and Opportunity to Mars, where they used more advanced equipment to study rocks and look for signs of water.
3	The spacecrafts Viking 1 and Viking 2 were launched.
4	They successfully landed on Mars in 1976, explored the surface, and collected and tested soil samples.
5	Earlier, in 1971, the Mariner 9 spacecraft was launched, and it successfully reached Mars, orbited around the planet, and photographed and mapped the entire surface of the planet.
6	Over the years, these missions and many others have helped scientists learn more about the Red Planet!

**Example #2: Partner Practice (Conclusion Section)**

1	<i>Who knows what new discoveries and mysteries may become clear in future missions!</i>
2	<i>Scientists will likely continue to focus their efforts on exploring Mars for years to come.</i>
3	<i>As people think more about the possibility of life on other planets, they look to Mars due to the likelihood that it held water and life at some point in the past.</i>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Create a brochure for children that teaches about one of the planets in our solar system.

Your brochure should include:

- An introduction that provides basic information about the planet
- One paragraph that describes any past or future exploration of the planet
- One paragraph that summarizes the most important questions or findings about the planet
- A conclusion that summarizes the main ideas about the planet

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Introduction Sentence:** \_\_\_\_\_

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### Paragraph 1

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
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- Detail: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_

**Conclusion Sentence:** \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Two Paragraph Outline

**Introduction Sentence:** *Mars fascinates scientists because it holds important clues about life that once lived there.*

### Paragraph 1

Topic Sentence: *NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.*

- Detail: *Mariner 9- 1st to orbit another planet, mapped most of Mars*
- Detail: *Vikings 1 and 2: 1st U.S. mission landed safely on Mars*
- Detail: *Rovers- Spirit, Opportunity, Curiosity*

### Paragraph 2

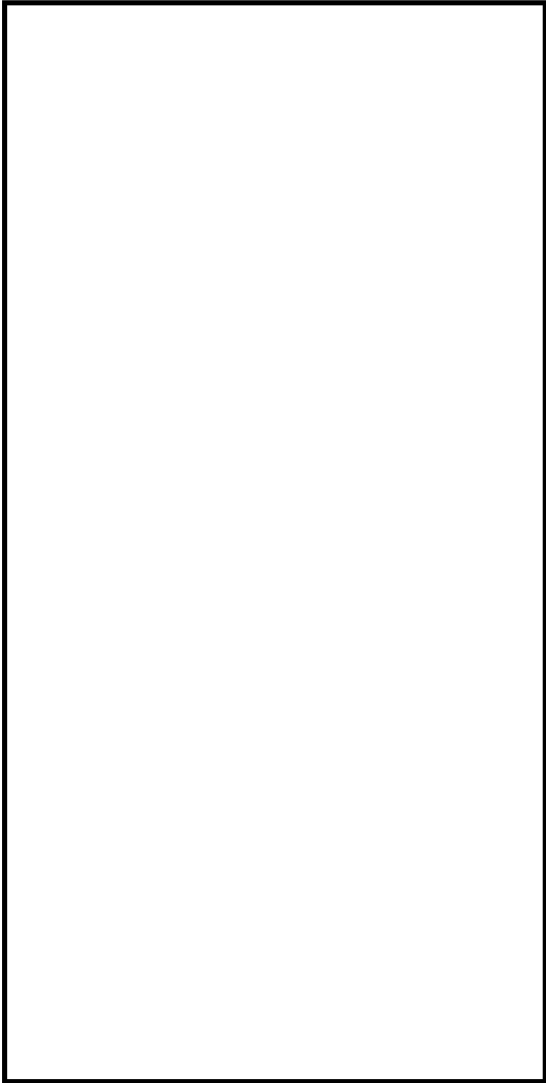
Topic Sentence: *Scientists are particularly interested in Mars because it shows promising signs that it once held life.*

- Detail: *signs of water presence*
- Detail: *magnetic fields*
- Detail: *studying weather/climate*

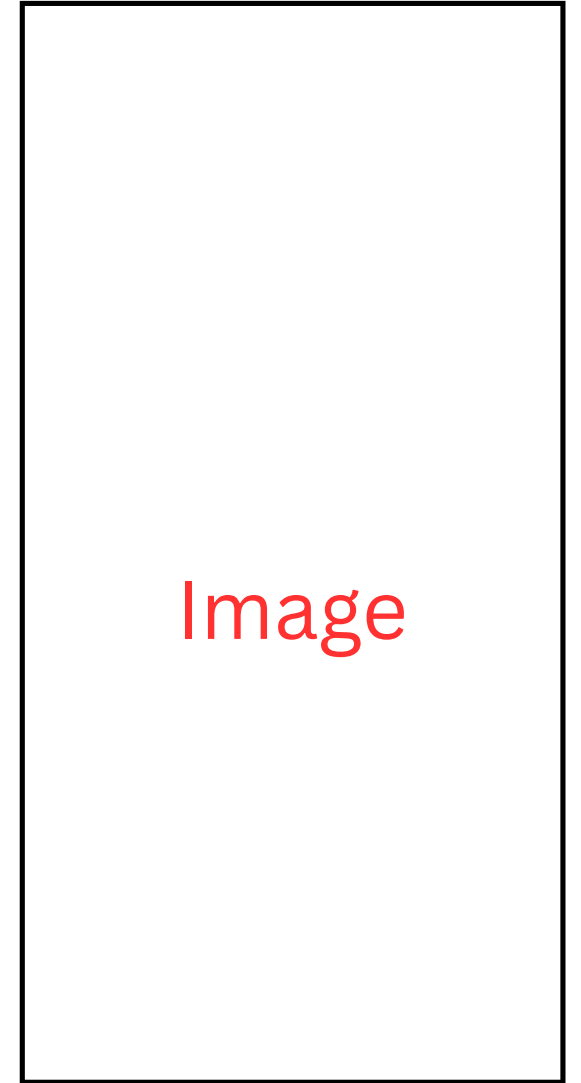
**Conclusion Sentence:** \_\_\_\_\_

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Conclusion



PLANET NAME



By: \_\_\_\_\_

Introduction

Heading 1

Heading 2

Image

Caption

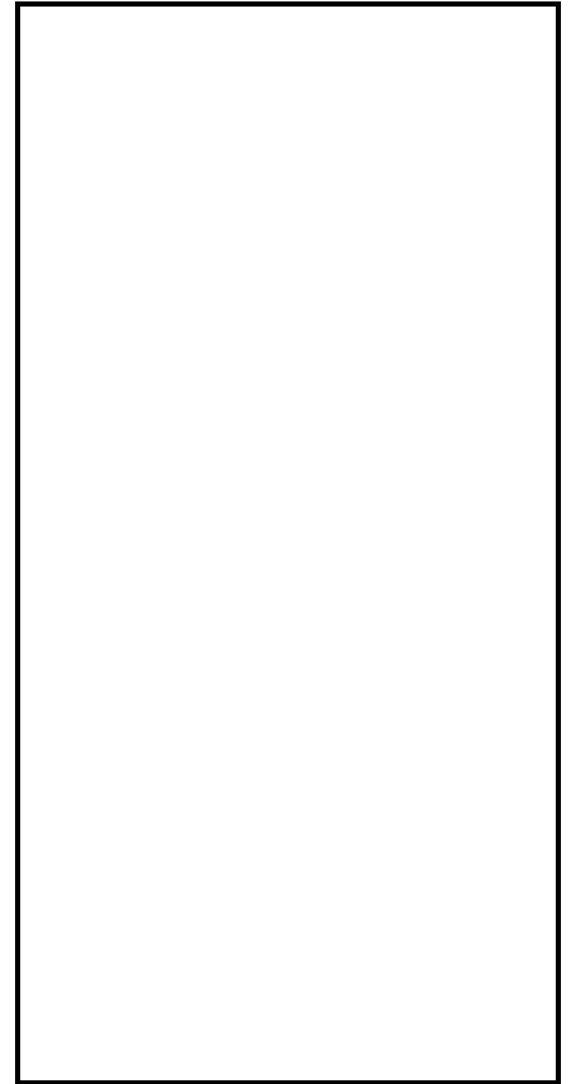
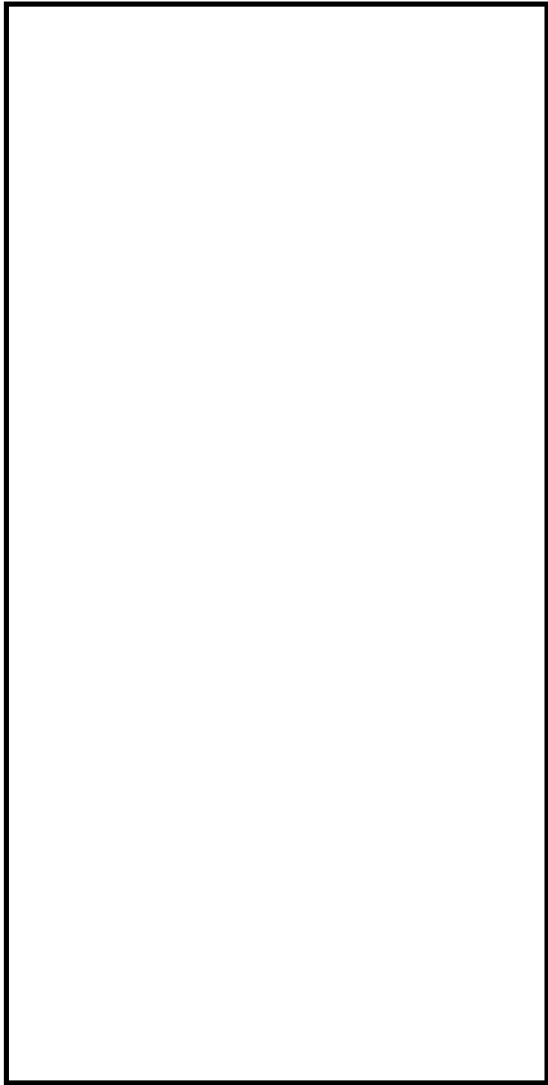
Text

Introduction

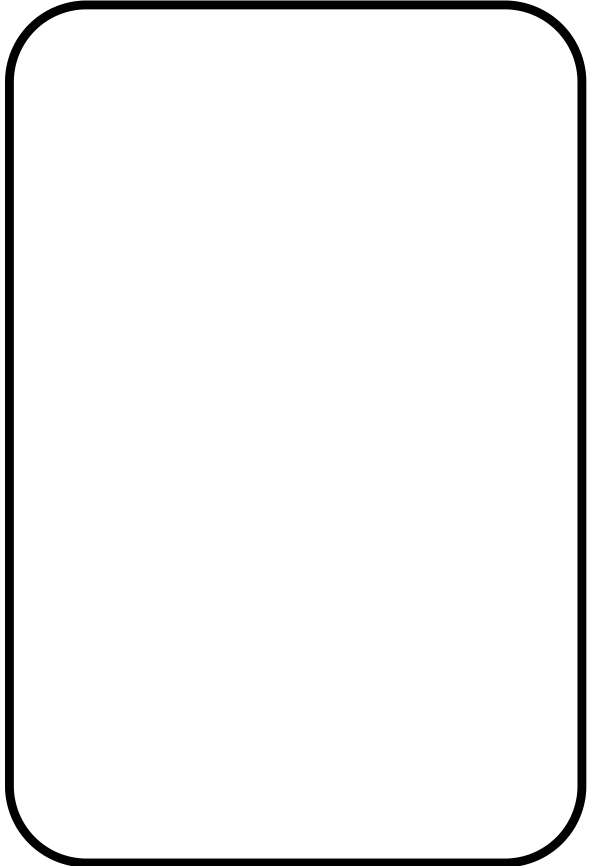
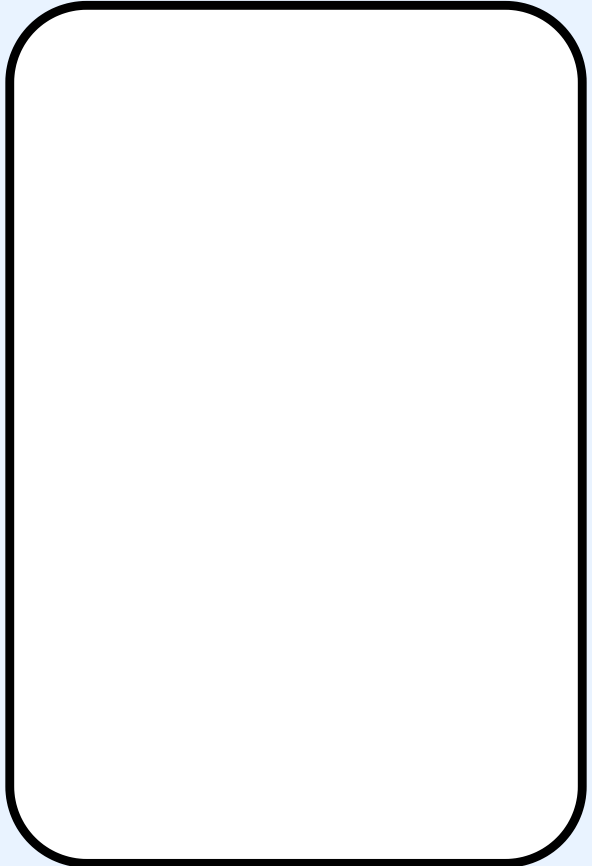
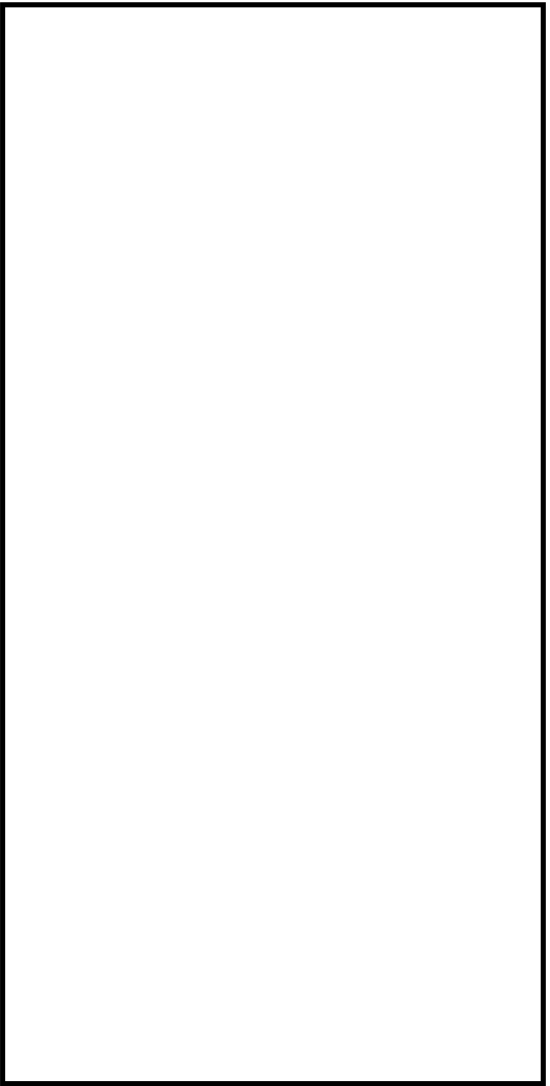
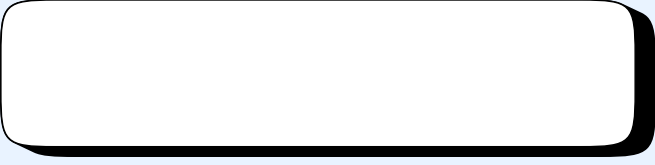
Text

Image

Caption



By: \_\_\_\_\_





By: \_\_\_\_\_



Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: _____	
Basic Information	
Exploration	
Important Questions/Findings	

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Gather relevant details, then identify the most important information to include in a [Two Paragraph Outline \(G5, Alt U4, L29\)](#). For each paragraph, craft a topic sentence that consists of a big, thematic idea about the historical figure. Make sure the completed outline includes introduction and conclusion sentences, as well as a topic sentence and supporting details for each paragraph.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Two Paragraph Outline

**Introduction Sentence:** \_\_\_\_\_

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### Paragraph 1

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_

### Paragraph 2

Topic Sentence: \_\_\_\_\_

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- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_
- Detail: \_\_\_\_\_  
\_\_\_\_\_

**Conclusion Sentence:** \_\_\_\_\_

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Two Paragraph Outline

**Introduction Sentence:** *Mars fascinates scientists because it holds important clues about life that once lived there.*

### Paragraph 1

Topic Sentence: *NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.*

- Detail: *Mariner 9- 1st to orbit another planet, mapped most of Mars*
- Detail: *Vikings 1 and 2: 1st U.S. mission landed safely on Mars*
- Detail: *Rovers- Spirit, Opportunity, Curiosity*

### Paragraph 2

Topic Sentence: *Scientists are particularly interested in Mars because it shows promising signs that it once held life.*

- Detail: *signs of water presence*
- Detail: *magnetic fields*
- Detail: *studying weather/climate*

**Conclusion Sentence:** \_\_\_\_\_

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: _____	
Basic Information	
Exploration	
Important Questions/Findings	

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Use your completed Two Paragraph Outline to draft the body paragraphs of your brochure. For each body paragraph, use a text structure that will help young learners understand how the information is related.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Two Paragraph Outline

**Introduction Sentence:** *Mars fascinates scientists because it holds important clues about life that once lived there.*

### Paragraph 1

Topic Sentence: *NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.*

- Detail: *Mariner 9- 1st to orbit another planet, mapped most of Mars*
- Detail: *Vikings 1 and 2: 1st U.S. mission landed safely on Mars*
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### Paragraph 2

Topic Sentence: *Scientists are particularly interested in Mars because it shows promising signs that it once held life.*

- Detail: *signs of water presence*
- Detail: *magnetic fields*
- Detail: *studying weather/climate*

**Conclusion Sentence:** \_\_\_\_\_

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: _____	
Basic Information	
Exploration	
Important Questions/Findings	

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Brainstorming Page 2

Use the table below to gather details and evidence related to the writing prompt.

Create a brochure for children that teaches them about one of the planets in our solar system.

Planet: <u>Mars</u>	
Basic Information	<p><u>Mars Facts</u></p> <ul style="list-style-type: none"> <li>● Half the size of Earth</li> <li>● 142 million miles from the sun</li> <li>● 1 day = Sol (solar day) = 24.6 hours</li> <li>● Has seasons: longer than Earth, not equal length</li> <li>● 2 moons– Phobos and Deimos</li> <li>● Oxidizing iron makes surface look red</li> <li>● Surface has canyons, craters, volcanoes</li> <li>● Thin atmosphere– temperature can get very cold</li> <li>● Winds create strong dust storms</li> </ul>
Exploration	<ul style="list-style-type: none"> <li>● Only planet inhabited by robots (<i>Mars Exploration</i>)</li> <li>● Mariner 9– first to orbit another planet, mapped most of Mars (<i>Mariner Missions to Mars</i>)</li> <li>● Vikings 1 and 2: first US mission to land safely on Mars, sent back picture (<i>Viking Project</i>)</li> <li>● Spirit, Opportunity, Curiosity have explored Mars (<i>Mars Exploration Rovers: Spirit and Opportunity</i>)</li> </ul>
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Name: \_\_\_\_\_

**Writing Prompt**

Finish drafting the sections of your brochure by adding an introduction and conclusion. The introduction should include appropriate background information about the topic, while the conclusion should leave the reader with a final, engaging takeaway.

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Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Revision Handout

### Rearranging Details

#### Example #1: Teacher Model

1	NASA has sent several rovers to Mars, the only planet inhabited entirely by robots.
2	Recently, scientists sent rovers called Spirit and Opportunity to Mars, where they used more advanced equipment to study rocks and look for signs of water.
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**Example #2: Partner Practice (Conclusion Section)**

1	<i>Who knows what new discoveries and mysteries may become clear in future missions!</i>
2	<i>Scientists will likely continue to focus their efforts on exploring Mars for years to come.</i>
3	<i>As people think more about the possibility of life on other planets, they look to Mars due to the likelihood that it held water and life at some point in the past.</i>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Revise your writing by rearranging sentences so that they help the reader understand the big ideas in the brochure.

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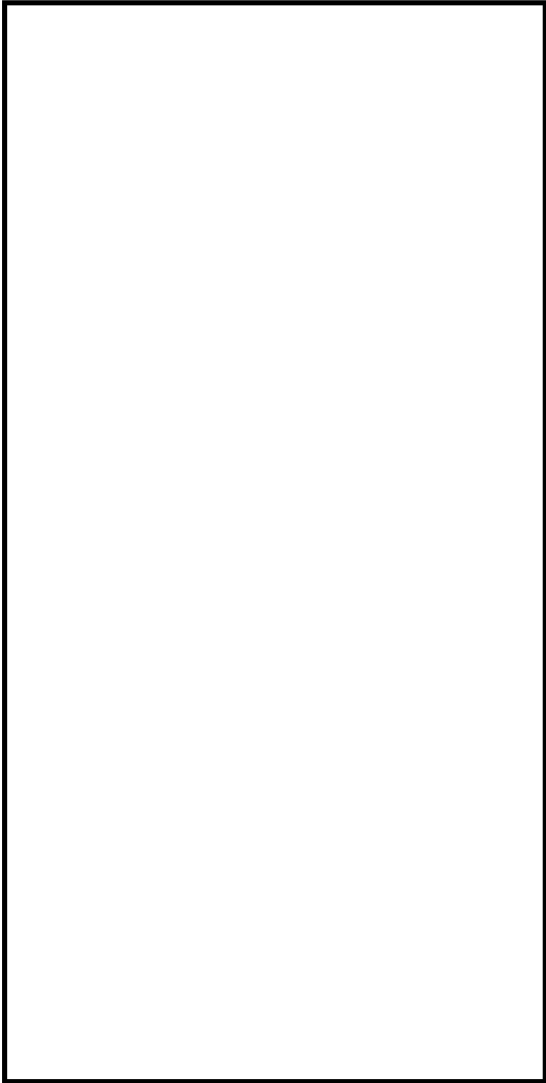
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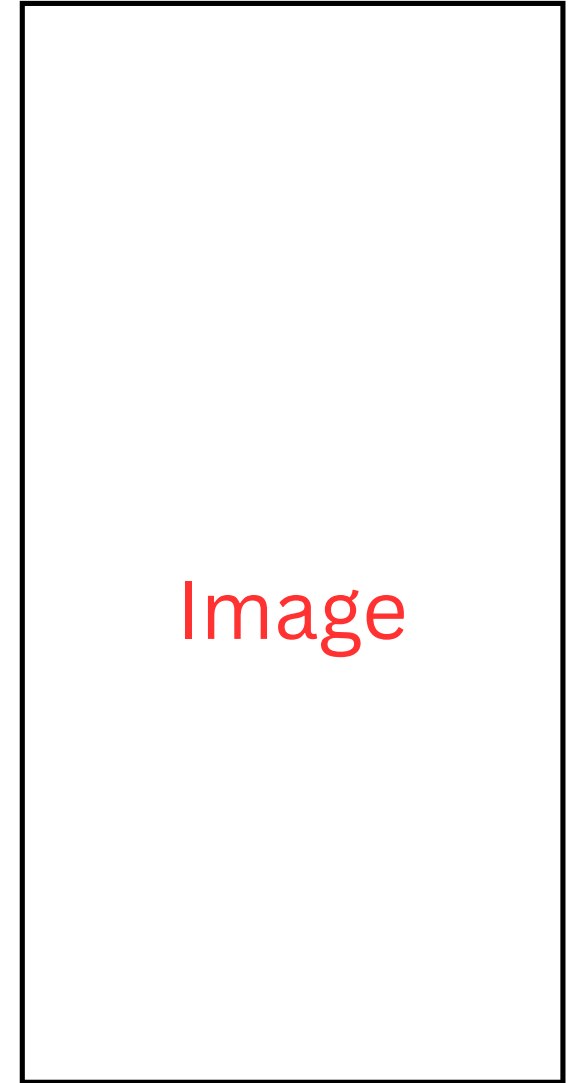
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Conclusion



PLANET NAME



By: \_\_\_\_\_

Introduction

Heading 1

Heading 2

Image

Caption

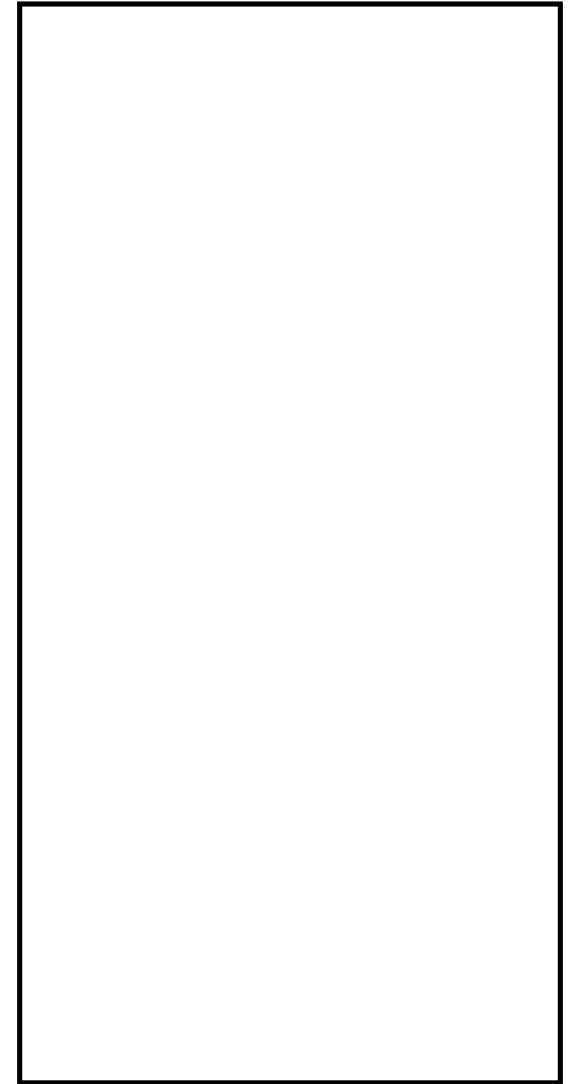
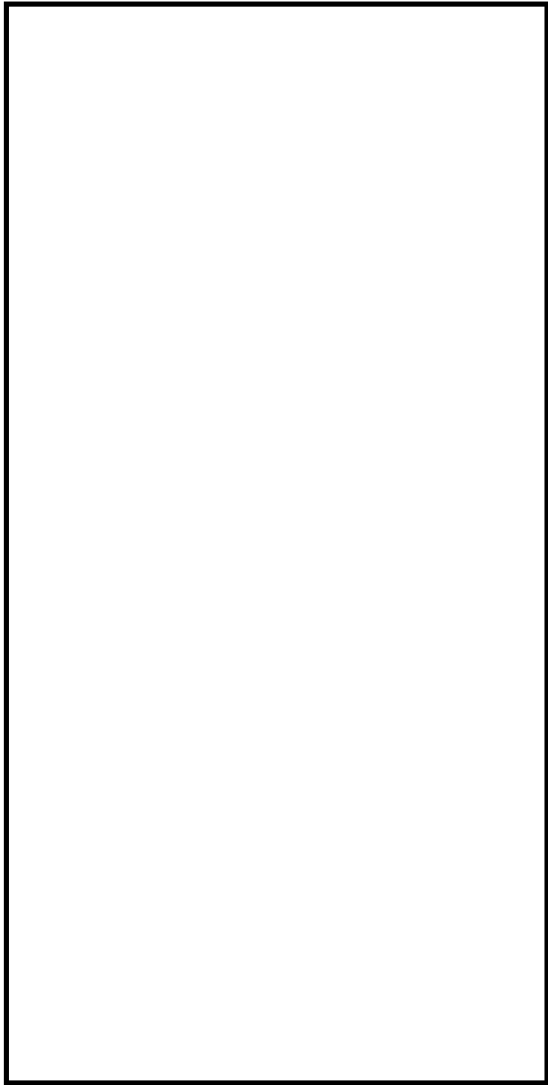
Text

Introduction

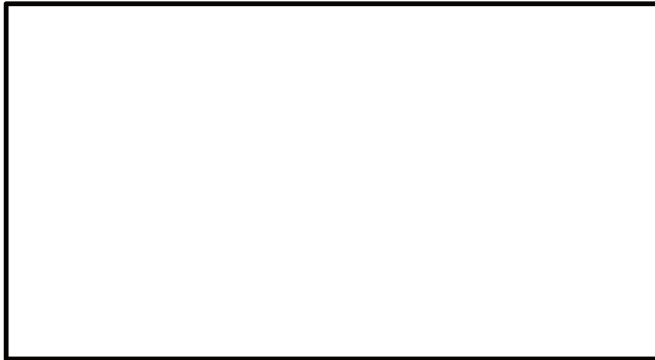
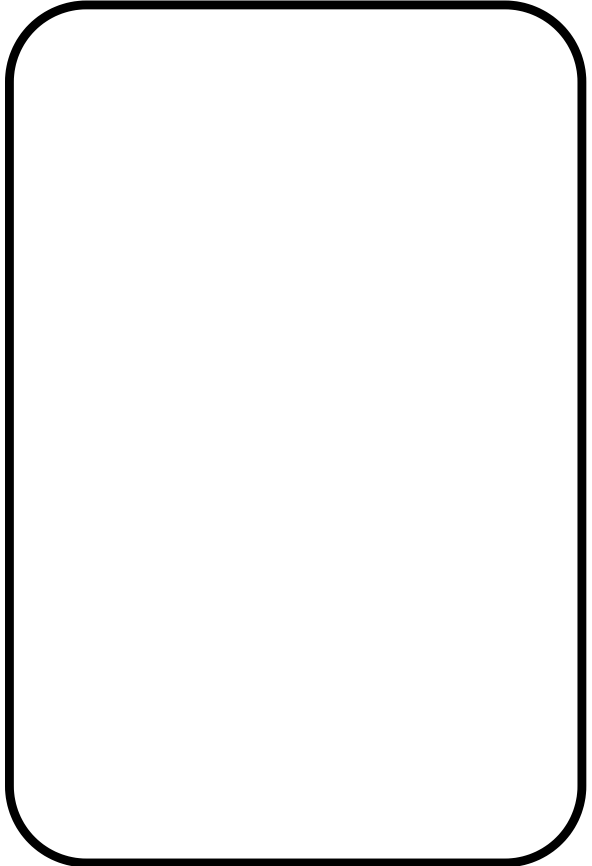
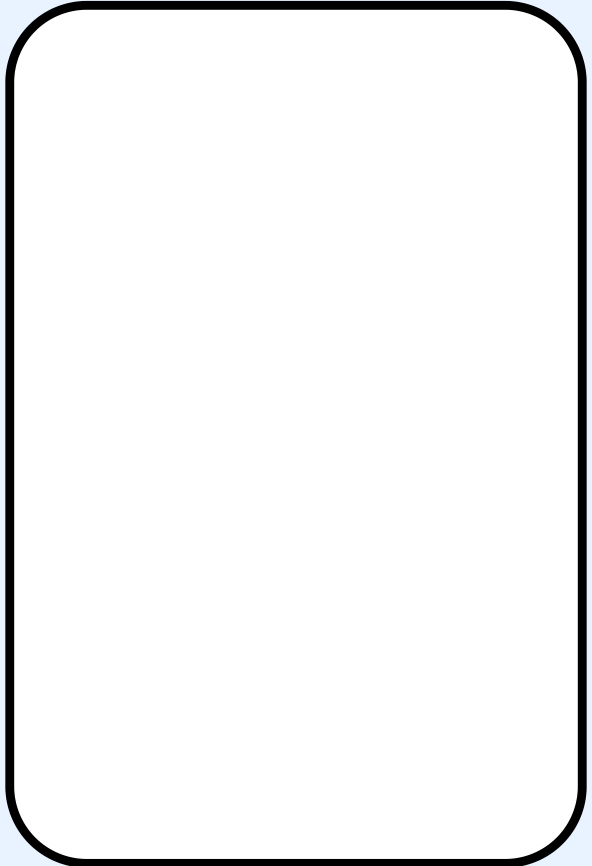
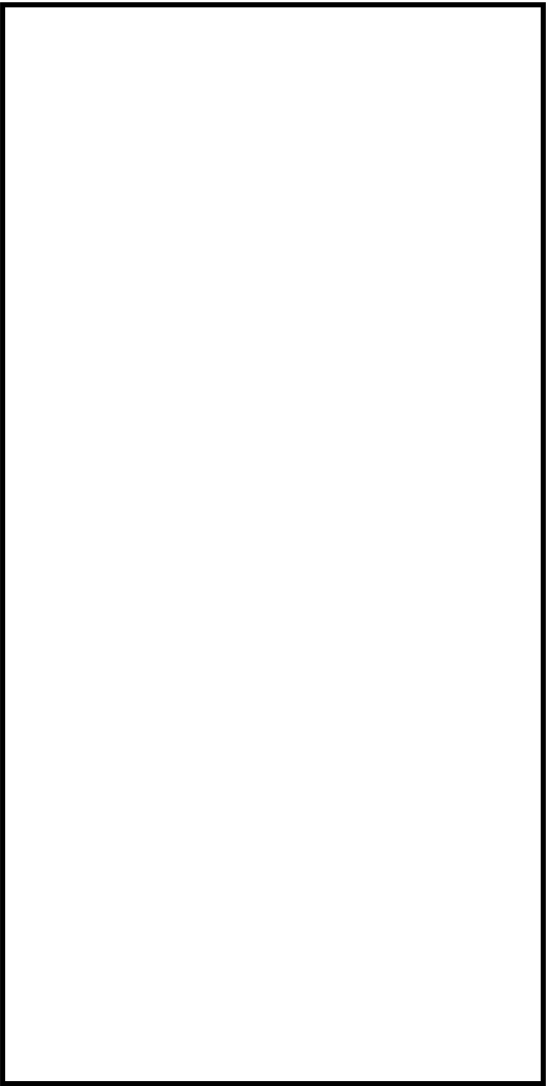
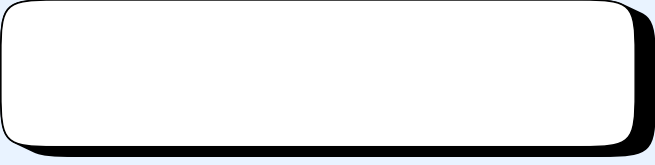
Text

Image

Caption



By: \_\_\_\_\_





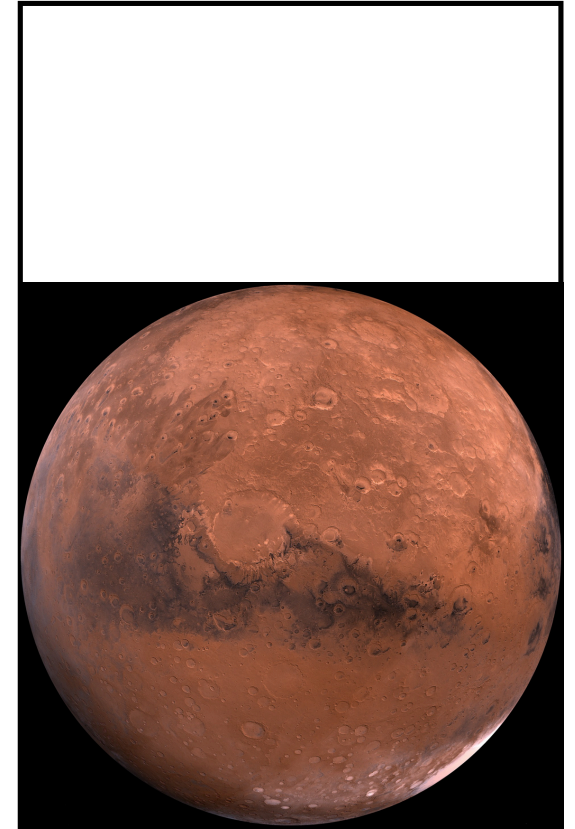
By: \_\_\_\_\_



# Conclusion

Scientists will likely continue to focus their efforts on exploring Mars for years to come. As people think more about the possibility of life on other planets, they look to Mars due to the likelihood that it held water and life at some point in the past. Who knows what new discoveries and mysteries may become clear in future missions!

# MARS



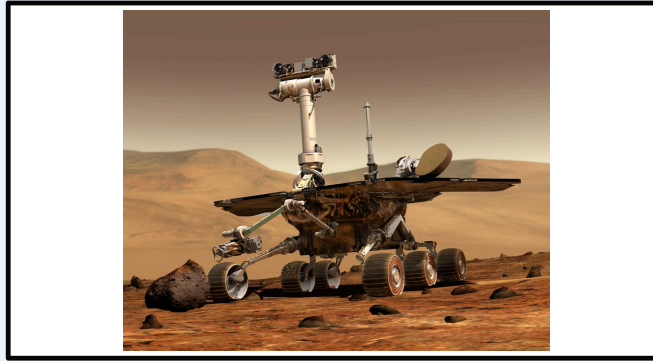
<https://www.publicdomainpictures.net/pictures/90000/velka/mars.jpg>

By: \_\_\_\_\_

# Introduction

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# Exploring Mars



A rover explores Mars

<https://images-assets.nasa.gov/image/PIA04413/PIA04413-medium.jpg>

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# Why is Mars Important?

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Could humans someday live on Mars?

<https://images-assets.nasa.gov/image/Moon%20to%20Mars%20Infrastructure/Moon%20to%20Mars%20Infrastructure-medium.jpg>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Writing Prompt**

Add text features or formatting that help the reader better understand the main ideas and important details in each section of the brochure. Include a heading and at least one other text feature per section.

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# Vocabulary

Word	Part of Speech	Definition
audacious	adj.	very confident and bold, often in a way that takes a risk or surprises people
bewildering	adj.	causing confusion
conserve	v.	to protect or save something
devoted	adj.	committed to something or someone
diligently	adv.	doing something with extreme care and attention
enormity	n.	big in size or importance
fare	v.	to perform or progress in a certain way
fatally	adv.	in a manner leading to ruin, failure, or sometimes death
geologist	n.	a person who studies rocks
habitable	adj.	able to be lived in
-ist	suffix	a person who, usually an expert in a field
magnitude	n.	the size or importance of something

Word	Part of Speech	Definition
malfunctioned	v.	to fail to work properly
micro-	prefix	small
microscopic	adj.	very tiny; only able to be seen through a microscope
ordeal	n.	an experience that was painful or took a lot of time
parameter	n.	a boundary or limit that sets a rule for how something works
pondered	v.	carefully thought about something
pre-	prefix	
precursors	n.	ones that come before, often to pave the way; earlier or previous versions of something
quest	n.	a journey in search of something
replica	n.	an exact copy of something
simulate	v.	to imitate the look or behaviors of something else
stationary	adj.	staying in one place or position; not moving

Word	Part of Speech	Definition
traversed	v.	to travel across something
treachery	adj.	very dangerous
un-	prefix	not
unprecedented	adj.	not done before
vindicated	v.	to show that something is true after it has been questioned



# Unit Rubrics & Assessments

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Single Point Narrative Writing Rubric

## 5th Grade English Language Arts

	<b>Areas for Growth</b> What could I do to make my writing even stronger? How can I improve?	<b>Criteria</b> Expectations for my writing assignment:	<b>Strengths</b> What am I doing well already? What am I proud of?
<b>Event Sequence</b>		I include the most important events that tell a story in my poem.	
		I include descriptive words or details about each event.	
<b>Poetry</b>		My poem conveys a clear theme about the subject.	
		I include rhyming to add rhythm and beauty to the poem.	
		I include figurative language to add imagery and meaning to the poem.	

# Narrative Writing Rubric

## 5th Grade English Language Arts

<b>Rubric Scoring Key</b>	<b>Fully meets (4)</b> All criteria present in the writing	<b>Mostly meets (3)</b> Most criteria present, with some misunderstandings	<b>Partially meets (2)</b> Criteria attempted, but major misunderstandings	<b>Does not meet yet (1)</b> Criteria are not attempted or not enough evidence to rate
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<b>Structure</b>	<b>Rubric Score</b>	<b>Notes</b>
<b>Event Sequence</b> Includes all the key components of the narrative arc: exposition, rising action, climax, falling action, resolution; Uses paragraphs to manage the sequence of events by showing a new event or when a new character speaks	4 3 2 1	
<b>Point of View</b> Point of view is clear and consistent throughout the story; Clear understanding of the task's audience and purpose	4 3 2 1	
<b>Setting</b> Includes many details directly and indirectly to describe the place, time, and (if pertinent) the weather conditions of the story; Describes the setting using multiple sensory details, descriptions of the characters' actions, dialogue, or physical appearance; Uses adjectives to evoke mood or atmosphere	4 3 2 1	
<b>Paragraph Structure</b> Consistently starts new paragraphs appropriately, including when a new event starts or when a new character is speaking	4 3 2 1	

<b>Development</b>	<b>Rubric Score</b>	<b>Notes</b>
<b>Characters</b> Includes one or more major characters; Develops the major character with multiple details and descriptions; Uses both direct and indirect description	4 3 2 1	
<b>Plot</b> Begins by introducing the characters, setting, and background information using sensory details; <u>May</u> begin by dropping the reader into the action; Major characters experience and solve problems throughout the story; Ends with a resolution, which <u>may</u> include: resolving the problem while showing a lesson or change, showing how the narrator reflects on the events of the story, or leaving the reader with a question to continue to think about	4 3 2 1	
<b>Precise Words and Phrases</b> Uses several temporal words to help the events in the story unfold logically	4 3 2 1	
<b>Dialogue</b> Appropriately uses dialogue to advance the plot and establish a character's personality; Includes a variety of dialogue tags that show how the characters are speaking	4 3 2 1	

<b>Language</b>	<b>Rubric Score</b>	<b>Notes</b>
<b>Grammar</b> Expands, combines, and reduces sentences when revising for meaning, reader/listener interest, and style; Appropriately uses correlative conjunctions (e.g. <i>either/or</i> , <i>neither/nor</i> ); Uses verb tense to convey various times, sequences, states, and conditions; Recognizes and corrects inappropriate shifts in verb tense when revising	4 3 2 1	
<b>Conventions</b> Uses correct capitalization and punctuation conventions; Uses commas correctly, including to separate items in a series, separate an introductory element from the rest of the sentence, set off the words "yes" and "no" (e.g. <i>Yes, thank you</i> ), set off a tag question from the rest of the sentence (e.g. <i>It's true, isn't it?</i> ), indicate a direct address (e.g. <i>Is that you, Norma?</i> ); Uses underlining, quotation marks, or italics to indicate titles of works	4 3 2 1	

Name: \_\_\_\_\_ Date: \_\_\_\_\_

# Single Point Informational Writing Rubric

## 5th Grade English Language Arts

	<b>Areas for Growth</b> What could I do to make my writing even stronger? How can I improve?	<b>Criteria</b> Expectations for my writing assignment:	<b>Strengths</b> What am I doing well already? What am I proud of?
<b>Introduction</b>		My introduction sentence includes a big, thematic idea.	
		My introduction section includes appropriate background information about the topic.	
<b>Sections</b>		I use a text structure that matches the information in each paragraph.	
<b>Conclusion</b>		My conclusion summarizes the big, thematic idea and leaves the reader with a final takeaway: <ul style="list-style-type: none"> <li>• Question, quotation, anecdote, or memorable image</li> </ul>	
<b>Text Features</b>		I include appropriate text features to help readers understand the main ideas.	

# Informational Writing Rubric

## 5th Grade English Language Arts

Rubric Scoring Key	Fully meets (4) All criteria present in the writing	Mostly meets (3) Most criteria present, with some misunderstandings	Partially meets (2) Criteria attempted, but major misunderstandings	Does not meet yet (1) Criteria are not attempted or not enough evidence to rate
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Structure	Rubric Score	Notes
<b>Sections</b> Groups information into multiple paragraphs or sections; Consistently uses paragraph structures to organize information depending on the type of information included and purpose of writing: sequence or chronology, cause-and-effect, comparison, problem and solution	4 3 2 1	
<b>Introduction</b> Starts by introducing a topic and why it is important; Introduction includes essential background knowledge; Consistently writes in the third-person	4 3 2 1	
<b>Conclusion</b> Includes a concluding section that summarizes the key ideas; Conclusion may include one of the following: question, quote, anecdote, or memorable image	4 3 2 1	

Development	Rubric Score	Notes
<b>Details</b> Includes three to four relevant facts and details to develop and support the topic; Details <u>may</u> include facts, definitions, concrete details, examples, quotations, descriptions	4 3 2 1	
<b>Text Features</b> As called for by the task, uses three to four text features to reinforce main ideas, including a title, illustrations, headings, labels, captions, bold words, diagrams, photographs, multimedia, fact boxes, sidebars	4 3 2 1	
<b>Linking Words and Phrases</b> Effectively and consistently uses linking words or phrases to connect ideas or paragraphs	4 3 2 1	

Language	Rubric Score	Notes
<b>Grammar</b> Expands, combines, and reduces sentences when revising for meaning, reader/listener interest, and style; Appropriately uses correlative conjunctions (e.g. <i>either/or</i> , <i>neither/nor</i> ); Uses verb tense to convey various times, sequences, states, and conditions; Recognizes and corrects inappropriate shifts in verb tense when revising	4 3 2 1	
<b>Conventions</b> Uses correct capitalization and punctuation conventions; Uses commas correctly, including to separate items in a series, separate an introductory element from the rest of the sentence, set off the words "yes" and "no" (e.g. <i>Yes, thank you</i> ), set off a tag question from the rest of the sentence (e.g. <i>It's true, isn't it?</i> ), indicate a direct address (e.g. <i>Is that you, Norma?</i> ); Uses underlining, quotation marks, or italics to indicate titles of works	4 3 2 1	

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Editing Checklist 1

<b>Language and Conventions Focus Area</b>	<b>✓</b>
<p>I use perfect verb tense appropriately to be specific about when events occurred:</p> <ul style="list-style-type: none"> <li>• <i>Ex. I <u>had been</u> in the school band for five years.</i></li> </ul>	

**My writing goal:**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

Exploring Mars: Spirit and Opportunity

## Editing Checklist 2

<b>Language and Conventions Focus Area</b>	<b>✓</b>
<p>I use perfect verb tense appropriately to be specific about when events occurred:</p> <ul style="list-style-type: none"> <li>● <i>Ex. I <u>had been</u> in the school band for five years.</i></li> </ul>	
<p>I use different verb tenses to show specific time or sequence of events.</p> <ul style="list-style-type: none"> <li>● Simple, progressive, or perfect</li> </ul>	

**My writing goal:**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Directions:** Read the excerpt from "IMPACT! Asteroids and the Science of Saving the World," then answer the questions that follow.

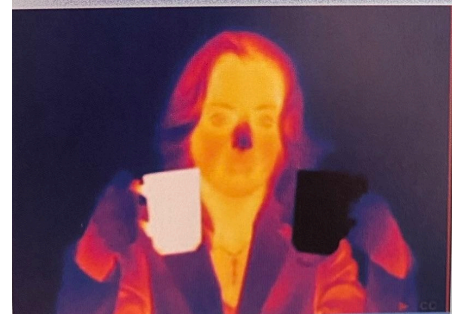
## Text 1

### Excerpt from *IMPACT! Asteroids and the Science of Saving the World*

By Elizabeth Rusch, adapted by Fishtank Learning

#### The Search from Space

- 1 Amy Mainzer and her colleagues knew that searching for asteroids from space has some big advantages over searching from the ground. Amy is the principal investigator for the space mission NEOWISE (Near-Earth Object Wide Infrared Survey Explorer). Shaped like a thick barrel with a telescope and camera on one end, the unmanned NEOWISE spacecraft orbits Earth, taking photos of our solar system every eleven seconds. Unlike a ground telescope, it doesn't have to peer through the atmosphere. It doesn't have to wait for clear weather. It doesn't even have to wait for nightfall.
- 2 NEOWISE has another big advantage: It isn't looking for light. It's looking for heat.
- 3 Asteroids don't emit visible light like the stars and our sun. They reflect the sunlight. Like a white T-shirt, a light-colored asteroid reflects a lot of light. Dark-colored asteroids—like dark T-shirts—don't, so they are much harder to see against the dark background of space from regular ground telescopes.
- 4 Instead of relying on visible light, NEOWISE uses infrared light—wavelengths of light redder than the reddest red humans can see. "When you feel sun on your skin, you are feeling infrared light," Amy explains. Asteroids are warmed by the sun, so they glow extremely brightly at infrared wavelengths. In fact, darker asteroids absorb more of the sun's heat, so they shine even brighter at infrared wavelengths.
- 5 Between its launch in 2009 and 2011, the space telescope discovered lots of asteroids—*thirty-four thousand* asteroids, 134 of them orbiting near Earth.
- 6 There was a problem, though: the telescope had to stay cool in order to detect tiny amounts of



Amy Mainzer holds two coffee mugs, one hot and one cool. In the photo taken with visible light (top), there is no way to tell which mug is heated. In the infrared photo on the bottom, the heated mug glows more brightly (white on left), while the cold mug is black.

heat far, far away in outer space. But the frozen hydrogen that cooled the instrument had run out.

- 7 NEOWISE was put into hibernation. Everything was powered down and turned off except what was needed to keep the spacecraft steady in its orbit. There it floated, dark and silent, around Earth.
- 8 The end of the mission was hard for the NEOWISE team members. "Having a spacecraft is like having a friend or a dog," says member Beth Fabinsky, who flew the spacecraft from mission control. "You see it every day, you get used to having it in your life. When you turn off the transmitter and you don't hear from it anymore, it's sad."
- 9 Then one day, Amy got a call from NASA. Public concerns over the threat of asteroid strikes were growing. NASA wanted her team to turn the spacecraft back on and continue the search.
- 10 "What?" Amy said. "Did I hear you right? Could you repeat that?"
- 11 She and her team went right to work writing a proposal to continue NEOWISE. "A lot of science is writing," Amy says. "You are always trying to convey what you've done or what you're hoping to do."
- 12 As the scientists prepared to extend the mission, they worried about how the spacecraft and telescope were doing. When they turned it back on, would everything work?
- 13 When the day came to restart, team members gathered around a blank screen. They transmitted to the spacecraft and waited to hear back. "Suddenly the screen filled with numbers and lines and we could see that it was alive," Beth says.
- 14 "Wahoooo!" the team cheered.
- 15 First, they pointed the telescope into deep space to cool it down. "The blackness of space is so cold that just by looking at it, the telescope loses heat," says Amy. On December 23, 2013, NEOWISE began work again, starting on a three-year mission to learn more about near-Earth objectives that could threaten our planet.

Rusch, E. (2017). Impact!

1. How is NEOWISE different from regular ground telescopes?
  - a. NEOWISE orbits Earth in space, so it does not have to deal with weather, daylight, or the atmosphere like ground telescopes do.
  - b. NEOWISE can only be used at night, while ground telescopes can be used during the day.
  - c. NEOWISE looks for visible light from asteroids, while ground telescopes look for heat.
  - d. NEOWISE stays on Earth but uses stronger cameras than regular telescopes to see farther into space.

2. How does the author use photographs to show why NEOWISE can detect asteroids that ground telescopes might miss?
  - a. The photographs show how NEOWISE takes a new photo of the solar system every eleven seconds.
  - b. The photographs show how NEOWISE uses infrared light to detect heat, causing dark asteroids to glow brightly.
  - c. The photographs show how NEOWISE is operated by multiple scientists who interpret its pictures.
  - d. The photographs show how excited scientists were when NEOWISE successfully restarted after being in hibernation.
  
3. Which statement best explains how Amy's team felt when they got the call from NASA?
  - a. They were thrilled to restart their mission, and confident that the spacecraft and telescope would awake from hibernation strong and ready.
  - b. They knew that the telescope only needed a few more months of hibernation in order to replenish its hydrogen levels, so they were thrilled to be able to start up again.
  - c. They were energized by potentially restarting the mission, but were worried about the condition of the spacecraft and telescope.
  - d. They were hesitant to restart the mission and wanted to do more research before committing.
  
4. Humans and technology are both important for discovering new asteroids. Which statement best describes the role each plays?
  - a. Humans are important for planning and developing the mission, but once NEOWISE is in the air, they have significantly less influence.
  - b. NEOWISE is able to collect and process photographs accurately without the support of humans. Humans monitor NEOWISE to ensure it stays on track.
  - c. Humans look at the initial photographs to identify initial asteroids, then the computers double check and confirm the findings.
  - d. NEOWISE is able to take lots of photographs and can begin to distinguish asteroids, but humans are needed to verify if something is or is not an asteroid.
  
5. Which detail best supports the idea that scientists were unsure whether NEOWISE would work after being restarted?
  - a. The team gathered around a blank screen and waited to hear back from the spacecraft.
  - b. NEOWISE had discovered thirty-four thousand asteroids before it was turned off.
  - c. The frozen hydrogen that cooled the telescope had run out.
  - d. The spacecraft takes pictures of the solar system every eleven seconds.

**Directions:** Read the article "NASA'S Asteroid Hunter Spacecraft Returns First Images after Reactivation," then answer the questions that follow.

## Text 2

### **NASA's Asteroid Hunter Spacecraft Returns First Images after Reactivation**

By NASA, adapted by Fishtank Learning

#### **Probe Will Assist Agency in Search for Candidates to Explore**

- 1 NASA's Near-Earth Object Wide-field Infrared Survey Explorer (NEOWISE), a spacecraft that made the most comprehensive survey to date of asteroids and comets, has returned its first set of test images in preparation for a renewed mission.
- 2 NEOWISE discovered more than 34,000 asteroids and characterized 158,000 throughout the solar system during its prime mission in 2010 and early 2011. It was reactivated in September following 31 months in hibernation to assist NASA's efforts to identify the population of potentially hazardous near-Earth objects (NEOs). NEOWISE also can assist in characterizing previously detected asteroids that could be considered potential targets for future exploration missions.
- 3 "NEOWISE not only gives us a better understanding of the asteroids and comets we study directly, but it will help us refine our concepts and mission operation plans for future, space-based near-Earth object cataloging missions," said Amy Mainzer, principal investigator for NEOWISE at NASA's Jet Propulsion Laboratory (JPL) in Pasadena, Calif. "The spacecraft is in excellent health, and the new images look just as good as they were before hibernation. Over the next weeks and months we will be gearing up our ground-based data processing and expect to get back into the asteroid hunting business, and acquire our first previously undiscovered space rock, in the next few months."
- 4 Some of the deep space images taken by the spacecraft include a previously detected asteroid named (872) Holda. With a diameter of 26 miles (42 kilometers), this asteroid orbits the sun between Mars and Jupiter in a region astronomers call the asteroid belt. The images tell researchers the quality of the spacecraft's observations is the same as during its primary mission.
- 5 The spacecraft uses a 16-inch (40-centimeter) telescope and infrared cameras to seek out and discover unknown NEOs and characterize their size, albedo or reflectivity, and thermal properties. Asteroids reflect, but do not emit visible light, so data collected with optical telescopes using visible light can be deceiving. Infrared sensors, similar to the cameras on NEOWISE, are a powerful tool for discovering, cataloging and understanding the asteroid population. Some of the objects about which NEOWISE will be collecting data could become candidates for the agency's announced asteroid initiative.
- 6 NASA's initiative will be the first mission to identify, capture and relocate an asteroid. It represents an unprecedented technological feat that will lead to new scientific discoveries and technological capabilities that will help protect our home planet. The asteroid initiative brings together the best of NASA's science, technology and human exploration efforts to achieve President Obama's goal of sending humans to an asteroid by 2025.
- 7 "It is important that we accumulate as much of this type of data as possible while the spacecraft

remains a viable asset," said Lindley Johnson, NASA's NEOWISE program executive in Washington. "NEOWISE is an important element to enhance our ability to support the initiative."

- 8 NEOWISE began as WISE. The prime mission, which was launched in December 2009, was to scan the entire celestial sky in infrared light. WISE captured more than 2.7 million images in multiple infrared wavelengths and cataloged more than 747 million objects in space, ranging from galaxies faraway to asteroids and comets much closer to Earth. NASA turned off most of WISE's electronics when it completed its primary mission in February 2011.
- 9 Upon reactivation, the spacecraft was renamed NEOWISE with the goal of discovering and characterizing asteroids and comets whose orbits approach within 28 million miles (45 million kilometers) from Earth's path around the sun.

NASA's Asteroid Hunter Spacecraft Returns First Images after Reactivation. (2013, December 19). NASA Jet Propulsion Laboratory (JPL). <https://www.jpl.nasa.gov/news/nasas-asteroid-hunter-spacecraft-returns-first-images-after-reactivation/>. This article is in the public domain.

6. Which statement best summarizes the main ideas of the press release?
  - a. NEOWISE takes detailed images of asteroids like (872) Holda and helps scientists learn about objects in the asteroid belt.
  - b. NASA plans to send humans to an asteroid by 2025 using new technology developed from earlier space missions.
  - c. NEOWISE was restarted and will continue helping NASA find and study asteroids that could be important for future missions and planetary safety.
  - d. Scientists were excited when NEOWISE began sending images again after being turned off for several years.
7. What was the author's purpose for writing the press release?
  - a. To inform readers about NEOWISE's reactivation and explain its role in studying asteroids and supporting future space missions.
  - b. To entertain readers with a story about scientists working on a space mission.
  - c. To persuade readers that NEOWISE is the most important spacecraft NASA has ever created.
  - d. To compare NEOWISE to other telescopes and explain which one works best.
8. How is the structure of *IMPACT! Asteroids and the Science of Saving the World* (Text 1) different from "NASA's Asteroid Hunter Spacecraft Returns First Images after Reactivation" (Text 2)?
  - a. Text 1 is organized like a narrative, while Text 2 is organized to present key information about a mission.
  - b. Text 1 lists steps in chronological order, while Text 2 explains causes and effects related to asteroid detection.
  - c. Text 1 presents key information, while Text 2 tells a story with characters and dialogue.
  - d. Both texts are organized the same way, describing how telescopes work in space.



Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Part One: Vocabulary**

1. Give an example of an **audacious** decision Steve and his team made. What made the decision **audacious**?

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2. What role did **geologists** play in the rovers' mission to Mars?
- They studied the rocks collected from Mars
  - They helped navigate the rovers towards interesting rock formations
  - They designed the solar panels
  - They figured out how to get the rovers unstuck from the sand
3. What does it mean if something is **unprecedented**?
- It is obviously true.
  - It is staying in one place without moving.
  - It has not been done before.
  - It is able to be lived in.
4. Which word best describes the terrain encountered by Opportunity?
- devoted
  - vindicated
  - treacherous
  - bewildering

5. Pick two of the words from the list below. Use them in a sentence that shows what the words mean.

traversed	simulate	magnitude	replica	malfunction
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- \_\_\_\_\_  
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**Part Two: Content Knowledge and Understandings**

6. Spirit and Opportunity faced many challenges during their mission to Mars. Describe a challenge either Spirit or Opportunity faced and how they and their scientists overcame the challenge.

Your answer should include:

- Description of the challenges faced
- Explanation of the steps taken to overcome the challenge
- Two to three vocabulary words from the unit

You may use your annotations and notes from the unit to help answer the question.

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Student: \_\_\_\_\_ Examiner: \_\_\_\_\_ Date: \_\_\_\_\_  
Words Read Correctly: \_\_\_\_\_ Errors: \_\_\_\_\_

## Excerpt from *The Mighty Mars Rovers: The Incredible Adventures of Spirit and Opportunity*

By: Elizabeth Rusch  
*Adapted by Fishtank Staff*

Does Opportunity have any chance of getting there? the team asked. The huge	13
crater was 7 miles (12 km) away, as far as the rover had already traveled since landing	30
on Mars. Even at a quick pace of 110 yards a day, the trip could take two years.	48
"It's a long shot," Steve admitted.	54
But what in this mission <i>hadn't</i> been a long shot?	64
"It's funny. When we first built [the rovers], we babied them, we coddled them, we	79
dressed up in funny suits, we had rubber gloves on, we tiptoed around them and were	95
extremely careful," said Steve. "Now they are scratched, beat up, and dirty. We have	109
pushed them to their limits on Mars, climbing the steepest slopes that they could	123
climb, going down slippery inclines, and drilling RAT holes into rocks while perched	136
on a precarious slope." But Steve, his team, and his rover were ready for another	151
adventure. With Steve's blessing, Opportunity rolled on.	158
On May 20, 2012, Opportunity broke the record for the longest mission operating	171
on another planet's surface. The record set by the Viking I Lander was 6 years and	187
116 days. Each day that Opportunity continues to explore, he sets another record.	200

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# Texts & Supporting Readings



In addition to the materials in this document, students will engage with third party, copyrighted materials as part of this unit. To see a list of those texts and their authors please visit:

<https://www.fishtanklearning.org/curriculum/ela/5th-grade/materials/>