Mission to Mars

LANGUAGE ARTS LEXILE 690L

Objectives

- Students will identify and investigate the definitions of unfamiliar words.
- Students will use information in the article to explain what scientists are doing to solve problems so humans can survive in space.

Resources

- Vocabulary Assessment Master
- Language Arts Assessment Master
- **Summary**

• The article "Mission to Mars" is a collection of infographics that explain how people could get to Mars, why the human body isn't built for space, and what people would need to survive on Mars.

BUILD VOCABULARY AND CONCEPTS

Display pages 22-23. Point out that there is no Wordwise feature in this article. **Say:** *That doesn't mean that as you read the article you won't come across unfamiliar words.*

Give each student a copy of the **Vocabulary Assessment Master**. As students read the article, instruct them to record each word they find difficult to understand. **Say:** *These may be words you've never seen before or they may be words you do know that are used in a new way.*

Tell students to circle three words on their lists. Have them predict and write a definition for each word. Next, have them write a sentence using each word, based on the definitions they wrote. Then have students find each word in a dictionary and record its definition. If a word has multiple meanings, have students use context clues in the article to select the correct definition. Have students write a new sentence based on the definition they found.

Invite volunteers to identify the words they defined and read aloud the before and after sentences they wrote. As a class, examine how investigating definitions contributed to students' understanding of each word.

READ

Display pages 16-17. Instruct students to examine the image. Then invite a volunteer to read aloud the headline and deck. Invite students to share their thoughts on the deck.

Inform students that space travel is dangerous. The purpose of this article is to help them understand how scientists are making it possible for humans to get to and survive living on Mars.

Say: *Before people can go to Mars, scientists have to understand all of the obstacles space travelers face. In other words, what are the problems? Then they work on solutions. This takes time. After all, you can't just go into outer space to conduct experiments on a whim.*

Scan the article with the class. Guide students to recognize that the article covers three main topics: getting to Mars, living in space, and how to survive once you reach Mars.

Give each student a copy of the **Language Arts Assessment Master**. Have students read the article on their own. As they do, instruct them to summarize the main problem addressed in each section. Then have them write a detailed explanation about what scientists are doing to help people overcome each obstacle.

Mission to Mars

LANGUAGE ARTS

TURN AND TALK

Have students turn and talk to discuss what they learned about space travel to Mars. **Ask:** *How long would it take astronauts to reach Mars?* (eight months) *Why would it take so long?* (Mars is 55 million kilometers (34 million miles) from Earth.) *What essential supplies would people need to take?* (air, water, and food) Encourage students to share other facts they learned about traveling to Mars as they read the article.

• **Predicting Definitions** Have students turn and talk to discuss what they learned about the three unfamiliar words they chose to investigate. Encourage them to compare their results in small groups. Instruct students to discuss how examining the information they collected impacted their understanding of each term.

• **Explain Concepts** Point out to students that when they read articles on scientific topics, they may encounter situations that present multiple problems and/or solutions. But just because the information is complex doesn't mean it has to be difficult to understand. **Say:** *The best way to figure things out is to ask questions as you read. What happened? Why did it happen? How is one thing related to another? You can usually find the answer to each of your questions right there in the text.* Point out that a good way to test your understanding of a topic is to try to explain the ideas to someone else. **Say:** *If you can't explain the concept, you might need to read the article again.* Have students turn and talk to share their **Language Arts Assessment Masters** with a partner. Can they state the problems clearly? Do their explanations of solutions make sense? If not, instruct partners to reread the text and revise their responses accordingly.

WRITE AND ASSESS

You may want students to write about what they learned to assess understanding. Encourage students to reflect upon what they read and how it affected their ideas about the topic.

• *Why is space dangerous for humans?*

• *How could people survive living on Mars?*

• *What surprised you about what you read?*

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SCIENCE

Objectives

- Students will compare and contrast the planets Earth and Mars.
- Students will understand how scientists use models to represent events and design solutions.
- Students will recognize obstacles that make it difficult for people to communicate between Earth and Mars.

Resources

- Content Assessment Master
- "Earth vs. Mars" poster (Teacher's Edition)
- Comprehension Check (page 25)

Science Background

Mars is the fourth planet from the sun. Its red surface is covered with loose dust and rocks. There are lots of volcanoes—one as wide as the state of New Mexico. And the planet's atmosphere is cold and thin. Liquid water cannot exist at the surface for any length of time.

Yet people want to go there. They want to live on Mars. And scientists are searching for ways to make that possible.

The first major obstacle is building a vessel able to take people all the way to Mars. No such spacecraft currently exists. But one is in the works. Once complete, it will be able to carry six astronauts 55 million kilometers (34 million miles) to Mars. The trip will take eight months.

That poses the second problem: surviving the journey. There is no way the spacecraft will be large enough to carry eight month's worth of supplies. So astronauts will grow their own food and recycle air and water. The spacecraft will use solar panels to collect energy from the sun.

Once the first settlers reach Mars—which could happen as early as the 2030s—they will need to build everything required to survive. If all goes as envisioned, their efforts could eventually grow into a self-sustaining colony capable of supporting up to a million people.

ENGAGE

Tap Prior Knowledge

Instruct students to imagine that they won a spot on the first mission to Mars. They've gone through extensive training. Now, it's time to pack for the trip. Space is limited so they're only allowed to take 2.2 kilograms (5 pounds) of personal items. What would they take and why?

EXPLORE

Preview the Lesson

Display pages 16-17 of the projectable magazine. Invite volunteers to describe what they see in the image. **Ask:** *Does this image look like it shows an astronaut on Earth or Mars?* (Students will likely say Mars.) *Why?* (Possible responses: The astronaut is wearing a space suit. The land looks red. They sky looks orange.) *How do you know that this isn't actually a photo of an astronaut on Mars?* (Nobody has ever traveled to Mars...yet!) Brainstorm ideas about what life might be like if people could live on Mars.

Set a Purpose and Read

Have students read the article in order to compare and contrast Earth and Mars, understand how scientists use models to represent events and design solutions, and recognize obstacles that make it difficult for people to communicate between Earth and Mars.

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SCIENCE

EXPLAIN

Understanding How Scientists Use Models Display pages 18-19. Review the line-art drawing of the spacecraft at the top of page 18. **Ask:** *How can you get a better idea of what it's like inside this spacecraft?* (Look at the larger drawing. They're the same thing.) Point out that the numbers on the larger drawing correspond with the numbers in the key at the bottom of the page. Explain to the class that scientists use models like these to represent their design solutions. Display pages 22-23. **Say:** *Not all models are simple. This illustration is a model, too. It shows and explains what a community on Mars might look like.* Give each student a copy of the **Content Assessment Master**. Instruct each student to draw a model of something else mentioned in the article. Examples could include a green wall garden, a close-up of the crew's living or work spaces, or a mechanism that makes air or water from Martian natural resources. Tell them to include enough details and information for readers to easily understand how the object works.

Communicating With People on Mars
As a class, brainstorm a list of ways people on Earth communicate with one another. **Ask:** *Do you think these same methods of communication would work if the person you wanted to talk to was on Mars?* As students share their opinions, guide them to recognize that the technology to communicate with people on Mars does exist. **Say:** *Your voice would just have to be transmitted as digitized information. The message you sent would then be decoded so it sounded like your voice when it reached Mars.* Have students write a list of questions they would like to ask the first astronauts who travel to Mars. Using information in the article as a starting point, challenge classmates to write accurate answers to each question.

ELABORATE

Find Out More
Inform students that Elon Musk, founder and CEO of SpaceX, has laid out plans for establishing the first human settlement on Mars. Some of the information presented in this article relates to his ideas. Divide the class into small groups. Instruct groups to conduct research to learn more about Musk and his vision. Based on what they learn, encourage students to write a brief essay expressing their opinions on Musk and his potential for success.

Extend Your Thinking About Living on Mars Display pages 22-23. As students examine the image, instruct them to really think about what it would be like to live on Mars. **Ask:** *Based on what you see, would you like to live on Mars or not?* Encourage students to share their opinions.

EVALUATE

Have students record their answers to the assessment questions in their science notebooks or on a separate sheet of paper.

- *What is a "green wall"?* (a vertical garden on a wall where people grow food)
- *Why do astronauts in space grow taller?* (Without the pull of Earth's gravity, the spine can expand and relax. This makes astronauts "grow" while they're in space.)
- *How could people breathe if they lived on Mars?* (They could make air by using carbon dioxide from Mars' atmosphere.)

If you wish, have students complete the **Comprehension Check** to assess their knowledge of concepts mentioned in the article.

Name _____ Date _____

VOCABULARY ASSESSMENT: Mission to Mars

Record unfamiliar words from the article. Circle three words on the list.
Use the organizer to investigate the meaning those words.

Unfamiliar Words			
Word			
Predicted Definition			
Sentence			
Dictionary Definition			
Sentence			

Name _____ Date _____

LANGUAGE ARTS ASSESSMENT: Mission to Mars

Summarize the problems identified in each section of the article. Write detailed explanations to tell what scientists are doing to solve the problems.

	Getting There	Life in Space	On Mars
Problems			
Solutions			

Name _____ Date _____

CONTENT ASSESSMENT: Mission to Mars

Create a detailed model of something people would need to survive on Mars. Number important parts of the model. Include a key that explains what each number represents.

Name _____ Date _____

COMPREHENSION CHECK: Mission to Mars

Read each question. Fill in the circle next to the correct answer or write your response on the lines.

1. Which of these is an essential item astronauts need to survive a trip to Mars?

   Ⓐ lightsabers

   Ⓑ Legos

   Ⓒ air

2. How long would it take for a spacecraft to reach Mars?

   Ⓐ eight months

   Ⓑ 500 days

   Ⓒ two weeks

3. How would "green walls" protect astronauts on the spacecraft?

   Ⓐ They would repel aliens.

   Ⓑ They would detect space junk.

   Ⓒ They would block radiation.

4. Which of these statements is true?

   Ⓐ The human body isn't built for space.

   Ⓑ The human body changes very little in space.

   Ⓒ The human body is healthier in space.

5. Describe three ways Earth is different from Mars.

_____

_____

_____

_____

ANSWER KEY

(continued)

Mission to Mars

Assess Vocabulary, page 22
All unfamiliar words must appear in the article. Predicted definitions and sentences will vary. Students may use a printed or online dictionary to find each word's actual definition.

Assess Language Arts, page 23
Answers will vary as there are many different problems and solutions to choose from in each section. However, students should outline a detailed solution for each problem identified.

Assess Content, page 24
Students models will vary. However, students should number important parts in their diagrams and include a key that explains what the number mean.

Comprehension Check, page 25
1. C; 2. A; 3. C; 4: A; 5: Answer will vary.