Ask® Teacher Guide: November/December 2017

Space Travelers

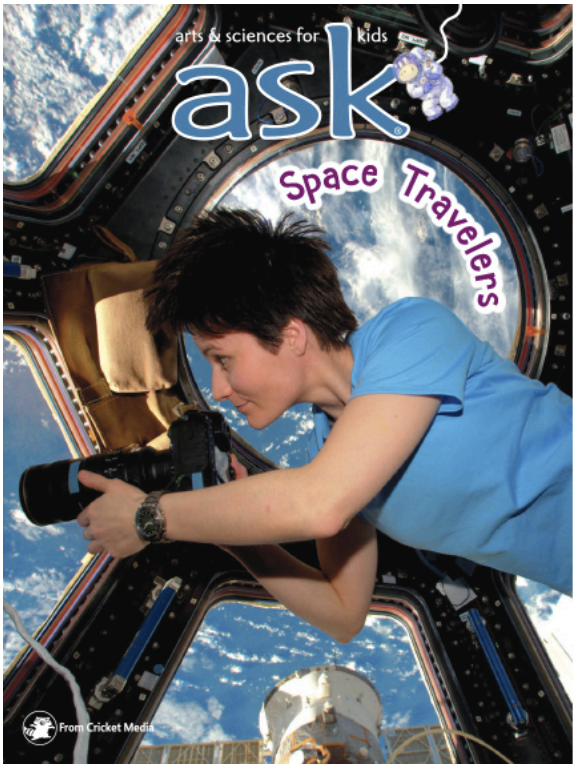
Have you ever dreamed about traveling to outer space? Find out how space travel has changed and what it takes to be an astronaut.

CONVERSATION QUESTION

What drives people to explore space?

TEACHING OBJECTIVES

- **Students will learn about the history and recent developments of space travel**
- **Students will learn what it takes to become an astronaut**
- **Students will analyze causes and effects**
- **Students will obtain and evaluate information**
- **Students will ask questions to gain information**
- **Students will analyze causes and effects, both intended and unintended, of historical developments**
- **Students will write narratives to develop real or imagined experiences or events**
- **Students will conduct short research projects by writing and conducting interviews**



In addition to supplemental materials focused on core STEM skills, this flexible teaching tool offers vocabulary-building activities, questions for discussion, and cross-curricular activities.

SELECTIONS

- **Riding Rockets**

Expository Nonfiction, ~1050L

- **Astronaut School**

Expository Nonfiction, ~850L

- **Meet an Astronaut**

Interview, ~750L

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Riding Rockets

pp. 6–13, Expository Nonfiction

Use this article to teach how studying cause and effect has advanced the development of rockets and space travel.

Lexile Score: ~1050

RESOURCES

- Blast Off!

OBJECTIVES

- Students will read and analyze a nonfiction science article
- Students will obtain and evaluate information
- Students will analyze causes and effects, both intended and unintended, of historical developments

KEY VOCABULARY

- ***gravity* (p. 7)** the force that attracts objects toward one another, such as objects pulled toward Earth
- ***launching* (p. 7)** sending or shooting (something, such as a rocket) into outer space
- ***satellite* (p. 8)** a device sent into space to travel around Earth to collect information
- ***velocity* (p. 8)** the speed of something in a given direction
- ***acceleration* (p. 9)** the act or process of moving faster or happening more quickly

ENGAGE

Conversation Question: What drives people to explore space?

Fill a balloon with air and pinch the end. Ask students what will happen if you let it go. Explain that rocket scientists use knowledge of forces to continually attempt to build better spacecraft. Have groups of students share what they know about rockets and space travel and then write five questions they have about the topic.

INTRODUCE VOCABULARY

Haves students write the vocabulary words in their notebook and then choose one word to master as an expert. Students may draw illustrations, show a simple demo, or create several sentences with the word in context. They will then form groups and teach each other their chosen words.

READ & DISCUSS

Have students read the article with a partner. Then use the following prompts in a class discussion to address the conversation question: What drives scientists to explore space?

- What do you think motivated Robert Goddard to make his own rockets?
- How are spacecraft engineers motivated today?
- What are the main factors that have advanced spaceflight?
- What future starship (p. 12) or wild idea (p. 13) would you want to work on? What would motivate you to research and design spacecraft?

CONCEPT/SKILL FOCUS: Analyze Causes and Effects

INSTRUCT: Guide students to look for cause-and-effect relationships in the article. Explain that scientific discovery builds on the work of others and takes generations of learning to gain understanding. Students record their information using the *Blast Off!* graphic organizer.

ASSESS: Use the graphic organizer to assess if students recorded cause-and-effect relationships from the article.

EXTEND

Social Studies Students make a list of significant milestones in rocketry and space travel found in the article, and create a historical timeline that places events in sequential order.

Blast Off!

Use this chart to organize information you find about the causes and effects of scientific discoveries that allowed for advancement in spacecraft.

Page	Cause	Effect
6	Invention of gunpowder in China	The first rockets were invented using gunpowder as fuel.

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Astronaut School

pp. 16–19, Expository Nonfiction

Use this article about becoming an astronaut to help students obtain and evaluate information.

Lexile Score: ~850

RESOURCES

- What It Takes to Be an Astronaut

OBJECTIVES

- Students will read and analyze a nonfiction science article.
- Students will obtain and evaluate information.
- Students will write narratives to develop real or imagined experiences or events.

KEY VOCABULARY

- ***astronaut* (p. 16)** a person who travels in a spacecraft into outer space
- ***candidates* (p. 16)** people who are being considered for a job or position
- ***gravity* (p. 18)** the force that causes things to fall toward the Earth
- ***missions* (p. 18)** flights by an aircraft or spacecraft to perform specific tasks

ENGAGE

Conversation Question: What drives people to explore space?

Ask students what skills and qualifications they think someone would need to be an astronaut. Together, write out a job description that lists these skills. After reading the article, return to the job description and have students add and edit with new information.

INTRODUCE VOCABULARY

Ask students to read and write the vocabulary words. Discuss the word meanings and how the vocabulary might be connected in the article. Challenge students to write sentences, where each sentence includes two or more vocabulary words.

READ & DISCUSS

After all students have read the story independently, use the questions below to discuss it:

- What are the most exciting and fun things about astronaut training?
- What are some of the most difficult skills needed to become an astronaut?
- What qualifications would require the most training?
- What makes people want to be astronauts?

CONCEPT/SKILL FOCUS: Obtain and Evaluate Information

INSTRUCT: Guide students to obtain information from the article about the skills and qualifications needed to become an astronaut. Have students make a list of these qualifications on the *What It Takes to Be an Astronaut* graphic organizer, and then share their opinion if this is a career they would consider. Ask students to support their opinions with reasons based on the qualifications list.

ASSESS: Use the graphic organizer to assess if students recorded information from the article and were able to evaluate their notes to write their opinion using information-based reasons.

EXTEND

Language Arts/Writing Students imagine themselves in astronaut school and write a journal describing three days of their training, choosing experiences from the article to personalize. Have students share and compare their journal entries with a partner.

What It Takes to Be an Astronaut: Collecting and Evaluating Information

Read the article and record information about the skills and qualifications needed to be an astronaut. Next, evaluate the information to see which qualifications you would enjoy pursuing.

Page	Skill/Qualification	Would I like to do this?
17	Study spacecraft, robotics, and computer programing	

Write a paragraph that states your opinion about whether or not you would like to train to be an astronaut. Support your opinion with reasons based on the qualifications you collected from the article.

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Meet an Astronaut

pp. 20–21, Interview

Use this interview to help students analyze how well-formed questions provide information about what it is like to be an astronaut.

Lexile Score: ~750

OBJECTIVES

- Students will read and analyze a nonfiction science article
- Students will ask questions to obtain information
- Students will conduct short research projects by writing and conducting interviews

KEY VOCABULARY

- ***astronaut* (p. 20)** a person who travels in a spacecraft into outer space
- ***passionate* (p. 21)** having, showing, or expressing strong emotions or beliefs
- ***missions* (p. 21)** flights by an aircraft or spacecraft to perform specific tasks
- ***perspective* (p. 21)** a way of thinking about and understanding something

ENGAGE

Conversation Question: What drives people to explore space?

Ask students what questions they would ask an astronaut, then skim the interview to review the questions this interviewer chose. Ask students how an interview might give information to help answer the conversation question.

INTRODUCE VOCABULARY

Ask students to search for the vocabulary words in the interview. Have them write these sentences and underline each vocabulary word. Ask students to define the words using context clues. Next, look up the words in a dictionary to check for correct understanding.

READ & DISCUSS

After all students have read the story independently, use the questions below to discuss it:

- What reasons did Matthew Dominick give for wanting to be an astronaut?
- Why do you think Dominick answered both "yes" and "no" when asked, "Is there anything that scares you about being an astronaut?"
- How does studying space make him feel about Earth?

CONCEPT/SKILL FOCUS: Asking Questions

INSTRUCT: Explain how interviews are used during research to gain information about a topic. Review the questions asked in this interview and point out how the questions are asked in a way that encourages explanation, rather than "yes" or "no" answers. Ask students what other open-ended questions they would ask Matthew Dominick.

ASSESS: Review the questions students share to find out if they understand the kinds of questions that cause more informative responses.

EXTEND

Language Arts/Writing Have students write a five-question interview to learn more about a career of a family friend, parent, or school professional. After conducting their interviews, have students share what they learned and assess which questions gave them the most information.