SPONSORED EDUCATIONAL MATERIALS

SCHOLASTIC

Mission to Mars

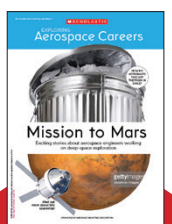
STEM and ELA Lessons About Aerospace Careers

GRADES 6–8

Dear Teacher,

This program gets students excited about careers in aerospace. You'll find:

- Lessons that can be used in STEM or ELA classes
- Two student activity sheets
- More great teaching resources at scholastic.com/talentfortomorrow



FREE STUDENT MAGAZINES **INSIDE!**

AEROSPACE INDUSTRIES ASSOCIATION

LESSON 1 Voyage Into Close Reading

Use informational texts to help students practice their skills while exploring aerospace careers.

Objective

Students will integrate information from multiple texts and cite textual evidence to support their analysis.

Time

60 minutes

Materials

- Dive Into Aerospace Careers activity sheet
- Student magazine

1. Have students brainstorm what they know about space travel and related careers in aerospace.

2. Explain that there are many elements that go into planning a mission. Students will read several articles about different challenges and the people who solve them.

3. Hand out the student magazine and the activity sheet. Remind students that they should pay attention to how the different articles and sidebars are related as they read.

4. Have students read independently or with a partner and respond to the questions on the activity sheet.

5. Invite students to share responses with a partner or with the class and discuss what they learned about the engineering design process.

LESSON 2 Engineering a Backup Plan

Get students thinking like engineers as they work to develop a solution to an everyday problem.

Objective

Students will define an engineering design problem and develop a solution using redundant systems.

Time

45 minutes

Materials

- Design a Backup Plan activity sheet
- Mechanical pencil and standard pencil

1. Have students raise their hands if they have used the following items: cell phone camera, wireless headphones, athletic shoes, ear thermometer, memory foam.

2. Explain that these items all use technology that was originally developed for the space program. Aerospace engineers are responsible for many inventions that we use every day.

3. Ask students if they have heard the word *redundant* and to give examples. If needed, provide an example: "The winning team won the tournament." The word *winning* is redundant, because a writer can remove the word *winning* without changing the meaning.

4. Explain that engineers view redundancy positively. In engineering, redundant systems serve as backup plans.

5. Hold up a regular pencil in front of the class. Ask students: What happens when your pencil breaks? What do you do if you don't have access to a pencil sharpener?

6. Hold up a mechanical pencil. Ask students: What happens when this pencil breaks? How does this design improve upon the original pencil?

7. Explain that when the spacecraft Orion is millions of miles away from Earth, redundant systems are essential to make sure that the crew returns home safely. For example, aerospace engineers designed Orion with not just one solar array to provide power, but four solar arrays. They also equipped Orion with eight auxiliary engines.

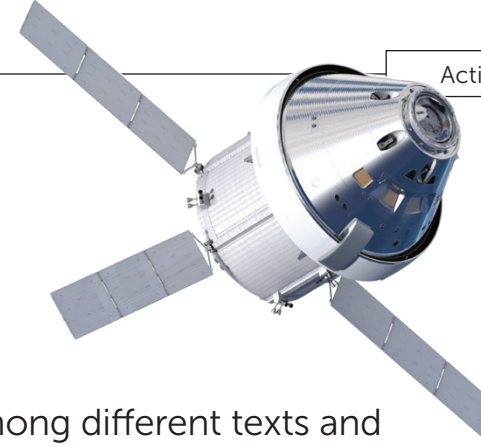
8. Hand out the Design a Backup Plan activity sheet. Have students work together or in pairs.

9. Invite students to share their ideas with the class.

Extension After students design their redundant systems, host a mini science fair in class. Students can showcase their design drawings or build models of their designs.

Name _____

Dive Into Aerospace Careers



Readers are always looking for connections among different texts and sources. Read the *Mission to Mars* magazine closely to learn about careers in aerospace and see how different topics are connected. Use evidence from the text to support your answers (write them on a separate sheet).

1. Read Closely

One of the author's claims is that **Orion** will be the safest, most advanced spacecraft ever built. List at least two pieces of evidence used to support this claim.

Choose one of the following terms from the magazine: **incinerate, additive manufacturing, recoverable resources**. Explain how you can determine the meaning of the term from how it is used in the article.

2. Make Connections

Compare the two aerospace engineers who are quoted, **Danielle Richey** and **Mohammed Hasan.** What do they have in common? How are their jobs different?

Choose one of the callouts in the magazine. What was the author's purpose in including this information? How does it help you understand the rest of the articles?

3. Apply Learning

The engineering design process involves **brainstorming, testing,** and **improving solutions** to a problem. Explain how this process applies to the problem of trash in space.

4. Add Math

The new **trash compaction and processing system** will reduce trash volume by 93 percent.

a. If a crew of eight astronauts produces **4 cubic feet of trash** per day, what will the volume of the crew's trash be in cubic feet after it is compacted?

b. One cubic foot contains **1,728 cubic inches**. If one cubic foot of trash is compacted, what will be the volume of trash in cubic inches?

Photo: Courtesy of NASA

Name _____

Design a Backup Plan

Aerospace engineers are constantly figuring out how to make things work better, no matter what happens. Get ready, because now it's your turn!

Record your answers on a separate sheet of paper.	
1. Choose an object that you use frequently. What purpose does it serve?	Example: The battery in my cell phone gives it power.
2. Describe what happens if part of the object fails to work.	Example: If the battery dies, I can't turn on my phone and I have to plug it in to recharge.
3. Brainstorm three ways to keep the object working even if part of the object fails (three possible redundant systems).	Example: I could add a solar panel to my phone to charge the battery using the sun.
4. List the benefits of each of the solutions you brainstormed.	Example: The solar panel would let me charge the phone without plugging it in.
5. List any drawbacks of each of the solutions you brainstormed.	Example: The solar panel might not be big enough to provide much power.
6. Choose the solution you think will be most successful. On the back of this sheet, draw a diagram of the object and the redundant system you want to add. **Congratulations—you just used the same skills that an aerospace engineer uses!**	