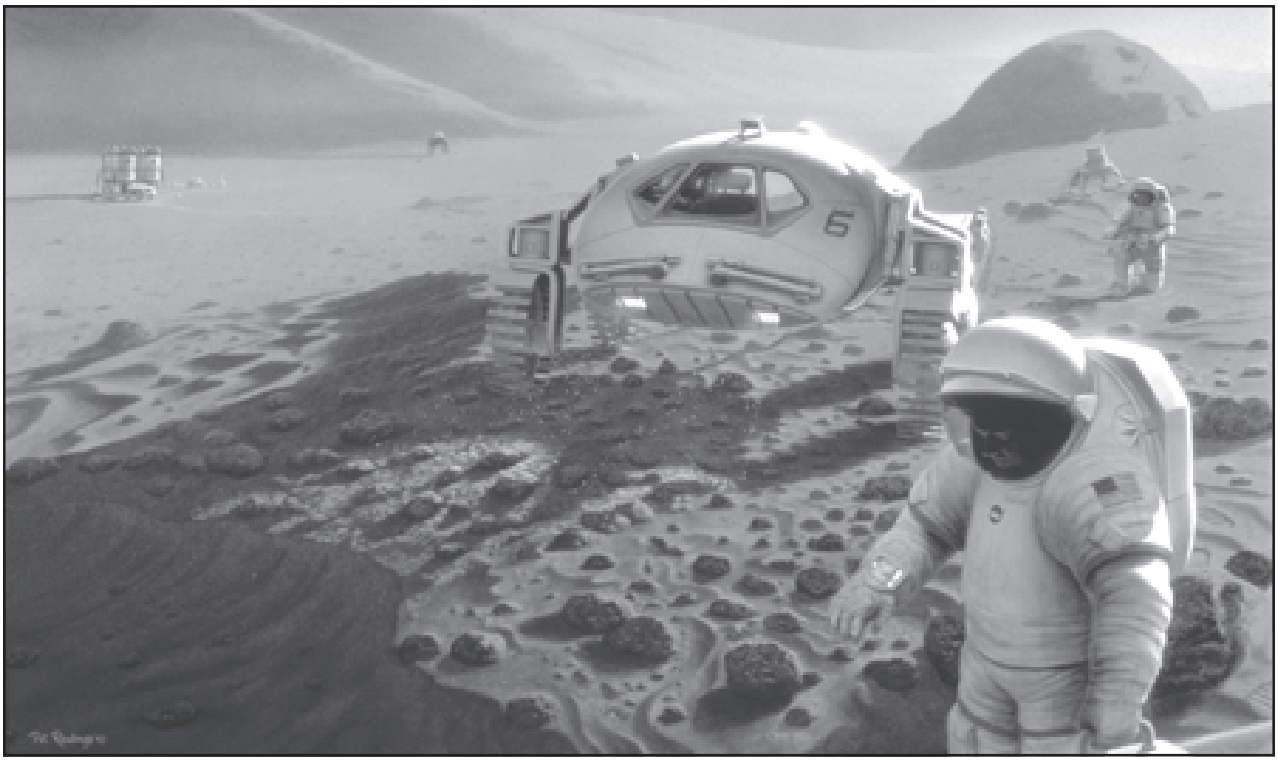
Lesson Six

Why Do We Explore?



About This Lesson

Students will work in small teams, each of which will be given a different reason why humans explore. Each team will become the expert on their one reason and will add a letter and summary sentence to an EXPLORE poster using their reason for exploration. With all the reasons on the poster, the word EXPLORE will be complete. Students will be using the skills of working in cooperative learning teams, reading, summarizing, paraphrasing, and creating a sentence that will best represent their reason for exploration. Students will also be illustrating and copying other teams' sentences so that each student will have a small copy of the large classroom poster for reference or extension purposes. The teacher will lead a discussion that relates the reasons humans explore to the planned and possible future missions to Mars.

Objectives

Students will:

- review the seven traditional reasons why people explore.
- write a summary of their reason why humans explore.
- illustrate their exploration summaries.
- relate the reasons for exploration to the missions to Mars.

Background

Students do not always realize that the steps in future exploration are built on a tradition of exploration that is as old as humans. This lesson is intended to introduce the concept of exploration through the seven traditional reasons that express why humans have always been explorers. Social scientists know that everyone, no matter how young or old, is constantly exploring the world and how it works. Space exploration, including the possible missions to Mars, has opened up a

whole new world for us to explore. It is essential that students understand the traditional reasons why humans are reaching beyond the Earth to Mars and why continued exploration is important. Students will be able to make informed decisions regarding exploration and the future of humans in space only if they understand that our future as explorers holds its foundations in our past and in our very nature.

Resources

Berger, Melvin. *Discovering Mars The Amazing Story of the Red Planet.* New York, Scholastic Inc., 1992 pp. 52.

Vogt, Gregory L. *The Solar System Facts and Exploration.* New York, Twenty-First Century Books, 1995 pp. 95.

Wilford, John N. *Mars Beckons.* New York, Alfred A. Knopf, 1990 pp. 244.

Materials

- ❑ one large piece of butcher paper or art paper
- ❑ one set of large cut letters E-X-P-L-O-R-E
- ❑ tall sentence strips or sturdy pieces of paper cut to fit the poster (one per team)
- ❑ E-X-P-L-O-R-E paragraphs, one per group (pgs. 53-54)
- ❑ *The Exploration of Mars* background information sheet, overhead or handout optional (pg. 51)
- ❑ tape
- ❑ pencils
- ❑ markers
- ❑ Student Sheet, *Why Do We Explore?* (pg. 52)

Procedure

Advance Preparation

1. Read background and additional resource materials as necessary.
2. Make the poster by placing letters vertically on large butcher paper, spelling E-X-P-L-O-R-E. Laminate it if possible for reuse.
3. Duplicate the handouts.
4. Prepare for seven teams.
5. Put the students into teams.

Classroom Procedure

1. Explain to the students that all humans are explorers including each of them.
2. Give each team a set of materials and the handout for their team.
3. Read the introduction on the top of the student sheet to the students.
4. Have the students read about the traditional reason for exploration given to their team.
5. Have the students write a sentence that best explains or summarizes their team's reason for exploring. The team's sentence must begin with the letter assigned to the team.
6. Ask each team to draw an illustration for their sentence.
7. Have each team copy their sentence and illustration on a sentence strip.
8. Instruct each member of the team to copy the team's sentence and illustration on the paper provided.
9. The members of the team will place their sentence strip on the large poster and explain their sentence and illustration to the rest of the class.
10. Each student will copy the other teams' sentences onto their own paper so that they each will have a mini poster when the exercise is completed. The mini posters can be used for closure, extensions, writing prompts, review sheets for testing, and/or making other connections to Mars exploration.
11. Lead a discussion that connects the historical reasons for exploration with the desire to explore Mars using space craft, landers, robotic craft, and humans.

The Exploration of Mars

Spacecraft	Country	Launch	Purpose	Result
Mars 1	USSR	1962	Fly-by	No data sent
Mariner 3	USA	1964	Fly-by	Lost during launch
Mariner 4	USA	1964	Fly-by	Sent 21 photos
Zond 2	USSR	1964	Fly-by	Sent no data
Mariner 6	USA	1969	Fly-by	Sent 75 photos
Mariner 7	USA	1969	Fly-by	Sent 126 photos
Mariner 8	USA	1971	Orbiter	Lost during launch
Mars 2	USSR	1971	Orbiter/lander	Sent no useful data
Mars 3	USSR	1971	Orbiter/lander	Sent minimal data
Mariner 9	USA	1971	Orbiter	Sent 7,329 photos
Mars 4	USSR	1973	Orbiter	Lost in space
Mars 5	USSR	1973	Orbiter	Sent some data
Mars 6	USSR	1973	Orbiter/lander	Sent minimal data
Mars 7	USSR	1973	Orbiter/lander	Sent minimal data
Viking 1 & 2	USA	1975	Orbiter/lander	Sent 50,000 photos, sample analyses, searched for life
Phobos 1	USSR	1988	Orbiter/lander	Lost in space
Phobos 2	USSR	1988	Orbiter/lander	Lost near Phobos, sent some data
Mars Observer	USA	1992	Orbiter	Lost near Mars
Mars '96	Russia	1996	Orbiter/lander	Lost during launch
Pathfinder	USA	1996	Lander	Surface photos rock analyses
Mars Global Surveyor	USA	1996	Orbiter	Continuing Data Set photos, altitudes, mineralogy
Nozomi	Japan	1998	Orbiter	Due at Mars Dec. 2003

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The Exploration of Mars

continued

Spacecraft	Country	Launch	Purpose	Result
Mars Climate Orbiter	USA	1998	Orbiter	Lost near Mars
Mars Polar Lander	USA	1998	Lander	Crashed on Mars
Mars Odyssey	USA	2001	Orbiter	In orbit around Mars
Mars Express	Europe	2003	Orbiter/lander	To be determined
Mars Exploration Rover	USA	2003	2 Landers	To be determined
Mars Recon. Orbiter	USA	2005	Orbiter	To be determined

Missions beyond 2001 have not been fully defined. NASA is planning to send an orbiter or lander at each opportunity. In addition to geologic, atmospheric, and radiation studies, the missions will seek evidence of past or present water and ice. Eventually humans will follow. The first people to walk on Mars are probably in school today.

Why Do We EXPLORE?

Whether we know it or not, we are natural-born explorers. There are many reasons why we explore. From birth we learn about life and how it works by exploring. No one can be satisfied for very long without exploring. Whether you are talking to someone next to you or looking around the room, you are exploring!

Directions:

1. You and your partners are helping to finish the EXPLORE poster on the wall.
2. Each team has a paragraph indicating one of the different reasons why humans explore.
3. At the beginning of the paragraph there is a letter designated for your team. You will use this letter to start a sentence that summarizes your team's reason for exploring.
4. Think of a sentence that describes the ideas from your paragraph. It has to begin with the letter listed on the top of your paragraph! Write the sentence on the sentence strip.
5. Now make an illustration to go with your sentence and put it on the sentence strip. Be colorful.
6. Each student should make a copy of your team's sentence and illustration on the paper provided.
7. Place your team's sentence and illustration on the poster and share them with the class.
8. Copy each team's sentence and illustration as they add them to the poster.

Your team has the letter "E" for the poster
People are curious about everything. We learn something new every day. If you get bored, you automatically look for something to do. That is the way we are. We like to learn new things. We also like to understand things and how they work. From the time you were born, you have been finding out how things work by exploring them. Curiosity makes us Explorers.

Your team has the letter "X" for the poster
Exploration looks ahead, not behind. We don't want to be stuck in the past. We want to move ahead. Exploration gives us the sense that anything is possible. Exploration leads to knowledge and understanding, and that means you make the world a better place. People have always tried to leave the world a better place for future generations. Exploration is one way we can do that. It is a gift that people of the past give people of the future. (You may use X or some other letter to start your sentence.)

Your team has the letter "P" for the poster
Leaders in space are leaders in the world. The countries that join together to go Mars and beyond will find new ways of working together and sharing their successes. Working together on major projects in space will help make nations on Earth more peaceful. Anytime you have to work with someone, you learn about them and yourself. Working together with common goals helps people understand each other. It is very hard to go to war with people you understand. Working together also makes us more creative.

Your team has the letter "L" for the poster
New places can be helpful to us because they have raw materials and natural resources. If we are going to explore new worlds, it can help our economy. Space exploration creates jobs and technology that make our world better. New worlds and new planets might have raw materials that are almost used up on Earth. We could also look for new, cleaner energy sources in space that might help protect our environment. Looking at Earth from space will give us a new view of our world and how to protect it.

Your team has the letter "O" for the poster
Exploration helps us understand our place in the universe. Where does the Earth, the third planet from the Sun, fit into things? Are people alone in the universe? Could there be life out there? If there are other life forms, what can we learn from them? What will they learn from us? Finding life in the universe could be the greatest discovery of all time.

Your team has the letter "R" for the poster
Exploration opens up new lands. Our country was once called the "New World" because the people of Europe found it when they thought only an ocean existed here. Europeans moved to the "New World," called it America, and we became our own country. We know no new lands exist on Earth to be discovered, so we look to other planets in our solar system. We might find a place to establish small colonies. Another home for humans might be made on a few bodies in our solar system, though it would take many years and a huge effort.

Your team has the letter "E" for the poster
We love adventure and when we explore new places, it is the best kind of adventure. Landing on another planet in a video game isn't nearly as exciting as landing there in person. Americans love adventure. From the time of the first colonies in America, we have spread across this great land and have loved the fun of finding new things. We have landed on our own Moon and sent spacecraft to the far reaches of the solar system. When humans explore, we make the universe our classroom for learning.