

What Do You Remember?

- Who was the first person to look up into the night sky with a telescope, and in what year did he do this? (10.1) **K/U**
- What happened to the two space shuttles *Columbia* and *Challenger*? (10.1) **K/U**
- Name four planets that scientists have sent space probes to. (10.1) **K/U**
- What is “space junk,” and why is it problematic for astronauts? (10.2) **K/U**
- Describe the theory of a space elevator and identify two obstacles to building it. (10.5) **K/U**
- What do the letters GPS stand for, and what does this technology do? (10.3) **K/U**
- In what ways is the Canadian satellite RADARSAT useful to people on Earth? (10.3) **A**
- In the 1960s, what was the goal of the *Apollo* space program? Was it successful in meeting that goal? (10.1) **K/U**
- What are the names of the two spacecraft designed by NASA to replace the space shuttle fleet in 2010? (10.5) **K/U**

What Do You Understand?

- One of Canada’s greatest contributions to research in outer space is studying the disease osteoporosis. What does this disease affect in the human body, and why is outer space a good place to study it? (10.2, 10.3) **K/U A**
- Give an example of something in your home that was created by research in outer space. (10.3) **A**
- Sketch a diagram of a satellite in orbit around Earth in free fall. Label it with the following words: force of gravity, speed, orbital path, satellite, Earth. (10.1) **K/U C**
- Explain the difference between the *Saturn V* rockets that took the *Apollo* astronauts to the Moon and the space shuttle currently in use. (10.1) **K/U**
- Why do astronauts’ muscles and bones weaken when they live aboard the ISS? (10.2) **K/U A**
- Explain the advantages and disadvantages of using nuclear power to produce electricity to power the instruments on spacecraft. (10.2) **A**
- Gamma-ray telescopes can collect electromagnetic radiation that human beings cannot see. Give two examples of gamma-ray telescopes and explain what they are used for. (10.1) **K/U**
- Compare the results of viewing a distant celestial object with a visual telescope with those of an X-ray telescope. (10.1) **K/U**
- In what ways have explorations of outer space helped tackle Earth’s environmental problems? (10.3) **A**
- Match the list of astronauts on the left with their contribution to space exploration on the right. (10.1) **K/U**

(a) Julie Payette	(i) was the first Canadian in space
(b) Chris Hadfield	(ii) was the first Canadian to operate Canadarm
(c) Marc Garneau	(iii) stayed on the ISS with six other astronauts
(d) Robert Thirsk	(iv) helped build the ISS

Solve a Problem

- Imagine you are hired to clean up a toxic waste spill in northern Ontario. Explain why you would want some of the engineers who designed the Canadarm to design a device to help with the cleanup effort. (10.1, 10.3) **A**
- What is the difference between “space tourism” and “space exploration”? How are the motivations behind each different? How are they similar? (10.1, 10.5) **A**
- After a particularly heavy year of rain, the river in your city is overflowing. How could space technology be used to track the damage to the surrounding area? Why would this knowledge be useful? (10.3) **A**

23. NASA is preparing for its next mission to Mars and needs to find a place on Earth to train astronauts who are going to be working on the Martian surface. Suggest a place that might be similar to Mars and explain your reasoning. (10.1, 10.5) **T/I** **A**
24. Imagine you are a scientist planning a future mission to the planet Mars. Suggest reasons why you would want to use the Moon as a base for launching your rocket to Mars. (10.5) **T/I**
25. Suppose there is a young protostar hidden in a certain gas cloud in our galaxy. Suggest a way that we could gather data from the star without relying on visible light. (10.1) **T/I**

Create and Evaluate

26. Write a letter to a family member as if you were a space tourist visiting the Moon for a couple of days. Describe your surroundings and how being on the Moon makes you feel. (10.5) **K/U** **C**
27. Write an e-mail to a friend as if you were a scientist living for the past six months in the first settlement on Mars (Figure 1). Describe the settlement on Mars and what the planet is like. (10.1, 10.5) **K/U** **C**



Figure 1

28. Sending human beings into space is much more expensive than sending robots into space. Debate the pros and cons of human space travel with your classmates. Be sure to back up your opinion with facts. (10.1, 10.2, 10.3, 10.4 10.5) **C** **A**
29. Write a letter to one of the astronauts mentioned in this section asking some specific questions about what his or her space experience was like. (10.1) **C**
30. UNISPACE is devoted to using space technology for peaceful means for the benefit of all humanity. Brainstorm ways in which space technology could be used to help people and encourage cooperation between people on planet Earth. (10.3) **A**
31. Suggest an experiment to be performed on the next space shuttle mission into space. Be sure to explain why you think this experiment is important and what you hope to achieve. (10.1, 10.3) **C** **A**

Reflect On Your Learning

32. What information from this chapter did you already know before you studied the content? How has your knowledge of this topic changed in the last couple of weeks? **C**
33. Name something that you learned in this chapter that changed the way you think about space or space exploration. Explain how it changed your thinking or understanding. **C**
34. Which topic in this chapter did you find particularly difficult to understand? Come up with two strategies to help you understand this topic before the next test or exam. **T/I**

Web Connections



35. The Mars Society is an organization that supports the idea of human beings living and working on Mars. Their mandate is “to further the goal of the exploration and settlement of the Red Planet.” Do you think humans should live on Mars? Support your decision with research. **T/I** **A**
36. Research Galileo’s contributions to developing telescope technology. How is the work that Galileo performed a product of the country and time period in which he lived? (10.1) **T/I** **A**
37. Space suits are a marvel of modern technology and are very carefully and intricately designed. Research the characteristics and design of space suits and how much they cost to develop. Summarize your findings in a brochure or poster. (10.2) **T/I** **A** **C**



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