CHAPTER at a glance

Now that you have completed this chapter, try to do the following. If you cannot, go back to the sections indicated.

(a) Define an extreme environment. (7.1)

(b) Explain what explorers need to survive in an extreme environment. (7.1)

(c) Draw an example of a life-support system. (7.1)

(d) Draw a variety of Aboriginal technologies that have been used for exploration. (7.1)

(e) Explain how the atmosphere affects our view of objects in space. (7.2)

(f) Use the example of a ball to help you explain gravity. (7.2)

(g) Draw a labelled diagram of the solar system. (7.2)

(h) Describe the different parts of the Sun. (7.2)

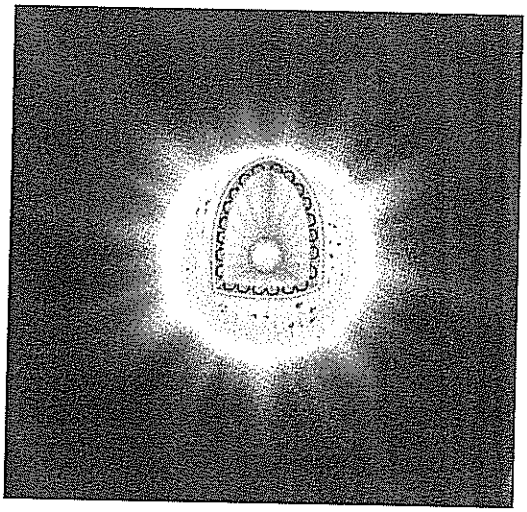
(i) Describe the different parts of a rocket and explain the role each plays. (7.3)

(j) Use the example of a ball and a skateboard to help you explain the action-reaction principle. (7.3)

(k) Use the example of a ball to help you explain how Earth's gravity keeps a spacecraft in orbit. (7.3)

(l) Describe some of the extreme conditions that astronauts experience while in space. (7.3)

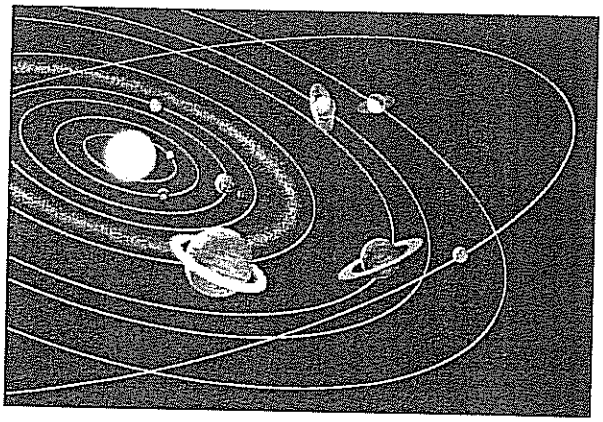
(m) Explain why exploring our solar system can help us understand more about Earth. (7.3)



Prepare Your Own Summary

Summarize this chapter by doing one of the following. Use a graphic organizer (such as a concept map), produce a poster, or write a summary to include the key chapter ideas. Here are a few ideas to use as a guide:

- Write a plan for exploring an extreme environment. Include the technology you would need, and the conditions you would face.
- Create a skit to show how astronauts work in space. Include a description of their life-support systems.
- Draw a poster to show the different parts of a rocket. Show how it reaches its orbit and how it can travel in a vacuum.



7 Review

Key Terms

environment
extreme
technology
exploration
astronaut
life-support
recycling
telescope
atmosphere
orbit
gravity
Sun
solar system
rocket
thrust
payload
stage
booster rockets
vacuum
airlock
microgravity
electromagnetic waves

Reviewing Key Terms

If you need to review, the section numbers show you where these terms were introduced.

1. Describe the difference between:
   (a) life-support and recycling (7.1)
   (b) atmosphere and planet (7.2)
   (c) thrust and payload (7.3)

Understanding Key Ideas

2. Why do you think space is called an extreme environment? (7.1)

3. **(a)** How is gravity related to mass?
   (b) How is gravity related to distance? (7.2)

4. Explain why astronauts experience the sensation of weightlessness in space. (7.2)

5. Describe how astronauts in a spacecraft communicate with scientists on Earth. (7.3)

6. Why would you need to enter an airlock before going from a spacecraft into space? (7.3)

Developing Skills

7. Describe two difficulties that a student could face creating a scale model of the solar system.

8. Draw a circle to represent the Sun. Draw and label the following:
   (a) a solar flare
   (b) corona
   (c) core
   (d) a sunspot

9. **(a)** Draw an example of an Aboriginal technology used for exploring an extreme environment.
   (b) Explain the key advantages of this technology.

Problem Solving

10. Choose an extreme environment other than space. Design a life-support system for an explorer working in the environment. Label your design.

11. Astronauts use spacesuits to allow them to work in space.
    (a) In what other extreme environments could spacesuits be used to help people explore?
    (b) Explain the advantages and disadvantages of using a spacesuit in each of the extreme environments you identify.

Critical Thinking

12. To live on Mars, we would have to deal with the thin atmosphere, lack of water, and cold temperatures. Suggest or draw a solution for each problem.

13. **(a)** What would happen to your mass if you went to Mars?
(b) Why?

14. The picture below shows the inside of a spacecraft orbiting Earth. Could the dog do this? Explain.

15. Why do objects float around in a spacecraft orbiting Earth even though they are not weightless?

16. If a malfunction occurs in *Voyager 1*, why would it not be known until after almost one full day?

17. **(a)** What are some advantages of space travel over using telescopes to explore the solar system?
(b) What are some disadvantages?

Pause & Reflect

Go back to the beginning of this chapter on page 186 and check your answers to the Getting Ready questions. How has your thinking changed? How would you answer these questions now that you have investigated the topics in this chapter?