Chapter 8 Review

Make Your Own Summary

Summarize the key concepts of this chapter using a graphic organizer. The Chapter Summary on the previous page will help you identify the key concepts. Refer to Study Toolkit 4 on pages 566–567 to help you decide which graphic organizer to use.

Reviewing Key Terms

1. Light from a star is a form of _____ _____. (8.1)

2. _____ telescopes use mirrors to collect light, and _____ telescopes use lenses to collect light. (8.1)

3. Once a _____ reaches a temperature of 10 000 000°C, the process of _____ _____ begins. (8.2)

4. _____ are dark areas on the Sun's surface. (8.2)

5. The Sun is located in the band of stars called the _____ _____ in a _____ _____ diagram. (8.3)

6. After the Sun becomes a red giant, it will contract and eventually become a _____ _____. (8.4)

7. A massive star will end up as either a _____ _____ or a _____ _____, depending on the star's initial mass. (8.4)

Knowledge and Understanding K/U

8. How have partnerships between the Canadian government and Canadian businesses contributed to the development of technology used in space research and exploration?

9. Describe how an event on the Sun can affect Earth. Use an example in your answer.

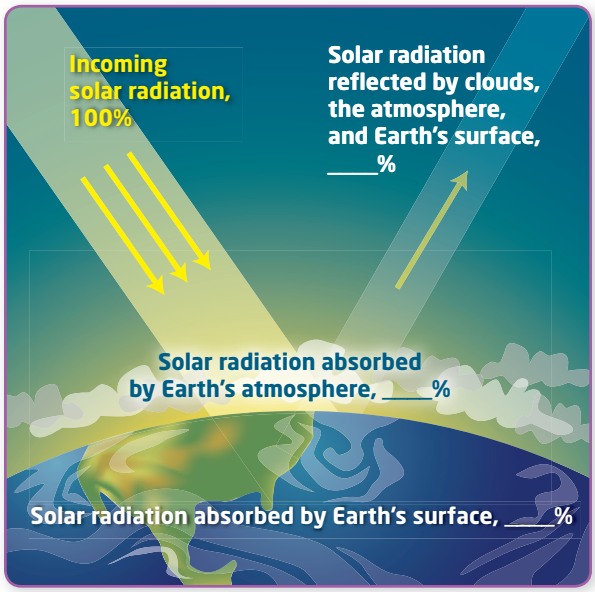
10. To answer these questions, refer to **Figure 8.15**, which shows some Canadian contributions to the International Space Station.

a. Give an example of a hazard that humans face when they are in space.

b. What technology was developed in response to the hazard in part (a)?

11. Describe how the Sun is necessary for life as we know it.

12. Copy the figure below into your notebook, and fill in the three missing percentages.



This diagram shows what happens to solar radiation when it reaches Earth.

13. Explain why the Sun is about 30 percent larger today than about five billion years ago.

14. Solar flares are associated with what features on the Sun's photosphere?

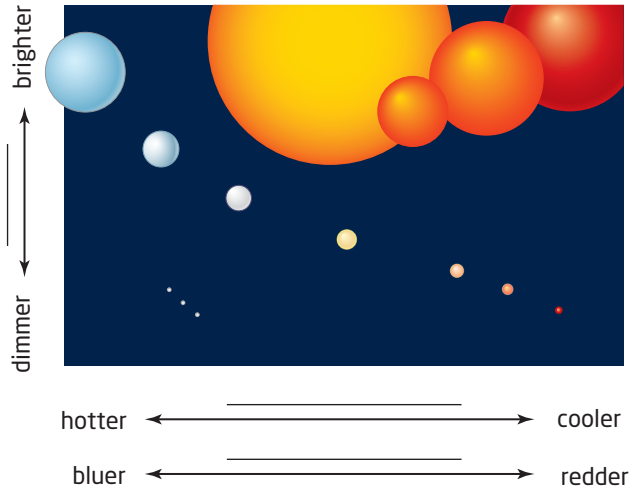
15. What evidence is there that the Sun rotates?

16. Describe how a star's spectrum is useful.

17. In a graphic organizer of your choice, list the evidence that supports the solar nebula theory.

18. Using the information in **Table 8.2**, compare and contrast MOST and the Hubble Space Telescope. Use a comparison strategy of your choice.

19. Create a Hertzsprung–Russell diagram like the one below in your notebook. Label the diagram with the following terms: main sequence, red giants, supergiants, and white dwarfs. Also, label the axes with the missing words.



A Hertzsprung–Russell diagram

Thinking and Investigation T/I

20. To launch humans into space requires very specialized systems. List the essential systems that aerospace engineers must include in a spacecraft to support humans in space, but that would not normally be needed for unpiloted spacecraft.

21. Why are white dwarfs hot as well as dim?

22. It is a common misconception that if a star turns into a black hole, the newly formed black hole will begin to gobble up everything around it. Explain why this assumption is false.

23. Why do you think the MOST satellite is called "Canada's Humble Space Telescope"?

Communication C

24. BIG IDEAS People use observational evidence of the properties of the solar system and the universe to develop theories to explain their formation and evolution. Describe, using an example from this chapter, how astronomers use observational evidence to develop a theory to explain the formation of the solar system.

25. BIG IDEAS Space exploration has generated valuable knowledge but at enormous cost. In this chapter, you learned about some of the risks associated with space exploration as well as some of the knowledge gained. Express your opinion on the pros and cons of space exploration in an e-mail to a friend.

26. Review the issues in **Table 8.3**. Take a position on whether you think it is ethical to send people to Mars. State your position in writing, and support it with your reasons.

27. Describe the important stages of a star's life. Use any method of presentation you wish.

Application A

28. In what ways do satellites benefit your life and the lives of your family and friends?

29. The Canadarm is an essential component of both the space shuttle system and the International Space Station. Research the Canadarm by visiting the Canadian Space Agency's website. Identify one medical benefit that has resulted from the development of Canadarm technology.

30. Robots on other planets can be controlled from Earth, but it takes several minutes for the instruction to reach the robot because of the vast distances between planets.

a. A camera on a Mars rover detects a hole directly in its path 100 m ahead (the length of a football field). Mars is located relative to Earth such that the signal takes 20 min to get to Earth. The technician on Earth sends a "stop" command. If the rover travels at 10 cm/s, will it stop before the hole? What is the maximum safe speed for the rover to operate to avoid missing the hole? (**Hint:** $v = d/t$, where v is speed, d is distance, and t is time.)

b. Suggest a way in which the risk to rovers on distant planets might be minimized.