Name: Class:

Student book questions

Review 6

Pages 152–153

Remember and understand

1 Match each word in the left column with its correct meaning in the right column.

1	Sun	A	groups of stars that are close together in the sky
2	galaxy	B	theory of the creation of the universe in a huge explosion-like event
3	star chart	C	everything that exists in space
4	constellation	D	huge collection of stars held together by gravity
5	universe	E	used to locate and identify objects in the night sky
6	Big Bang	F	our closest star

2 What is the main difference between astronomy and astrology?

3 What are scientists Penzias and Wilson famous for discovering?

4 Decide whether the following statements are true or false.

a All stars are yellow and very hot.

b All galaxies are the same shape and size.

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c The brightness of a star when viewed from the Earth is its absolute magnitude.

d Bigger stars are usually hotter, brighter and burn for longer than smaller stars.

5 Why are light-years used instead of kilometres as a unit of distance?

6 Explain why it is difficult to judge the distance of a star by measuring only its brightness.

7 How does the night sky enable us to look back in time?

8 List the following in order of size from largest to smallest: neutron star, the Sun, white dwarf, red giant.

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9 State two differences between a white dwarf and a red giant.

10 Explain why the ASKAP is an important tool for astronomers.

Apply and analyse

11 Briefly describe the Doppler effect.

12 What was the link between Hubble's observations and the Doppler effect?

13 Why can't you see stars (apart from the Sun) during the day?

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14 Draw a diagram to show why different stars are visible from different places on the Earth's surface.

Evaluate and create

15 Many ancient cultures had legends about the origin of constellations. Investigate Koori, Polynesian or Ancient Greek legends about constellations. Do these legends still influence how we view and understand the constellations today?

16 a How does the pitch of an ambulance siren change as it races past you?

b Why does this change occur?

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c Would the driver of the ambulance hear this change?

17 If the Sun is 149 600 000 km from the Earth and light travels at 300 000 km/s, calculate how long it takes for light to reach us from the Sun. Express your answer in minutes.

18 How many kilometres from the Earth is each of these celestial objects?

a Star Altair at 16.7 light-years

b Coalsack nebula at 600 light-years

c Jewelbox star cluster at 7600 light-years

19 If the speed of light is 300 000 km/s, what distance does light travel in:

a 1 second?

b 1 minute?

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c 1 hour?

d 1 day?

20 Why don't we use light-years for measuring distances within our solar system?

Critical and creative thinking

21 Create a poster showing the fate of the Sun as it expands from its current size into a red giant and then as it contracts into a white dwarf. Label each stage and find photos from the Internet to illustrate the process. View a space movie. What is its plot? Create a poster showing what things in the movie are scientifically correct and what things are not.

22 On 27 September 2007 the space probe Dawn was launched from Cape Canaveral at a cost of US$357 million, excluding the cost of the rocket (Figure 6.20). Dawn's 4.8 billion kilometre 8-year journey included exploration of the asteroid Vesta in 2011 and the dwarf planet Ceres, between Mars and Jupiter, in 2015. Humans hunger for knowledge. But does this knowledge enhance our civilisation? And is space exploration vital to our survival?

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23 Watch the movie *Interstellar* and research how the discovery of gravitational waves would help us to understand the nature of dark energy which is causing the Universe's expansion to accelerate. Have a class discussion about this.

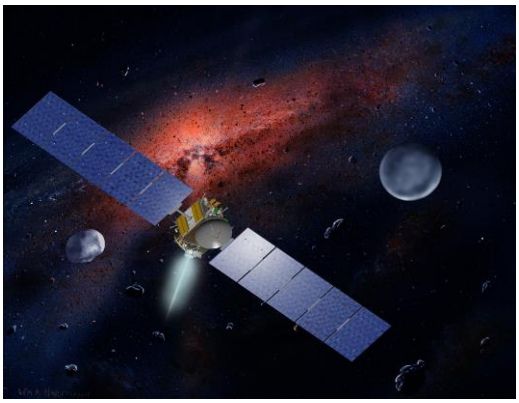

Figure 6.20 The Dawn space probe is on an 8-year interplanetary cruise.

Figure 6.21 Photo of the Overseas Telecommunications Dish at the WA Carnavon Space and Technology Museum that facilitated in putting Astronaut Gernan on the moon as part of the Apollo 17 mission.

Research

24 Choose one of the following topics for a research project. Present your report in a format of your own choosing.

Dark matter

Scientists think that there is extra matter in the universe that is invisible. This is called dark matter. What is the difference between ordinary matter and dark matter? What evidence do scientists have for the existence of dark matter? What is the composition of dark matter? Scientists believe that the universe started from the Big Bang and that it will expand before gravitational forces pull it back in to start the entire process all over again. What effect does dark matter have on the future of our universe?

Ion propulsion

The engines on some spacecraft use a unique, hyper-efficient system called ion propulsion. What is an ion? Can such an engine lift a spaceship from the Earth's surface? Why? What is the fuel used? How does this fuel produce thrust? Why are large solar collectors necessary? What is the thrust produced by the engines?

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Australian observatories

The Parkes Radio Telescope is a well-known Australian telescope. Find out a brief history of this telescope and what it is used for. The movie *The Dish* might be helpful in your research.

Australian scientist

Australian scientist Penny Sackett has lead teams of scientists in researching the exoplanets similar to earth. What is an exoplanet? How do astronomers search for them?

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