Before-reading questions

1 Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune
2 *Reader's own answer.*
3 *Reader's own answer.*
4 *Reader's own answer.*
5 *Reader's own answer.*
6 *Reader's own answer.*

During-reading questions

CHAPTER ONE

1 They believed that the Earth was at the centre of the Universe, and that the planets, the Sun and the stars were all quite near to each other.
2 The "Big Bang" is when matter was very hot and close together and started to expand. It happened about 13.8 billion years ago.

CHAPTER TWO

1 He developed laws about motion and gravity.
2 He discovered that nothing could travel faster than the speed of light.

CHAPTER THREE

1 The Sun lights them up.
2 Pluto is a dwarf planet because it has many rocks and other matter in its orbit.
3 Exoplanets are planets that orbit stars different from our Sun.

CHAPTER FOUR

1 ***Model answer***: Plants, animals and humans need carbon, water, amino acids, the right temperature and gravity.
2 The Goldilocks Zone is an area in a solar system that is just right for life.

CHAPTER FIVE

1 Venus
2 Jupiter and Saturn

CHAPTER SIX

1 The Universe is made up of 5% atoms, 27% dark matter and 68% dark energy.
2 You could find a black hole by seeing the way its gravity pulled things around it.

CHAPTER SEVEN

1 ***Model answer***: It could have two round, but not solid, mouths which could take us from one place to another place in the Universe. It could do this through a tunnel which has four or more dimensions.
2 "Time dilation" helps us to understand how time can pass more slowly in a fast-moving spaceship than it does back on the Earth.

CHAPTER EIGHT

1 Satellites are used for television, mobile phones and the internet. They can study the atmosphere and help us to understand the weather.
2 Space probes can travel further and faster than spaceships with people on them. They do not need as much energy, and they do not need to be as big. It costs less to send them into space, and nobody dies if there is a problem on a probe.

CHAPTER NINE

1 Russian astronaut Yuri Gagarin was the first human in space. He orbited the Earth on 12th April 1961 in the spacecraft Vostok I.
2 The "Overview Effect" is how astronauts feel when they see the Earth from space and realize just how small and in danger it is.

CHAPTER TEN

1 Because it would take a long time to get to us, so it might be better to send a lot of information about themselves and their planet.

2 An asteroid could hit the Earth, or we could be burned by gamma rays from space.

After-reading questions

Reader's own answers.

Exercises

CHAPTER ONE

1 **1** c **2** g **3** h **4** b **5** a **6** e **7** f **8** d

CHAPTER TWO

2
1. Galileo Galilei was born near Pisa in Italy, **although** his family came from Florence.
2. He was studying to be a doctor **before** he changed to maths and philosophy.
3. **When** he was just eighteen, he watched a light high on the ceiling in Pisa Cathedral.
4. **According to** the story, Galileo climbed to the top of the tower and dropped stones from it.
5. Galileo developed a new telescope, **which** marked the true start of astronomy.
6. He saw four moons orbiting Jupiter, **so** he realized that not everything in the Solar System went around the Earth.

CHAPTERS THREE TO SIX

3
1. People used to **believe** that the Moon was a mirror, or a bowl of fire, and that it was magic.
2. Pluto used to **be** thought of as a planet, but it is now called a dwarf planet.
3. Astronomers can see where water used to **flow** on the planet Mars.
4. One theory about Saturn's rings is that they came from a moon that the planet used to **have**.
5. Titan's dense atmosphere is formed of gas, which may be like the Earth's atmosphere used to **be**.

CHAPTER FOUR

4 **1** f **2** e **3** a **4** c **5** b **6** d

CHAPTER FIVE

5
1. Mercury turns very slowly on its **axis**; each day lasts 59 Earth-days.
2. The heat on Venus's surface cannot escape because its atmosphere experiences a **process** called the "greenhouse effect", with gases holding the heat in.
3. The **diameter** of Mars is 6,805 kilometres, and it has an iron core.
4. The famous Great Red Spot, a big red area that you can see on the **surface** of Jupiter, is actually a huge storm twice the size of the Earth.
5. Any life found in Europa's ocean would probably be more like **microbes** than fish.
6. Saturn is made of a hot core of rocks with a layer of **liquid** metal and gas around it.
7. Uranus has the coldest **atmosphere** of any planet in the Solar System, and an average surface temperature of −197.2°C.

CHAPTER SIX

6 The Universe should be expanding more [1]**slowly** because of all the things that are attracting each other and slowing them down in the process. But, in 1998, astronomers discovered that this idea was [2]**completely** wrong. They did this by using very strong telescopes to time-travel. Light takes time to travel across the Universe to us, so when we look at things far away, we see them as they were a long time ago and not as they are now. This is how astronomers discovered that the Universe was [3]**actually** expanding more [4]**quickly** now than in the past. Although we still do not [5]**really** understand dark energy and how it works, we know that we need to understand it.

CHAPTER SEVEN AND EIGHT

7
1 **make** energy/a hole in the ground/a sound
2 **take** photographs/a journey/us from place to place
3 **find** your way/people/some information
4 **talk** to aliens/to each other/to yourself
5 **check** the weather/how plants are growing/the time
6 **launch** a satellite/a rocket/a probe/a spaceship

CHAPTER NINE

8 Russian astronaut Yuri Gagarin [1]**orbited** the Earth on 12th April 1961 in the spacecraft Vostok I. Six weeks later, US President John F. Kennedy said that he wanted [2]**to land** a man on the Moon in less than 10 years. So, the newly-formed NASA started [3]**working** to send astronauts into space. At that time, NASA had only 16 minutes' experience of [4]**flying** in space, but now the race to be the first on the Moon [5]**had begun**! On 20th July 1969, the Americans [6]**reached** the Moon before the Russians.

CHAPTER TEN

9
1 The writer said that the distances in space were so great that we could not be sure that we would ever meet an alien in person.
2 The writer said that we could only really guess what aliens might say to us, but to hope that they would send a long message.
3 The writer said that if we did find alien life in the future, it could be very different from us.
4 The writer said that every few million years, Earth was hit by an asteroid or a comet, and the explosion was big enough to put life on Earth in danger.
5 The writer said that there were also fewer animals and plants on the Earth, as we had moved into the places where they lived and grew.
6 The writer said that we all needed to take time to learn about the causes of climate change and how it would affect our planet in the future.

ALL CHAPTERS

10 **1** h **2** f **3** a **4** c
5 b **6** e **7** d **8** g

Project work

Reader's own answers.