

4.1 The night sky

Learning objectives

After this topic you will be able to:

- describe the objects that you can see in the night sky
- describe the structure of the Universe.



▲ An astronaut on a spacewalk is building part of the ISS.

Foul Fact!

The odds of being killed by falling space debris are one in five billion.

Key Words

artificial satellite, orbit, Earth, Moon, natural satellite, planet, Sun, Solar System, comet, meteor, meteorite, star, galaxy, Milky Way, Universe, astronomer

When you look at the stars in the night sky you do not see them as they are today. The light from them has taken years to get here. You are looking back in time.

Satellites

The nearest objects that you can see without a telescope are **artificial satellites**. They **orbit** the **Earth**. You can see the International Space Station (ISS) with the naked eye (without using binoculars or a telescope). The light reflected from the ISS reaches us in a fraction of a second.

Light reflected from the **Moon** reaches us in just over a second. The Moon orbits the Earth. It is the Earth's only **natural satellite**.

A Name the natural satellite that orbits the Earth.

What is wandering across the sky?

There are five **planets** that most people can see with the naked eye: Mercury, Venus, Mars, Jupiter, and Saturn. Like the Earth they orbit the **Sun**. Venus gets closest to the Earth, about two light-minutes away. Light from Saturn takes about 1.5 hours. The planets form part of the **Solar System**.

B Name the planets that are visible to the naked eye.

Comets and meteors

A **comet** is one of the most spectacular sights in the night sky. They are huge snowballs that orbit the Sun.

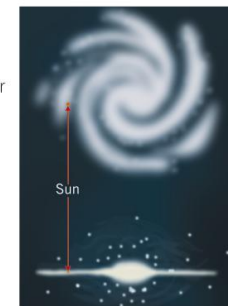
Meteors are bits of dust or rock that burn up as they move through the Earth's atmosphere and produce streaks of light. Any meteor that makes it to the ground is called a **meteorite**.

C Describe how the appearance of a comet is different to the appearance of a meteor.

Lights in the sky

Most of the dots of light that we see are **stars** in our **galaxy**, the **Milky Way**. A galaxy is a collection of stars and there are billions of stars in the Milky Way.

Light takes about eight minutes to get to us from the Sun, our nearest star. Our next nearest star is over four light-years away.



This shows our Sun in our galaxy, ► the Milky Way.

Some of the dots of light in the night sky are other galaxies. A galaxy contains billions of stars. The Milky Way is just one of billions of galaxies that make up the **Universe**. Our nearest large galaxy is Andromeda, which you can see with the naked eye. Light from Andromeda takes 2 million years to get to Earth.



◀ The Andromeda galaxy is the nearest large galaxy to us.

D State what is meant by a 'galaxy'.

How do we know?

Astronomers have learned about the objects that we see in the night sky from the observations they have made. You cannot do experiments in astronomy. Astronomers use models to work out what makes up the Solar System, the Milky Way, and the Universe.



▲ Comet Hale-Bopp was visible in the night sky in 1997.

Fantastic Fact!

All the elements that you are made of were made in the centre of stars in galaxies.

Summary Questions

- 1 🧪 Copy the sentences below, choosing the correct bold words. There are thousands of satellites in orbit around the **Sun/Earth**. The Moon is a natural satellite of the **Sun/Earth**. Comets are huge snowballs that orbit the **Sun/Earth**. Planets orbit the **Sun/Earth**. (4 marks)
- 2 🧪 Describe the difference between a meteor and a meteorite. (2 marks)
- 3 🧪 When you look up at the night sky you see dots of light that don't appear to move. List what the dots of light could be. (2 marks)
- 4 🧪 Compare the time it takes light to reach us from the different objects that you can see in the night sky. (6 marks)