Chapter 1

The Solar System

Look at the sky on a clear night and you will see thousands of stars. The Bible tells us that, "In the beginning God created the heaven and the earth" (Genesis 1:1). God created the universe. The **universe** is space and all the matter and energy in it. *Energy* is what is needed to cause change or to do work. Energy is needed on the earth. Earth is our home. It is a tiny piece in the universe. You see parts of the universe every time you look at the sky.

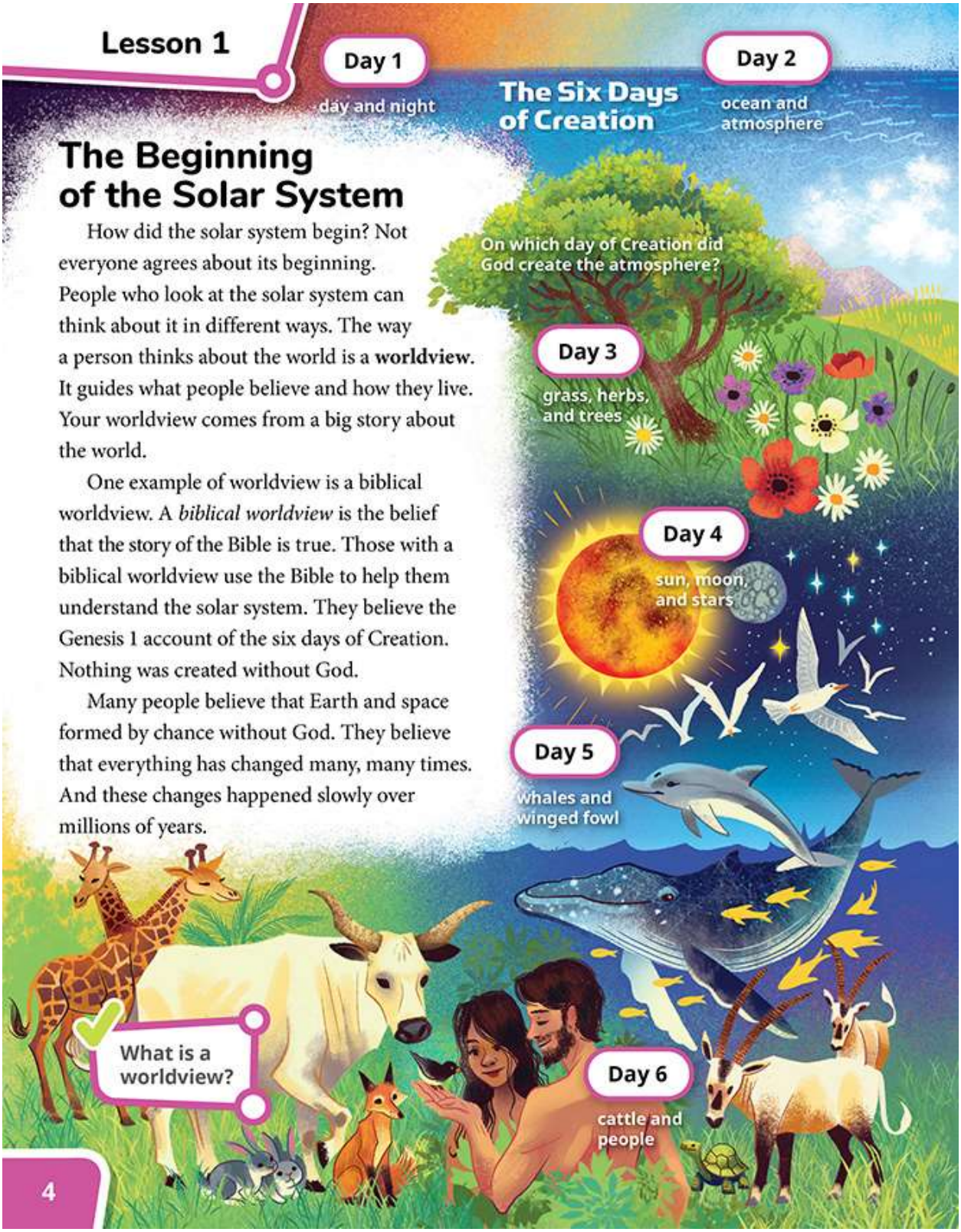
The layer of gases surrounding the earth is called the **atmosphere**. The heaven, or outer space, is everything beyond the earth's atmosphere. The sun and the objects that revolve around the sun are called the **solar system**.

The Beginning of the Solar System

How did the solar system begin? Not everyone agrees about its beginning. People who look at the solar system can think about it in different ways. The way a person thinks about the world is a **worldview**. It guides what people believe and how they live. Your worldview comes from a big story about the world.

One example of worldview is a biblical worldview. A *biblical worldview* is the belief that the story of the Bible is true. Those with a biblical worldview use the Bible to help them understand the solar system. They believe the Genesis 1 account of the six days of Creation. Nothing was created without God.

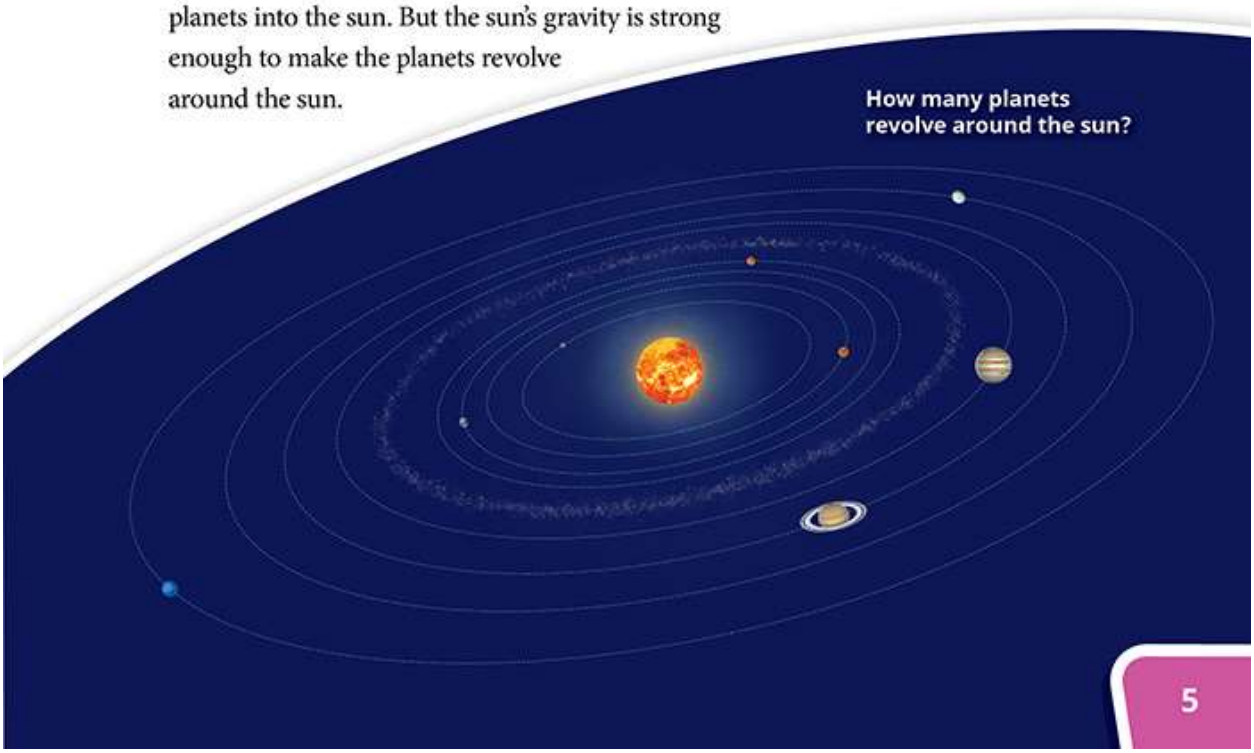
Many people believe that Earth and space formed by chance without God. They believe that everything has changed many, many times. And these changes happened slowly over millions of years.



Both worldviews look differently at the way objects move. Those with a biblical worldview believe that God created the movement of the objects around the sun. Those with a different worldview believe that this movement came about by chance. Your worldview should come from the Bible. The Bible is true and anything that disagrees with the Bible is false.

Gravity

One part of God's design, or plan, in the solar system is the force that He created. A *force* is a push or a pull. This force holds all things together. This force also keeps the solar system in order. This force is called *gravity*. The sun's gravity is stronger than the other objects in the solar system. A **planet** is a large ball of gas or rock that revolves around the sun. The planets revolve, or move, around the sun because of gravity. The sun is not strong enough to pull the planets into the sun. But the sun's gravity is strong enough to make the planets revolve around the sun.



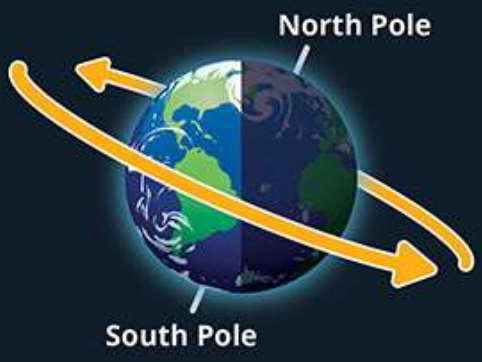
How many planets revolve around the sun?

Patterns in the Solar System

God designed the parts of the solar system to move in patterns. A **pattern** is a design or natural order that happens over and over again. One example of pattern is a revolution. A *revolution* is the motion of one object around another object. Earth and the other planets revolve around the sun. One complete revolution of any planet around the sun is called a year.

Another pattern makes the sun appear to rise in the east. Then the sun appears to move across the sky and set in the west. This pattern is called a rotation, or one spin. A *rotation* is when a planet turns on its axis one time. An **axis** is an imaginary line that runs through the center of a planet from the *North Pole* to the *South Pole*. One rotation of Earth is called a day. Every planet rotates on an axis and has days.

What is this pattern of Earth called?



What is the force that pulls the objects in the solar system toward the sun?

The Sun and Other Stars

A **star** is an object in space that produces its own heat and light energy. It is a ball of gas. At night you can usually see many dots of light in the sky. A few of them are planets. But most of the dots of light are stars.

The star in our solar system is called the sun. The sun is the largest object in our solar system. It looks bigger and brighter than any other star. This is because it is much closer to Earth than any other star. But compared with other stars in the universe, the sun is a medium-size star.

The sun is very important for Earth. It is Earth's main source of energy. The sun gives light and heat energy that are necessary for life on Earth. The sun gives light and heat during the day when the sun is shining on one part of Earth.

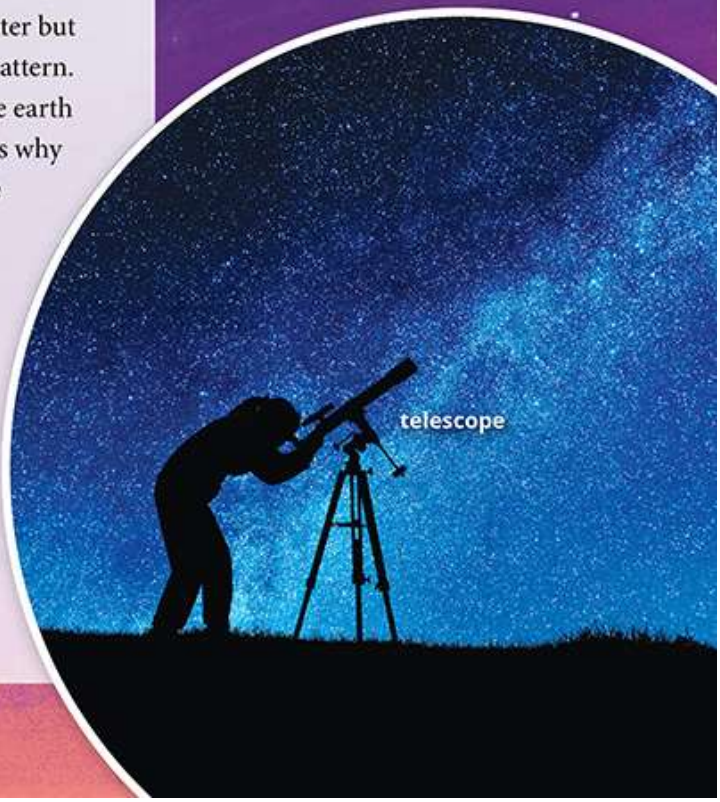
What is the main source of energy for Earth?

Observing Stars and Planets

All through history people have looked at the stars and observed patterns. Many of these patterns are constellations. A **constellation** is a group of stars that form a pattern or picture in one area of the sky. A constellation is similar to a dot-to-dot picture. A dot-to-dot picture connects dots with lines. The stars in a constellation are connected with imaginary lines. The stars and imaginary lines form the shape of an animal, person, or other object. You may have seen the Big Dipper. It looks like a large spoon with a long handle. Its pattern is part of a larger constellation called Ursa Major. The name Ursa Major means "Great Bear."

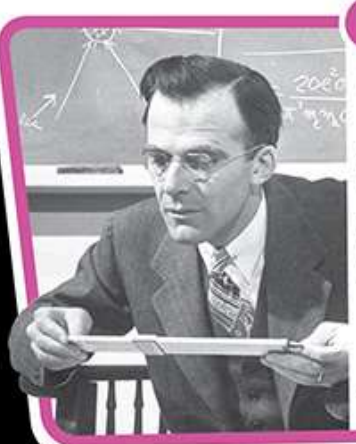
Our view of outer space changes as the earth revolves around the sun. Some constellations can be observed in the sky in the winter but not in the spring. This is a seasonal pattern. Seasonal patterns happen because the earth changes location as it revolves. This is why some constellations cannot always be seen.

People have been studying the stars since ancient times. Scientists who study the stars, planets, and moons are called **astronomers**. In 1610 an astronomer named Galileo used a telescope for the first time to look at the night sky. He saw stars that no one had seen before. A **telescope** is a tool used to see objects that are far away.



Telescopes are still used today. We can use them to study objects in space. Most telescopes are long tubes with curved pieces of glass and mirrors inside. The glass and mirrors make faraway objects appear closer. Astronomers use telescopes to learn many things about the planets and stars. They do not look at the sun, though, because it is too bright. Computers record data from telescopes. **Data** is information or facts collected by making observations. The data helps astronomers learn about the universe.

Meet the Scientist



Lyman Spitzer, Jr.

In 1946 Lyman Spitzer Jr. (1914–1997) suggested putting a telescope in space. He thought a telescope above Earth's atmosphere would get better images. Spitzer worked on the first space telescope for more than 15 years. It is called the Hubble Space Telescope. In 1990 the Hubble Space Telescope was sent into space. Spitzer stayed active in astronomy until his death. In 2003 the new Spitzer Space Telescope was launched into space in his honor.

Hubble Space Telescope

Why can some constellations not be observed in the sky during all seasons?

Solar Mobile

Inquiry Skills

- Classify
- Communicate

Cameras have been used to take pictures of the planets from space. These pictures were taken by manned and unmanned spacecraft. These pictures show what the planets look like close up. The planets are very far away from each other. Scientists have used the pictures of the planets to find out how the planets revolve around the sun. Scientists have made models to show what the planets look like in their orbits, or paths, around the sun.

In this Exploration, you will make a model of the planets in the solar system. You will put the planets in the same order that they revolve around the sun.