

SKY WATCHING

When we sky watch, we look at everything above Earth. This includes what is in Earth's **atmosphere** and the objects we can see beyond it, in **space**.

Why do we sky watch?

Sky watching helps us to understand more about Earth's place in space. Earth is our home. It is also a planet that is part of a space neighbourhood called the **solar system**. When we sky watch we learn about Earth, and our neighbours inside and outside the solar system.

What objects are in the sky?

There are thousands of objects in the sky above Earth. These are Earth's neighbours – the Sun, the Moon, planets, stars and flying space rocks (**comets, asteroids** and **meteoroids**). Some can be seen at night and others can be seen during the day. Although some are visible with the human eye, all objects must be viewed through a telescope to be seen more clearly.

When and how can we see objects in the sky?

Object in the sky	Visible with the human eye 	Visible only through a telescope 	Visible during the day 	Visible at night 
 Earth's atmosphere	X	X	X	X
 Sun	✓ (Do not view directly)	X (View only with a special telescope)	✓	X
 Moon	✓	X	Sometimes	✓
 Planets	Sometimes	Sometimes	Sometimes	✓
 Stars	Sometimes	Sometimes	X	✓
 Comets	Sometimes	Sometimes	X	✓
 Asteroids	Sometimes	Sometimes	X	✓
 Meteoroids	Sometimes	Sometimes	X	✓

WHAT DOES IT MEAN



space the area in which the solar system, stars and galaxies exist, also known as the universe

EARTH'S ATMOSPHERE

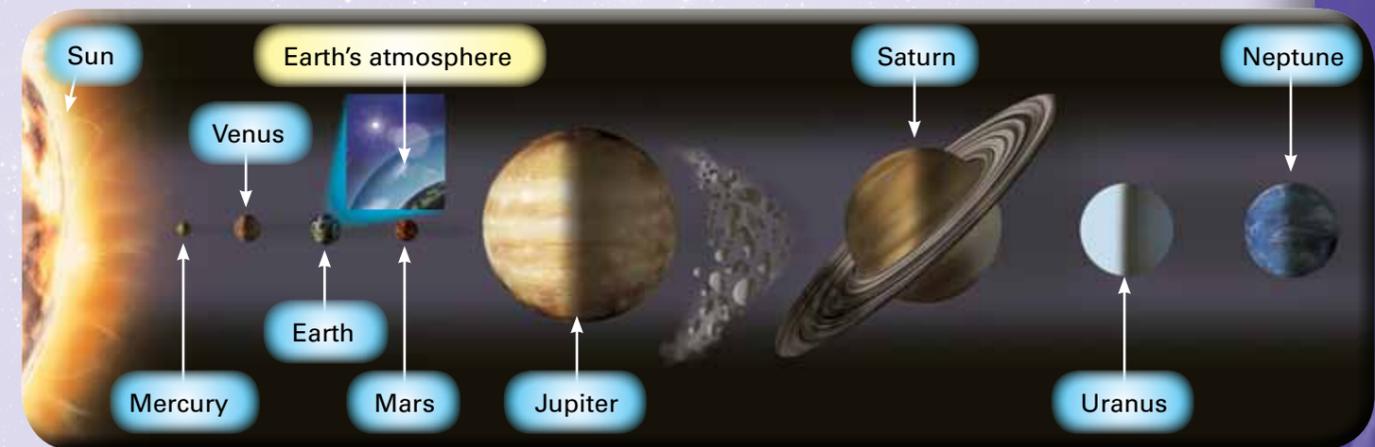
The atmosphere around Earth is invisible. However, we can see **matter**, such as dust and water, in the atmosphere. We can also feel the temperature and movement of the air.

Watching the atmosphere

Humans have always watched the skies. Only 300 years ago, scientists discovered that the air around them and the skies just above were all part of the atmosphere. Thanks to more discoveries, we now know what the atmosphere is made of, what kind of matter and objects exist in it, and what it does for Earth.



 Sky watching can be done during the day or night, with or without a telescope. Just look up!



 Earth's atmosphere is the area that lies between Earth and space. This diagram shows the approximate relative sizes of the Sun and the planets. The distances between them are not to scale.

WHAT IS EARTH'S ATMOSPHERE?

The **atmosphere** is made up of layers of **gases** that surround Earth. It formed billions of years ago. The atmosphere acts like a blanket that protects Earth from the dangers of **space**. It helps to create the right conditions for life.

The atmosphere is like a blanket around Earth

The atmosphere is made up of five layers of gases that stretch more than 500 kilometres into space. These layers act like a blanket wrapped around Earth. They keep the planet warm and protect it from the Sun's strong rays. Conditions within the atmosphere provide the air and water that allows life to exist on Earth.

V Earth's atmosphere acts like a blanket, and protects the planet from the harsh Sun and many collisions with space rocks.

Distance to nearest space object (the Moon): 384 400 kilometres

Depth of the atmosphere: 500–1000 km above Earth

Earth

Atmosphere fact

The word 'atmosphere' comes from two ancient words. The Greek *atmos*, which means vapour, or mist, and the Latin *sphaera*, which means sphere, or ball.

The atmosphere was formed billions of years ago

The atmosphere was first formed about 3.8 billion years ago. It was made by gases that were given off by volcanoes on Earth's surface. About 2.7 billion years ago, the first plants began to grow. They made a gas called **oxygen**. Oxygen mixed with the other gases to make air.

Between 3 and 4 billion years ago, volcanoes gave off gases that formed an atmosphere around Earth.

Between 1 and 2 billion years ago, plant life began to grow and give off oxygen.



When plants added oxygen to Earth's atmosphere it made the air breathable for animals and humans.

FAMOUS SKY WATCHERS



Carl Wilhelm Scheele, a Swedish chemist, became the first to discover the gas oxygen in the air in 1774. He called it 'fire air'. In 1777 Antoine Lavoisier, a French chemist, gave it the name oxygen.

WHAT DOES IT MEAN



oxygen an invisible gas produced by plants that makes up about 20 per cent of the Earth's atmosphere and makes air breathable

WHAT DOES EARTH'S ATMOSPHERE LOOK LIKE?

From Earth, the **atmosphere**, which includes the air around us, is **invisible**. However, we can see **matter** and objects in the atmosphere, and we see the daytime sky as blue.

The atmosphere is invisible, but ...

Although the **gases** in the atmosphere are invisible, **water vapour**, smoke and dust carried in the air are not invisible. We can see clouds and weather activity, such as rain, snow and lightning, in the atmosphere. We can also see and feel the effects of wind, and feel the temperature of the air.

Atmosphere fact

Scientists use balloons to find out about the atmosphere. They have equipment that can measure wind speed and temperature, and take samples of the different parts of the atmosphere. This helps them to understand what it is made up of.

 Wind, temperature and clouds are all part of weather activity that happens in the atmosphere and affects Earth.

Clouds are made up of water vapour.

The temperature affects all life on Earth.

Wind affects trees and other objects.

WHAT DOES IT MEAN 

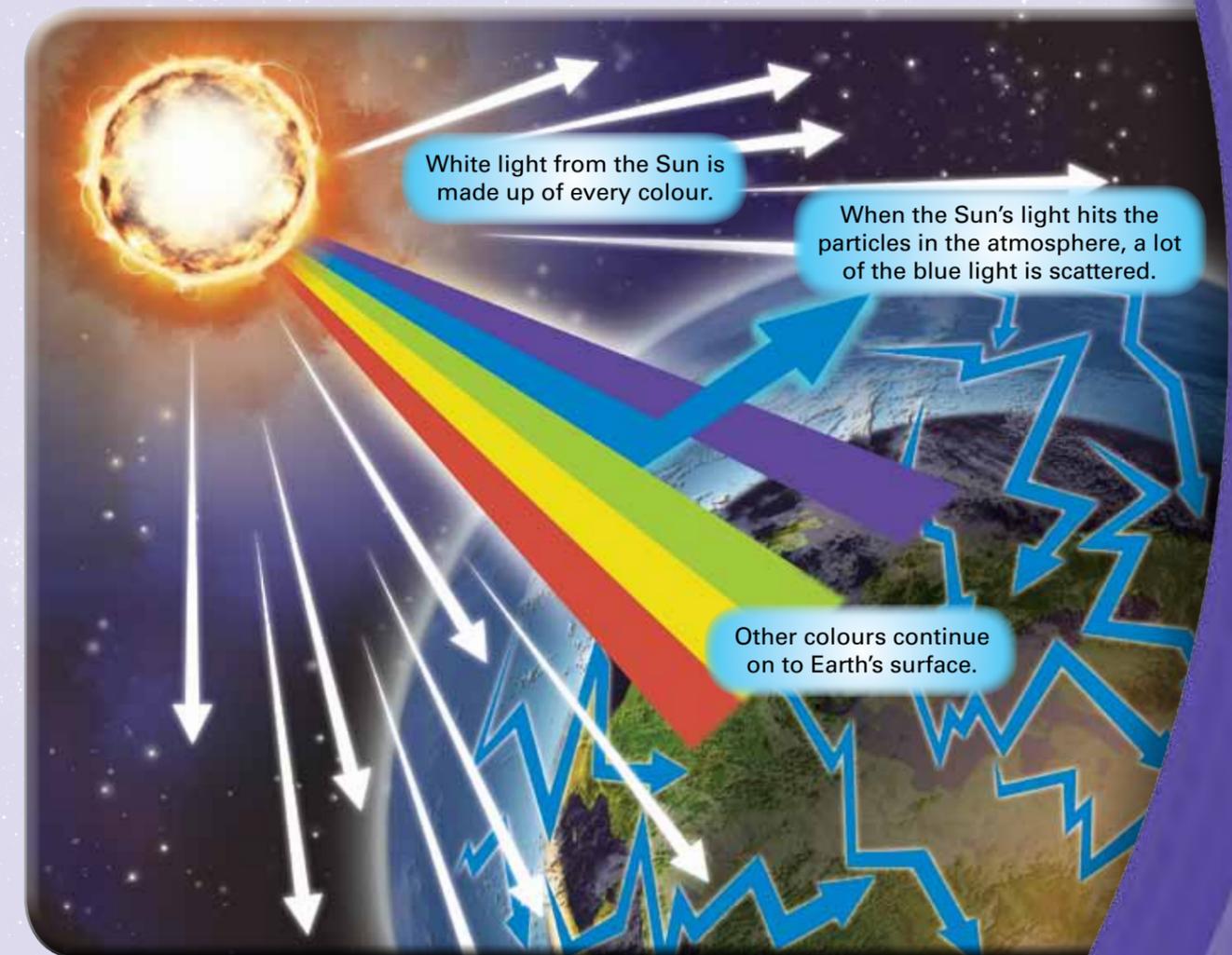
water vapour tiny particles of water that are no longer a liquid and can be carried in the air

The atmosphere makes the sky look blue

If we were in **space**, the sky would look black during the day. On Earth, the sky looks blue. This is because of Earth's atmosphere.

The atmosphere scatters blue light

The Sun's light seems white, but it is really made up of every colour. When this light shines on Earth, most colours reach the surface without stopping. However, blue light has a short **wavelength** that causes it to bump into **particles** in the atmosphere. When the blue light hits these particles, it scatters in different directions rather than going straight to Earth's surface. The sky looks blue because when we look up, we see all of the blue light that has been scattered.



 The scattering of blue light in Earth's atmosphere is called Rayleigh scattering.