

# Space and the Solar System

## Teacher's topic guide

### God is Creator (Creation Day 4) Year 8

#### Spiritual Awareness

God has placed the stars, planets and their moons in place. He upholds them by His power. He has created the gravitational systems that cause our times and seasons.

#### Values: Our response to 'God is Creator'

- **Thankfulness** to God for His supernatural ability to create and provide the things we need to live.
- **Trust** in a mighty, supernatural God. Recognize that He is in control of all He has made.
- **Stewardship**: showing care for the universe He has created.
- Appreciation of the vastness of the universe yet God's concern for individuals

#### Outcomes: Students will

- Understand our place in space.
- Explain what a solar system is.
- Compare our planet with other planets.
- Understand the difference between a stars and planets, moons, comets and meteors.
- Explain the cause of day and night, times and seasons. To understand the main characteristics of the sun and its importance to earth.
- Understand the phases of the moon and its effect upon tides.
- Explain the effect of the earth's tilt.
- Explain the main characteristics of the planets in our solar system.
- Explain the effects of an eclipse.
- Define galaxies, constellations and stars, and find examples in the night sky.
- Investigate the position and movement of planets in our solar system.
- Construct and use a range of representations, including tables and graphs, to represent and describe observations.

#### Bible stories and passages

Genesis 1 - The Creation

Joshua 10 - The day the sun stood still.

Psalms 136:1-9 - Give thanks for His great creation.

Isaiah 40:25-26 - The greatness of the stars.

Matthew 27:45 – Evidence of a total eclipse on the day Jesus died

#### Bible Verses

Psalms 19:1 The heavens declare the glory of God; the skies proclaim the work of his hands.

Psalms 74:16-17 - You established the sun and the moon; it was You who set all the boundaries of the earth; You made both summer and winter.

Psalms 104:19 - The moon marks off the seasons and the sun knows where to go down.

Psalms 102:25 - In the beginning you laid the foundations of the earth and the heavens are the work of your hands.

Psalms 8:3-4 - When I look at the sky which You have made, and the moon and stars which You set in their places – what is man that You could think of him and care for him?

Psalms 113: 3 From the rising of the sun to the place where it sets, the name of the LORD is to be praised.

## Key Questions

What does the greatness of the universe show us about God?

How great is God's love?

Is the Earth a special planet?

What has God provided for us in the creation of the solar system?

What does such a great and mighty God think about me?

## Activities

- Draw a diagram of our solar system and name the planets.
- Write 3 or 4 facts about each planet.
- Write a list of all the things that have been given to our planet to sustain life.
- Set up a model using a light globe and a ball to show the way in which the earth rotates on its axis, experiencing day and night.
- Use the model to show the earth's revolution around the sun.
- Make a 3D model of the solar system.
- Find our place on a rotating earth model.
- Make a shadow stick and chart the position of the sun during the day and explain why the sun rises and sets. Record results of observations in table form.
- Observe and record geographical position of sunrise and sunset.
- Record times of sunrise and sunset over a month. Graph results.
- Experiment with a mirror and an electric light bulb to show how the moon reflects the sun's light.
- Chart the phases of the moon.
- Graph the times of high and low tide over a month. Explain the relationship between tides and the moon's gravitational pull.
- Make a model which illustrates how an eclipse occurs.
- Describe the experiences of astronauts and their space voyages.
- Design and make a rocket.
- Recognize and name the phases of the moon. Keep an observation chart.
- Find out relative distances of planets from sun and show in diagram form.
- Make a star map and learn to recognize the main constellations.
- Make a report on the conditions of each planet in the solar system and explain why the Earth is perfectly suited to living things.
- Study Galileo's work with the telescope.

## Assessment

1. Write down ten interesting questions about the solar system and give researched answers for four of them.
2. What have I learned from the study of the solar system...
  - about God?
  - about doing what God wants me to do?
  - about the Bible?

## Learning Connections

**English:** Research space exploration, moon missions, the role of astronauts, dangers faced and reports of God's protection, e.g. Apollo 11.

**Health:** Sun benefits to health and sun safety

**Thinking skills:** Solar System; Creation

**Beacon Media research cards:** Space, Creation

**Biography:** James Irwin

# Values education Year 8

## God is Pure and Holy

### Respect

God wants us to show consideration for people and our environment.

#### Respect for people...

- having consideration for the feelings and rights of others
- treating people with care and consideration
- showing good manners
- honouring the rules of my family, school and church

#### Respect for our environment...

- treating property in our community with respect
- caring for the natural environment

#### Activities

1. Make a list of rules that would be important for families to get on together.
2. Which rules do you have in your family?
3. Choose one rule and say what might happen if this rule was not respected.
4. Now do the same for school rules.
5. Make a list of people you think are respectful and why you added them to your list.
6. Make a list of people you think should be respected.
7. What are three ways you can show your teacher respect?
8. What are three ways you can show your parents respect?
9. Make a list of things people say who are respectful. Here are a few: "please." "Thank you." "I appreciate that." "May I hold the door?" "Pardon me." "I'm sorry I offended you."
10. Make a list of things people do who are respectful. Here are a few: hold the door open for someone who needs help; listen without interrupting; don't talk back, whine, or sass; throw away trash.
11. List five ways we could show greater respect for our environment.
12. Describe a respectful way to answer the phone.
13. Suppose you're invited to your friend's home for a family dinner. What are some ways you could show respect and courtesy when your first arrive? At their table? When you leave? Write at least 50 words.

#### What does the Bible say about respect?

Ephesians 6:1 Children obey your parents in the Lord.

Matthew 7:12 Treat others as you would want to be treated yourself.

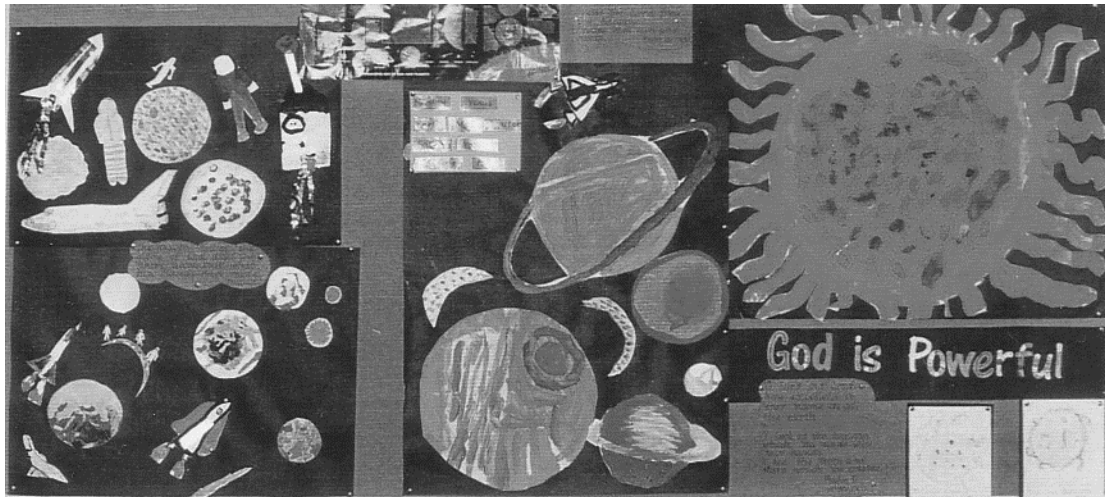
1 Peter 2:17 Show proper respect to everyone.

# Art Year 8

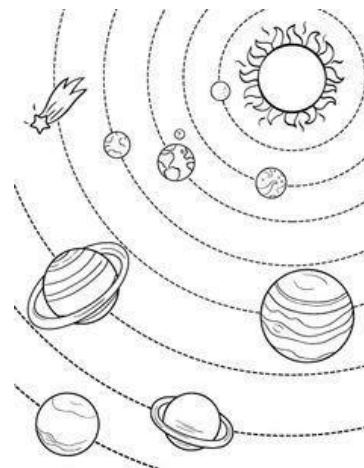
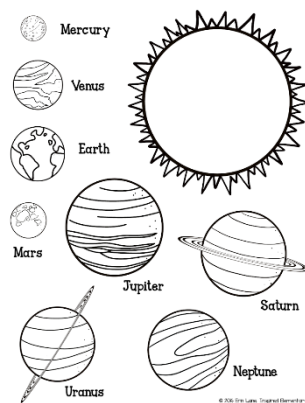
## God is Creator

### Space and the Solar System

**Biblical wall art and text:** The heavens declare the glory of God; the skies proclaim the work of his hands. Psalm 19:1



Use paint or 3D models to create images of our Solar System.



- Add sand or sawdust to paint to create a textured image or model of the surface of the moon.
- Make a poster of the phases of the moon.
- Paint scenes focusing on sunrise / sunset or a night sky
- Make a collage showing space rockets and capsules using coloured/white papers and aluminium foil on a dark background.

# Practical Science: Solar system / space and time

## Astronomy and football

[http://www.primaryscience.ie/media/pdfs/col/astronomy\\_and\\_football\\_activity.pdf](http://www.primaryscience.ie/media/pdfs/col/astronomy_and_football_activity.pdf)

### What you will need:

- Large beach ball, small pea, small seed (to represent the Sun, Earth and Moon).
- A football field
- Balls of various sizes to represent the different planets (an actual soccer would be good for one of the planets).
- If using Styrofoam balls the following are suggested size ratios:
- 1 = Mercury;  $1\frac{1}{4}$  = Mars;  $1\frac{1}{2}$  = Venus;  $1\frac{1}{2}$  = Earth; 2 = Neptune;  $2\frac{1}{2}$  = Uranus; 3 = Saturn; 4 = Jupiter; 6 = Sun.
- You could also use different fruits to represent the planets, e.g. melons, apples, grapes, etc.)

### Background information:

A football field can be used to compare distances in our Solar System. It should help towards some understanding of the vastness of our part of the Universe.

The planets orbit the sun in an elliptical path, so each planet has a maximum and a minimum distance from the sun. To help us get a realistic feel of sizes, a large beach ball can represent the Sun, a small pea the Earth, and a small seed the Moon.

Pluto was the smallest planet and one of the coldest places in our Solar System (minus 230°C!), but it is no longer classified as a planet. In 2006 it was re-classified as a 'dwarf planet'. So there are now officially 8 planets in the solar system rather than 9.

Because it is difficult to deal with distances of thousands of millions of kilometres, astronomers often use Astronomical Units (A.U.): they called the distance from Earth to the sun 1 A.U. Mars is just over one-and-a-half times further from the sun than the Earth, so its distance is called 1.52 A.U.

### Questions:

What is our planet called?

Where does the light and heat on Earth come from? (The sun)

Looking at the small pea (Earth) and large beach ball (the Sun) "How big is the Sun compared to the Earth?" (about 7000 times bigger!)

Why does the sun look so small to us? (Because it is so far away)

What would happen to you if you went close to the sun? (You would roast!)

Does the sun move? (No, the Earth revolves around the sun, once in a year).

### What to do:

1. On the 'football field' (whether a real one or just a large space in the school yard) place the sun on one goal-line, and Neptune on the other goal-line.
2. Place appropriately-sized balls or fruit in order from Mars to Jupiter.

# Practical Science: Solar system / space and time

## The moon, craters and meteorites

[http://www.primaryscience.ie/media/pdfs/col/meteorites\\_activity.pdf](http://www.primaryscience.ie/media/pdfs/col/meteorites_activity.pdf)

### What you will need:

- large tray (minimum 4 centimetres deep)
- flour or sand
- newspaper
- plasticine (or else different-sized spherical objects, e.g. marbles, balls, beads), drinking chocolate powder, metre stick
- cm rulers
- sieve

### Preparation

This activity may be best done outdoors as it is quite messy!

### Background information

The dark circles which you can see on the Moon (with your naked eye, or better with binoculars) are craters. A crater is a hollow on the surface of the Moon. These craters were formed when meteorites hit the Moon's surface. The impact of the meteorites caused the hollows to form and some of the surface to be thrown up and out around the crater. This is called *ejecta* (because it was ejected from the surface).

Meteorites are bits of rock in space.

### Questions

What is a crater? (Remind student of a crater being the hollow at the top of a volcano.)

Moon craters are very different. What do you think might have caused them?

What happens if you drop something heavy onto soft sand on the beach?

Is it the same as dropping something onto a wooden floor?

### What to do

Spread the newspaper onto the floor, put the tray on the newspaper and put some flour onto the tray, until it is about 5 or 6 centimetres deep. Make the flour as smooth as possible without packing it down. Hold the sieve over the flour and put some drinking chocolate into it and shake it until you get a thin brown layer on the flour.

Make different sized balls from plasticine (these are the 'meteorites').

1. Drop one ball and measure the diameter of the crater. Now drop the same ball from different heights; each time carefully remove the ball and measure the size of the crater. How do different heights change the size of the crater?
2. Drop different sized balls from the same height onto the flour. How do different balls change the size of the crater?
3. Does it make a difference if you measure to the furthest splash of flour from the impact? (Tip: the easiest way of measuring the diameter of the ball is to put a ruler

on either side of the ball and use another ruler to measure the distance between them).

4. Form conclusions about how to make craters of different sizes.

### **Safety**

Some flour may fly up when the balls are dropped from a height. The students should stay at a safe distance so the flour does not get into their eyes.

### **Follow-up activity**

Use 'meteorites' of different weight and note if there is any difference in the craters.

Throw the 'meteorites' (gently!) at different angles onto the flour and notice if the craters are any different shape.

Throw the 'meteorites' at different speeds to see if that makes any difference to the size of the crater.

What happens if we change the shape of the meteorite (easy if it is made of plasticine)?

What happens if the meteorite disintegrates on impact? Try mud balls instead of hard balls.

What happens if the surface is wet? Try dropping the meteorite onto dry, moist and wet surfaces.

# Practical Science: Solar system / Space and time

## The Tides

Why does the ocean have high and low tides?

### What you need:

- A bucket
- Plastic ball or balloon
- Water

### What to do:

1. Half fill the bucket with water.
2. Place the ball in the bucket so it is floating.
3. Place both hands onto the ball and push down very slowly.
4. Let the ball come up again.
5. Watch the change in water level.

### Did you know?

Seventy per cent of Earth's surface is covered with oceans. Every twelve hours the tides rise and fall. This happens without the level of water changing. As Earth and the Moon spin, gravity pulls them together and the Moon pulls at the ocean water directly beneath it, causing it to rise and fall. When it is high tide on one side of Earth, it will be low tide on the other side.



# Practical Science: Solar system / Space and time

## Seasons

See how Earth experiences the different seasons.

### What you need:

- Balloon with a line drawn around the middle (Earth and its equator)
- Bowl (to rest Earth on)
- Torch (the Sun)
- Books (to rest the torch on)

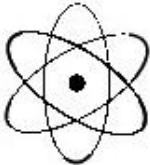
### Steps

1. Slowly spin 'Earth balloon' around.
2. Sit Earth balloon onto the bowl so the line of the equator is slightly sloping.
3. Rest the torch onto the books so it is shining just above the equator. Where the Sun's light is brightest, the countries will be experiencing summer. Where the Sun's light is furthest away, the countries will be experiencing winter.

### Did you know?

Light from the Sun does not fall evenly onto Earth because our planet is round. The equator is the hottest part of our planet because it is closest to the Sun and therefore it is where the Sun's light and heat is the strongest.

Thinking Skills Creator Yr 8

<p><b>Solar system 1</b></p> <p>Draw a rocket ship.</p> <p>Now redesign it by using one of the following steps:</p> <p><b>B</b> – make one part <b>bigger</b>.</p> <p><b>A</b> – <b>add</b> something extra.</p> <p><b>R</b> – <b>replace</b> one part with something extra.</p>	<p><b>Solar system 2</b></p> <p>Name 10 outer space objects that we can NEVER see in the night sky.</p>
<p><b>Solar system 3</b></p> <p>What if the sun suddenly disappeared?</p> <p>Write down 10 consequences.</p>	<p><b>Solar system 4</b></p> <p>Draw a detailed space suit.</p> <p>Now make 5 improvements to it.</p>
<p><b>Solar system 5</b></p> <p>Place the letters A-Z down the side of the page.</p> <p>Now, name any object in space which starts with each of the letters.</p>	<p><b>Solar system 6</b></p> <p>Use your imagination.</p> <p>Work out different things this picture could represent. It has to be something to do with space.</p> 

**Thinking Skills Creator Yr 8**

<p><b>Solar system 7</b></p> <p>Predict how rockets will be powdered in 50 years.</p> <p>Describe how this new system will work.</p>	<p><b>Solar system 8</b></p> <p>Name 8 things that <b>a rocket control panel</b></p> <p>And <b>a sewing machine</b></p> <p>have in common.</p>
<p><b>Solar system 9</b></p> <p>Find 10 different uses for:</p> <p><b>sunlight</b></p>	<p><b>Solar system 10</b></p> <p>The answer is Jupiter.</p> <p>Make up 5 questions.</p>
<p><b>Solar system 11</b></p> <p>Too much space junk is floating around our upper atmosphere.</p> <p>Brainstorm 3 possible solutions.</p>	<p><b>Solar system 12</b></p> <p>You are forced to live for 2 years on a space station by yourself. Food and water have been provided.</p> <p>You are allowed to take only 10 items.</p> <p>Name them, and explain why you would take each one.</p>

**Thinking Skills Creator Yr 8**

<p><b>Creation 1</b></p> <p>List 5 things about God's original Creation that made it 'very good'.</p>	<p><b>Creation 2</b></p> <p>What went wrong with God's perfect Creation? What did God do to fix the problem?</p>
<p><b>Creation 3</b></p> <p>Define and give examples for the word 'design'.</p>	<p><b>Creation 4</b></p> <p>List 5 good reasons for a belief in a special creation.</p>
<p><b>Creation 5</b></p> <p>Design a sign to discourage Adam and Eve from eating the forbidden fruit.</p>	<p><b>Creation 6</b></p> <p>List 3 beliefs that people may have about the beginning of the universe, outside of the Bible teaching.</p>

# James Irwin

## Biography

**Born 1930, died 1991, U.S.A.**

James Irwin worked as a test pilot before training with NASA as an astronaut.

James Irwin was the eight man to walk on the moon and the first to ride in the Lunar Rover. The Apollo 15 was a 'J-Mission,' which meant that the two astronauts, James Irwin and David Scott spent an extended period on the lunar surface – almost three days, where they collected 170 pounds (77 kg) of geologic material including the famous "Genesis Rock."

Outside their spacesuits, the temperature on the lunar surface was 150 degrees. The two astronauts felt extremely hot, even in their space suits. Perspiring so much meant that they were in danger of losing minerals from their bodies which could bring on a heart attack.

While Irwin did not suffer a heart attack, flight surgeons on earth who monitored the men were alarmed when they saw both astronauts develop irregular heart rhythms.

As Irwin moved about the lunar surface, apparently unaware of his dangerous health situation, he was struck by the size of the earth – about the size of his thumbnail.

"I was just amazed to see the earth," he said. "It reminded me of a Christmas tree ornament – a very fragile one, hanging majestically in space. It was very touching to see earth from that perspective."

At one point, Irwin had trouble with a planned science experiment. He was having trouble with the experiment. Frustrated in his attempts to get the experiment to work, Irwin decided he would pray.

While raised in a Christian home – and a believer and churchgoer since age 10, he was a nominal Christian at this stage of his life. He did not take the Christian faith seriously.

But now he really needed wisdom due to this problem and he said, "God I need your help right now."

Suddenly Irwin experienced the presence of Jesus Christ in a remarkable way, unlike anything he ever felt on earth. The Lord showed him the solution to the problem and he was able to perform the experiment.

He was completely overwhelmed at seeing and feeling God's presence so close. At one point, he turned around and looked over his shoulder as if Jesus was standing there.

This unusual encounter with Jesus – some 238,000 miles from earth, changed Irwin's life forever.

After his return from the moon, Irwin and Scott rode through the streets of New York. There were thousands of people lining the street and he was trying to see all their faces.

But Irwin did not care for fame. God dropped it in his heart that he had a responsibility to mankind to share Jesus with everyone after that.

Like other men in church history who have experienced dramatic encounters with God, the result was an increased power to witness for Jesus Christ, a confidence and boldness that fueled his passion to become a witness for Jesus Christ to the nations.

Within a year of Irwin's return from space, he resigned from NASA in order to carry on his Christian work.

"God decided that He would send His Son Jesus Christ to the blue planet," Irwin said, "and it's through faith in Jesus Christ that we can relate to God. Jesus Himself said, 'I am the way and the truth and the life. No one comes unto the Father except through me.'"

"As I travel around I tell people the answer is Jesus Christ, that Jesus walking on the earth is more important than man walking on the moon."

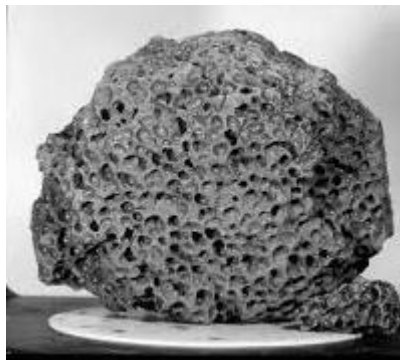
For two decades, Irwin traveled the world and presented small flags he carried from the moon to the leaders of various countries. And for each flag that he presented, he was able to be a witness for Jesus Christ.

Irwin continued to suffer heart problems after he left the space program. On the 20th anniversary of the Apollo 15 mission, he spoke in Aspen, Colorado. The next day he took a long bicycle ride. After the ride, he collapsed due to a massive heart attack and went to live forever with the God he loved – the same one he encountered on the surface of the moon.

It is ironic, perhaps, that his heavenly homecoming was within hours of the 20th anniversary of his earthly homecoming from the moon.

The day before he died, Irwin said to his best friend, "All I want to do is be faithful."

<http://blog.godreports.com/2011/03/encounter-with-jesus-on-the-moon-left-astronaut-changed/>



Genesis rock, collected by James Irwin, Apollo 15

## Space 1

### How many stars?

### Student activities

Have you ever considered the greatness of the universe? David, who wrote the Psalms, must have considered the greatness of God as he watched the stars each night while tending his sheep. Our solar system, and the stars beyond it tell us how great and mighty God is. The Bible says, "The heavens declare the glory of God." (Psalm 19:1)

Isn't it wonderful to know that such a great and powerful God cares for us? He knows each person by name and knows all about us. We can put our trust in God because He is so great.

When we look at the sky on a clear night, we can see thousands of stars. By using a telescope we can see many more. Stars are huge balls of flaming gas. Most stars are millions of kilometres from one side to the other. Each star burns at amazingly hot temperatures and so brightly that they can be seen from billions of miles away.

No one knows how many stars there are, except for God. He has counted and named all of them.

In the Psalms we read: *He counts the number of the stars and calls them each by name. Great is our Lord and mighty in power. (Psalm 147:4-5)*

A small number of stars in a group is called a **constellation**. One constellation in the Southern Hemisphere is the *Southern Cross*. A large group of stars, made up of many constellations is called a **galaxy**. *The Milky Way* is a galaxy.

1. What is a star?
1. How big is a star?
2. What does the size of the universe tell us about God?
3. What is a constellation? Name one.
4. What is a galaxy? Name one.

## **Space 2**

### **Our Solar System**

Only a great and powerful God could create such a huge universe! And yet He has placed us carefully in a very special place in the universe. He has given us our own special star, the Sun, for light and heat. He has placed us at exactly the right distance from the Sun. Our solar system is made up of a small star called the Sun and eight planets, including Earth. These planets travel around the Sun. The Sun is the Earth's nearest star.

The eight planets have moons, which circle them. There are also some other objects, including comets. All of the planets, their moons and the comets, move in the way they do, because of the Sun's gravity.

Our planet, the Earth, is third in line from the Sun. The planets are quite different. Their differences are largely the result of their different distances from the Sun. The four planets that are closest to the Sun are called the inner planets. They are small, rocky planets. The outer planets are larger and gassy.

Only one of these eight planets is suitable for living things. The earth is just the right temperature, and has air and water. All the other planets are too hot or too cold, and have no air or liquid water. Earth is the planet that God has designed for life. Man may be able to live on other worlds one day, but making a place like the moon suitable for living on would be very difficult. So many things would have to be brought in spaceships from the earth. When astronauts go into space, they can only stay alive because of the air, water and food that they take with them from earth.

1. What is a solar system?
2. How many planets in our solar system?
3. Why is earth a special planet?



### Space 3

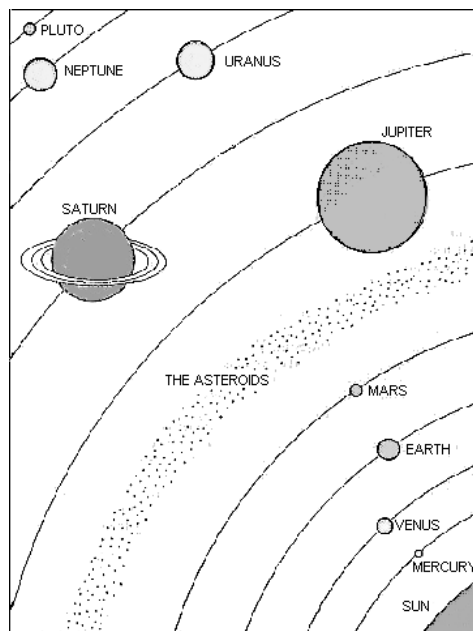
#### Planets in our Solar System

There are eight planets in our solar system.  
Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

Draw the eight planets in their right order. Name them and draw them the correct sizes. Show the Sun as well.

Learn a silly saying to help you remember the names of the planets:  
(The starting letter of each word is the starting letter of a planet.)  
**M**y **v**ery **e**nergetic **m**other **j**umps **S**aturdays **u**ntil **n**ight-time.

Until 2006 there were nine planets in our solar system, the ninth being the small planet called Pluto. Scientists decided that Pluto did not fit into the planet category. Instead it has been placed in the category of dwarf-planets, of which it is the second largest.



## Space 4

### The Sun

Think of what the world would be like without the Sun. There would be no life, no light, no warmth, no sounds.

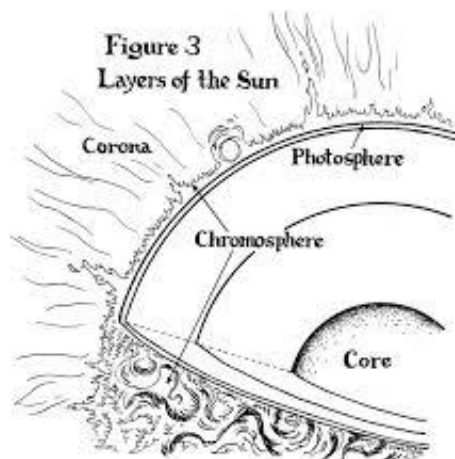
The sun is a star. To us, the Sun seems bigger than all the other stars, but this is only because it is the nearest star to Earth. The Sun is a huge ball of gases. These gases are mainly hydrogen and helium. The atoms come together and explode because of the high temperature and pressure. This is called nuclear fusion. When this happens, a huge amount of energy is released. The energy is in the form of light and heat. The Sun provides light and heat to the Earth.

No one should look at the Sun without protecting their eyes. The intense light comes from a layer of gases on the surface of the Sun. This layer is the *photosphere*, the layer of light.

Above this is another layer, made up of brilliant red-coloured gases: this is called the *chromosphere*, the layer of colour.

A third layer is called the *corona*, which means *crown*. This can be seen through a telescope during an eclipse. Sometimes great tongues of flame shoot out from the Sun. These are called *solar flares*. At times, dark patches can be seen on the Sun. These are *sunspots*. These can affect the weather on the Earth.

Draw a picture of the sun showing the layers. Write one fact about each layer.



## Space 5

### How did it begin?

Many people think that the Universe all started with a big bang, about 15,000 million years ago. People who believe in the Bible know that this isn't true. The Universe was designed by a powerful Creator, only thousands of years ago. People who believe in the *big bang*, also believe in *evolution*. That is, that everything started from chemicals which came together and somehow formed a living cell. That cell developed and changed, and developed and changed until all kinds of living things came into being.

People who believe the Bible know that that God designed the Universe, and had a perfect order for doing it, and that it was created in just six days. Read about the order in the first chapter of Genesis.

Did you know that plants were created on the third day? They were created even before the Sun, moon and stars. The Sun, moon and stars were created on the fourth day. The plants needed the warmth of the Sun for growth, so God had to quickly create the Sun, just 24 hours later. Once God had created plants for food, then He could create the animals and humans. God had a perfect order and His timing was perfect too. It took Him just six days, and not millions of years.

God said that there was no death before Adam and Eve sinned. The world was perfect until that time. People who believe that the world developed over millions of years believe that death occurred before humans came to the Earth. The Bible tells us that this is not so.

1. What is evolution?
2. What does the Bible say about the beginning of the universe?

## Space 6

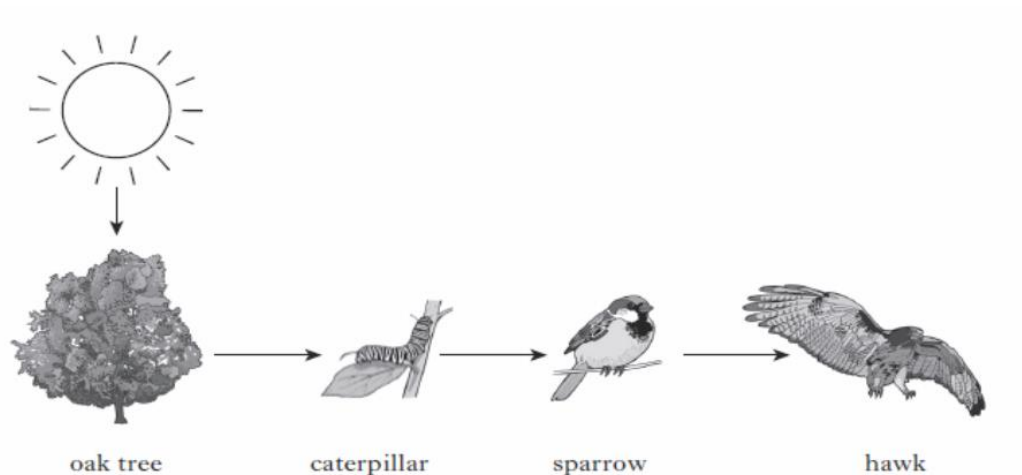
### Food chains

Think of what the world would be like without the Sun. There would be no life, no light, no warmth, no sounds. There would be no people, plants or animals. God created the Sun for life. All things that move or grow use **energy**. All plants and animals use energy. Think about this:

The Sun helps plants to grow.  
We eat the plants.  
Animals eat the plants.  
We can also eat the food that comes from animals.  
So we get energy from the Sun every time we eat

This is a food chain. Food chains all start from the sun's energy.

*Draw a picture of a food chain a bit like the one below. Use different plants and animals. Put yourself at the end of the food chain.*



## **Space 7**

### **Sun facts**

#### **Did you know...?**

People in Europe many years ago thought there must be a god who drove the Sun across the sky. To honour this god, they named a day of the week after the god. The day became known as Sunday. How wonderful to know who really makes the Sun rise and set.

#### **Did you know...?**

The Sun does not really move at all, but it is the Earth that moves. It just *seems* like we are still and the Sun is moving. Take notice of where the Sun is early in the morning; at mid-day and in the late afternoon. On a sunny day you could try making a shadow stick and draw the shadow lines with chalk at various times during the day.

#### **Sun safety**

Too much radiation can be dangerous, and may cause skin cancer. Make a drawing to show how can we protect ourselves from the Sun's rays?

#### **Sun-shape poem**

Write the word **SUN** inside a circle, then write describing words for the Sun, coming from the circle like rays of the Sun.

## Space 8

### Planet Earth

The Sun sends heat and light to all of the planets in our Solar System. The amount of heat energy that reaches each planet depends on how far that planet is from the Sun. Our earth is just the right distance from the Sun. Just enough heat energy and light energy reach the earth to give it a mild climate where plants and animals can live.

### The Earth

The Earth is the only planet that has life, and the only planet that has flowing water on its surface. Almost three-quarters of the Earth's surface is covered by water.

The pull of the Earth's gravity traps a layer of air called *atmosphere*. The atmosphere is has been provided by God as protection against large meteors. When they hit the atmosphere they bounce off into space, and do not crash through on to the Earth. The atmosphere also protects from the Sun's harmful rays, and of course provides air for breathing.



## Space 9

### The Earth's moon

Other planets have moons too, but the Earth's moon is the only place in the solar system apart from Earth, where man has set foot. Between 1969 and 1972, a total of 12 astronauts landed on the Moon.

Many astronauts have told how they put their trust in God, as they traveled into space. Being in space made them feel very close to the creator of the universe!

The moon's gravity is only one-sixth of the Earth's, so there is no atmosphere and no air.

The moon has craters. We can see them from the earth.

The Moon reflects the Sun's light, so it lights up the night sky. God also created the Moon to show the seasons.

*God said, And let them be for signs and for seasons, and for days and years...And God made two great lights: the greater light to rule by day, and the lesser light to rule the night." (Genesis 1: 14 and 16)*

The Moon also causes tides, which are necessary for keeping the sea clean. If the water in the sea didn't keep moving, then it would become stagnant and the plants and animals would die.

*Write 5 facts about the moon.*

## Space 10

### Shapes of the moon

Have you noticed that the moon has different shapes? At times it looks round, at other times it looks half round. Sometimes it looks like a cookie with a bite out of it.

#### What causes the Moon's shapes?

Like the earth, the moon receives direct sunlight on only one side. The different shapes are caused by different amounts of sunlight shining on the moon. Here are some of the shapes:

##### 1. crescent

We see less than half of the moon's sunlit side.

##### 2. half moon

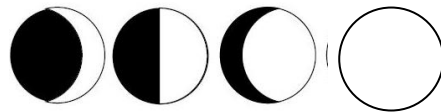
We see half of the sunlit side.

##### 3. gibbous

We see more than half, but not all of the sunlit side.

##### 4. full

We see all of the sunlit side when the moon faces the earth.



The different shapes of the moon are called phases. It takes 30 days for the moon to go through all its phases.

*Draw and label the four phases of the moon.*



## Space 11

### Mercury

- Mercury is the smallest planet in the Solar System:
- Mercury is the most cratered planet in the Solar System:
- Mercury is only the second hottest planet. (Venus is the hottest.)
- Mercury is the closest of the eight planets to the Sun. The side of Mercury that faces the Sun is 415 degrees C. That's as hot as a pottery kiln! However, as the planet turns away from the Sun at night time, the temperature plunges to minus 170 degrees C.
- Mercury has just 38% the gravity of Earth,
- Only two spacecraft have ever visited Mercury. Because it is close to the Sun, Mercury is a difficult planet to visit. During 1974 and 1975 Mariner 10 flew by Mercury three times, during this time they mapped just under half of the planet's surface. Mariner 10 sent back pictures of a rocky planet, a third the size of the earth, and covered with craters.

*Write 5 facts about Mercury.*

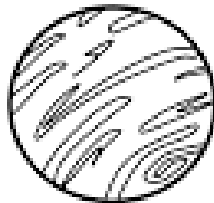


## Space 12

### Venus

- Venus is the hottest planet. It is 475 degrees C.
- Venus is just slightly smaller than the Earth.
- It has an atmosphere mainly of carbon dioxide. That is a poisonous gas.
- It has gravity similar to that of Earth.
- Venus is surrounded by clouds made of acid gases. These clouds create the most corrosive acid rain found anywhere in our solar system.
- The clouds are so thick that little light even reaches the surface. The light that does reach the surface is converted to heat and can not escape the atmosphere making Venus the hottest planet at around 500 Degrees Celsius.
- The surface of Venus is often described as a "stormy desert" full of many craters and very active volcanoes.
- The surface is also likened to molten lead.
- Venus has no liquid water.

*Write 5 facts about Venus.*



Venus

## Space 13

### Mars

- Mars is a rocky red desert.
- Mars is slightly smaller than the Earth.
- Mars has two moons and some gravity.
- Mars looks like a red star in the sky.
- Mars is home to the tallest mountain in the solar system:
- Mars has the largest dust storms in the solar system:
- On Mars the Sun appears about half the size as it does on Earth:
- People used to think there was life on Mars. That's where we get the name 'Martians' from. However in the 1970s, space probes visited Mars and found that there was no life there. Christians do not need to worry about and extra terrestrial beings or UFOs because we know that God created the Earth for life and not other planets.

*Write 5 facts about Mars.*

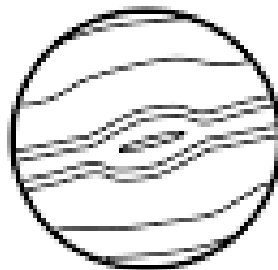


## Space 14

### Jupiter

- Jupiter is the largest planet in our solar system.
- It is 13,000 times bigger than the Earth!
- It is a huge ball of liquid wrapped in thick colourful gas clouds. The gases that surround Jupiter are deadly poisonous
- The quick spinning of the planet whips up the atmosphere, creating the bands around the planet.
- Jupiter has a great red spot, about the size of the Earth. This is caused by a storm in the planet's atmosphere.
- At the centre of Jupiter is a rocky core, slightly bigger than Earth but weighing about 20 times more.
- Jupiter has a very strong magnetic field. You would weigh two and a half times as much as you would on Earth.
- Jupiter has many moons circling around it. Four of these moons are bigger than Pluto.

*Write 5 facts about Jupiter.*



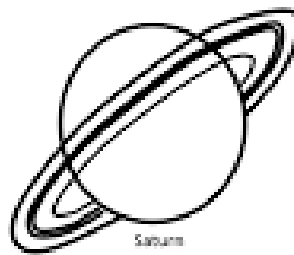
Jupiter

## Space 15

### Saturn

- Saturn is the second biggest planet.
- It has rings which are made of rocks, the size of bricks coated in ice. The rings are 10 km. thick.
- Saturn is mostly made of gas. It is very light because it is made up of more hydrogen than helium.
- It is very cold. It has 18 moons.
- Saturn has a small rocky core covered with liquid gas.
- Like Jupiter, Saturn has many moons which surround it.
- Storm winds race around the atmosphere at 800kmp/h.

*Write 5 facts about Saturn.*

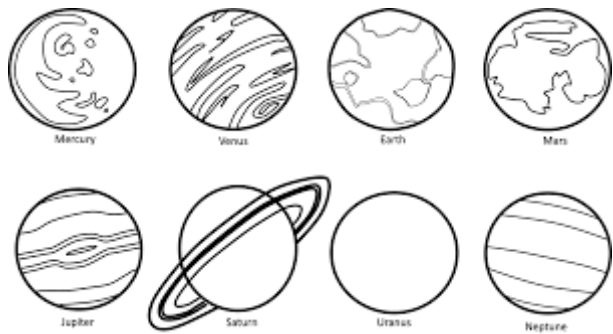
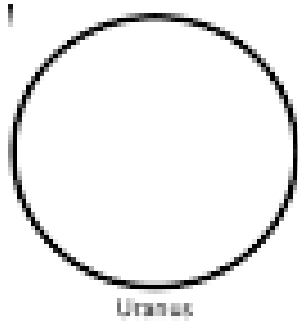


## Space 16

### Uranus

- Uranus is a cold ball of gas.
- Uranus is about 4 times bigger than the earth.
- It spins slowly, and one day is 40 Earth years.
- The gases on Uranus are mostly hydrogen and methane.
- It looks green because of the methane gas.
- Uranus was the first planet discovered by telescope.

*Write 5 facts about Uranus.*

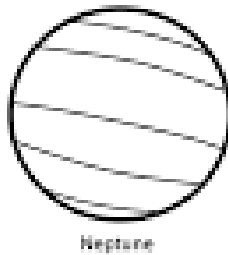


## Space 17

### Neptune

- Neptune is a large, water planet with a blue hydrogen-methane atmosphere and faint rings.
- Neptune is a large planet, nearly four times the size of Earth.
- Neptune has the most violent weather in our Solar System. Storms have been spotted swirling around its surface and freezing winds that blow about ten times faster than hurricanes on Earth make it the windiest planet.
- Neptune is covered in thin white clouds which stretch out around the planet.
- Neptune takes 165 years to go around the Sun.
- It is a ball of hydrogen and helium gases with a rocky core surrounded by ice.

*Write 5 facts about Neptune.*



## Space 18

### The first astronomers

People who study the stars are called astronomers. It is very likely that the first astronomers were shepherds, who had plenty of time to watch the stars as they tended their sheep. During the long still nights, they probably watched the moon, as it gradually changed its shape night by night, from crescent, to full moon and back to crescent. The period of time, almost 30 days, became known as a month. The word month comes from the word moon. Later they learned to count the time it took the sun to travel from its highest place in the heavens and back to its point of starting. This became known as year. What people didn't realize was that the journey of the sun was really caused by a change in the position of the earth, as it journeyed through space. That is to say, the sun stood still but the earth moved.

There was one famous astronomer who lived from 1564-1642. His name was Galileo. He developed a telescope to watch the stars. He became convinced that the earth moved around the sun, and not the sun around the Earth. No one would believe him, but he set out to prove it was true. And he did!

1. Who were the first astronomers?
2. What did the shepherds notice about the Moon?
3. What did they notice about the Sun?
4. What did Galileo discover?





## Space 19

### Who were astrologers?

Astrologers were people appointed to the king, in olden days, to note the movement of the stars. Their job was to learn about the stars. However, they became dishonest. They turned to fortune-telling and tried to trick people into believing they could tell the future.

These days, many people still practice astrology. They ask people when they were born, and tell them their star sign. Then they try to tell people what will happen to them in the future. Many astrologers look to using Satan's power. If anyone ever asks you for your star sign, just ignore them. Don't get fooled into playing their game, even in fun. Astrology is the opposite of God's truth.

1. Why was the job of the first astrologers useful?
2. What happened when they became dishonest?
3. What is wrong with the astrology that some people practice today?

## Space 20

### The first men to land on the moon

Astronauts are space explorers. There is no air to breathe in space so astronauts must wear special suits to stay alive. Apollo spacecraft are designed for moon missions. They carry all the air, water, food and equipment the astronauts will need in space. Rocket engines, fuel, oxygen and electric power supplies are carried in the back of the service module. The Apollo Command Module is about the size of a small car and it has two windows. Here the astronauts work, eat and sleep. They cannot move very far. A trip to the moon takes about four days.

On July 20<sup>th</sup> 1969, Neil Armstrong was the first person to ever walk on the moon. Astronauts' space suits have to be sealed tight so that their oxygen doesn't escape. On the moon, an astronaut wears a backpack filled with oxygen for breathing, water for controlling temperature, and radio equipment for talking to the Apollo Command Module and people back on earth.

Moon Rover is a special car that the astronauts bring with them. It travels on the surface of the moon bringing tools, TV and radio equipment so they don't get lost.

On the moon everything weighs much less than on earth. This is because there is less gravity. Everything weighs one sixth of its earth weight. The astronauts bounce and float around. The astronauts leave a flag on the moon, and collect moon rocks to bring back to earth.

*Pretend you are an astronaut going to the moon. Write a story about it.*

## Space Exploration

There is so much to learn about our solar system and the universe around us. People have been exploring the heavens through telescopes for centuries, but the best way to add to our knowledge is to travel into space. Space exploration reveals more about the structure of other planets. This information helps us to know more about the earth and how to manage it better.

Firstly, learning about other planets and the changes that have happened there will help us to understand changes on earth. Scientists use information gathered from space probe to predict similar changes there. This will help us prepare for such changes.

Secondly, astronauts using cameras on board spacecraft investigate the materials that other planets are made of. This knowledge helps them to know if similar materials are found on earth or if they could be useful to us.

Exploration carried out by spacecraft such as voyager take investigations further into space. The amazing discoveries have revealed exciting information for scientists. Some think that life could exist on some of the other planets.

Scientists are investigating the suitability of other planets as a place for humans to live if our planet becomes too crowded. However, conditions on other planets are not suitable for supporting life. Other planets are too hot, too cold, with violent storms, without air and without water. It would be therefore extremely expensive to create a space station that was big enough with the right conditions for human life. Some people think that the money spent on space exploration could be better spent on solving the food and water crisis on our own planet, so that less people die of starvation.

Many people think that other planets may be inhabited, but Christians believe that the earth is a unique planet, created especially for life, and if there was life on other planets the Bible would tell us about this. Nowhere in the Bible does God speak of life on other planets. The Bible tells the account of God's special creation, humans being created here on earth on the sixth day, and that God sent His only Son to our planet so that we could have a relationship with the Creator.

### Comprehension

1. What instruments did people first use to explore the heavens?
1. What are two ways in which space exploration can help us?
2. What name is given to a person who explores and travels into space?
3. Why do astronauts examine materials found on other planets?
4. Why do scientists want to find out about changes that occur on other planets?
5. Trying to create the right conditions for human life on other planets would be very, very expensive. What is your opinion on the idea of trying to create space stations on other planets for human habitation?