

# Our Special Planet: Outcomes and activities

## God is Protector Year 6

### Spiritual Awareness

God has provided a special home for us in the Cosmos. Because God is wise, He knows the exact conditions for our survival on this planet and created it especially for us. Although God is outside of time, He created time for us. He created the Earth to spin and rotate on its axis while it orbits around the sun.

Our special planet has built-in protection. The Earth is the only planet in our solar System that is suitable for living things. It is just the right temperature, has air, flowing water and gravity. God designed planet Earth for human life. He also designed the Earth with a special protective layer, the atmosphere. The atmosphere protects the Earth from extreme heat and cold, from radiation and from harmful meteors. God has a plan for our planet. He knows the beginning and the end. He wants us to trust Him and remain with Him as we walk through life, and not to worry about the future.

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

- **Trust** in God to be a guide for the journey of life
- **Confidence** that God is in charge

### Outcomes: Students will

- understand the properties of the atmosphere
- explain the position of the earth in space
- compare the special features of earth with other planets: the earth is one of the eight planets in our solar system, but it is unique in that it is the only planet with living creatures
- understand how the relationship between the earth, sun and moon, and the rotation of the earth on its axis give us time, seasons, day, night, years, months
- measure time
- observe moon changes over a month
- observe movement of shadows
- compare hours of daylight at the equator and the poles at different times of the year

### Bible stories and passages

Joshua 10 - The day the sun stood still. (God has control over time; He has control over nature).

Mark 4:35-42 Jesus calmed the storm. (He has control over nature.)

Psalms 104:19 – You created the moon to mark the month; the sun knows the time to set.

### Verses about trusting God for the future:

Ecclesiastes 3:11 - He has made everything beautiful in His time.

Jeremiah 29:11 I alone know the plans I have for you, plans to bring you prosperity and not disaster, plans to bring about the future you hope for. (Good News Translation)

Proverbs 3:5-6 Trust in the Lord with all your heart, and do not lean on your own understanding. In all your ways acknowledge him, and he will make straight your paths. (ESV)

Psalms 95:4-5 In his hand are the depths of the earth, and the mountain peaks belong to him. The sea is his, for he made it, and his hands formed the dry land.

Psalms 24:1 The earth is the Lord's, and everything in it, the world, and all who live in it.

## Key Questions

What makes our planet more special than any other planet?

What protection has God given to our planet?

What does the Bible tell us about trusting God, even when there are troubles and even disasters?

What does God say about the future?

## Activities

- Describe the earth's atmosphere.
- Discuss the importance of the atmosphere for protection from a) meteors, b) ultra-violet rays, c) extreme heat and cold.
- Define the ozone layer: part of the upper atmosphere - the air from about 10 km. to 50 km. above the Earth. This layer, the stratosphere, contains ozone. Ozone protects the Earth from ultra violet rays.
- Discuss the importance of the ozone layer. (Without the ozone shield, the sun's rays would damage our health, including skin and eyes. It would also affect plants and animals.)
- Draw a diagram of the solar system to show the earth's place in space.
- Compare conditions on earth to those of other planets and discuss suitability to life.
- Record local temperatures. Make a list of highest, lowest and average temperatures around the world. Establish the temperature range that best supports life.
- Make a table to show the seasons in the Northern Hemisphere compared to the months and seasons in the Southern Hemisphere.
- Discuss the relationship of the earth to the sun by using two different size balls and demonstrate how the earth moves around the sun.
- Discuss the relationship between the earth, the sun and the moon.
- Observe how the relationship between the earth, sun and moon gives us time, seasons, months, day and night.
- Draw the changing shape of the moon over a month.
- Research the relationship between the phases of the moon and our months.
- Discuss differences in seasons in Northern and Southern hemispheres.
- Research the north and south poles and observe differences in hours of daylight in winter and summer.
- Draw and name star patterns.
- Research the planets in our solar system

**Geography:** Give students plenty of practice with identifying continents and countries on the world map.

# Values education Year 6

## God is Protector

### Peace

#### Peace is ...

A calm feeling inside, no matter what is going on outside

#### Activity

##### Story: The Two Artists

Once upon a time there were two artists. Each artist was asked to paint a picture that would best depict the idea of peace.

One artist painted a crystal clear lake in the mountains. There was not a breath of wind, and not a ripple on the lake. The lake, like a mirror, reflected the image of the surrounding trees and mountains.

The second artist painted a picture of a roaring waterfall. Hanging over the waterfall was a great tree branch. Hidden away in a secure part of the limb was a little bird's nest. Inside the nest was a tiny bird, sitting peacefully as the water rushed and swirled below her and the water sprayed around her. Amidst the tremendous roar of the waterfall the little bird sat as if she had not a worry in the world. Her nest was snug and warm, nestled in the strong branch. She knew she was safe.

#### Discussion

1. Which picture do you think gave the best idea of peace? Why?
2. What kind of troubles can we have?
3. What can give us a feeling of peace when we are in the middle of troubles?

The second painting can be similar to feeling safe and secure in God's care. God doesn't promise that we will be free from all troubles, but He does promise that when we do have troubles, He will be with us, and can give us peace inside.

#### Bible references

Matthew 7:24-26 The house on the rock.

Job: Job trusted God, despite many troubles.

John 14:1-3,18,25-27 Jesus promised inner peace to His disciples, and the comfort of the Holy Spirit.

2 Corinthians 1:3-4 God comforts us in times of trouble.

John 16:33 In the world we have tribulation but in Christ we have peace.

Matthew 11:28 Come to me all of you who are tired from carrying heavy loads, and I will give you rest. (GNB)

# Year 6 Art

## God is Protector

### Our special planet

**Biblical wall art and text:** The earth is the Lord's, and everything in it, the world, and all who live in it. Psalm 24:1

Students can paint a giant map of the world, showing land and sea, mountains and deserts.

#### Painting

Suggestions for planet earth subject:

- A night sky
- Weather and seasons
- Lands of ice and snow
- A desert scene



#### Some painting techniques

- Spatter work for stars in a night sky (paint on a toothbrush, and run finger down the toothbrush to make speckles)
- Colour blending for sky effects
- Snow scenes using only black, white and tones of grey
- Combine oil pastel and paint. Use oil pastel to draw details on a painted background.

# Practical Science Year 6

## God is Protector

## Our Special Planet

## Make a rain gauge

(to measure rainfall)

### Materials:

- Empty two-liter plastic bottle
- Scissors
- A few handfuls of clean pebbles, gravel, or marbles
- Masking tape
- Water
- Ruler
- Permanent marker
- Rainy weather
- Paper and pencil

### Experimental Procedure

Carefully use the scissors to cut the top of the bottle off at the wide part just below where it begins to get narrow.

Put the pebbles in the bottom of the bottle—these will help keep it from getting blown over if it's windy.

Turn the top of the bottle upside down—make sure there's no cap on it! It's going to act like a funnel—and place it in the bottom part of the bottle, pointing downward. Line up the cut edges and tape them together so the top part is held firmly in place.

Use a long piece of tape to make a straight vertical line from the top edge of the bottle to the bottom. Use the marker to draw a line on the vertical piece of tape just a little above the top of the pebbles. This will be the bottom of your rain gauge.

Set the ruler against the vertical tape so that the "0" line lines up with the bottom mark. Use the marker to mark every quarter-inch (or, if you want to get fancy, every eighth-inch) along the piece of tape. Then label the inches from bottom to top. (Alternatively, you can mark centimeters and half-centimeters instead.)

Set the bottle on a level surface and pour some water in until it reaches the bottom mark. Your rain gauge is now ready to go!



Put the rain gauge outdoors—you'll need to pick a really good spot! You want somewhere level that's open to the sky and that's not likely to get too windy, where the gauge isn't likely to be disturbed. There shouldn't be anything hanging over the gauge that could either block any rain or make extra raindrops drip into the bottle (like a tree or a power line or the edge of a roof).

Pay attention to the forecast. On a day that you're likely to get rain, make sure the water in the bottom hasn't evaporated below your bottom mark; if it has, refill it to that mark.

If it rains within 24 hours, check your gauge and see how high the water is now. That's how much rain has fallen in the last day! On your piece of paper, make a note of the date and the amount of rain. Then read the newspaper or go online and find out the official amount of rainfall in your area for the day and make a note of it—see how closely your figure matches the official one!

Repeat steps 7-9 for several rainy days.

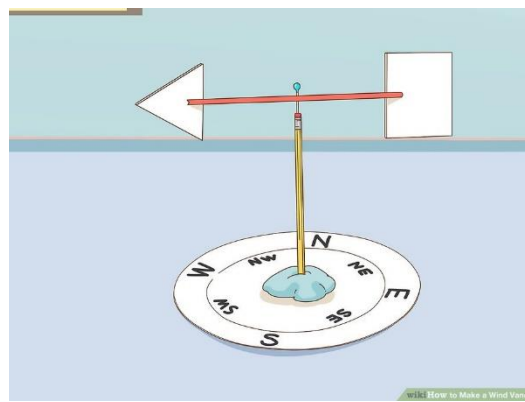
Author: Michelle Formoso

## God is Protector

### Our Special Planet

#### Make a wind vane (to measure wind direction)

- Materials:
- Paper plate
- Blur tac
- Pencil with rubber on end
- pin
- straw
- cardboard and scissors to cut the shapes



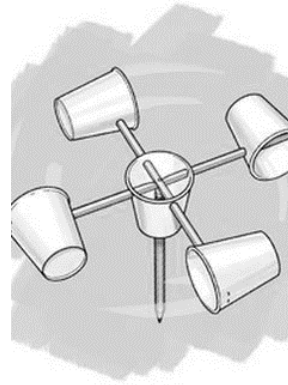
## God is Protector

### Our Special Planet

#### Make an anemometer (to measure wind speed)

##### Materials:

- 5 paper cups
- 2 straws
- pin
- paper hole punch
- scissors
- stapler
- sharp pencil with an eraser (rubber)



##### Process:

Take four of the paper cups and use the paper punch to punch one hole in each, about 5 cm (half an inch) below the rim.

Take the fifth cup and punch four equally spaced holes about a quarter inch below the rim. Then punch a hole in the center of the bottom of the cup.

Take one of the four cups and push a straw through the hole. Fold the end of the straw and staple it to the side of the cup across from the hole. Repeat this procedure for another one-hole cup and the second straw.

Slide one cup and straw assembly through two opposite holes in the cup with four holes. Push another one-hole cup onto the end of the straw just pushed through the four-hole cup.

Bend the straw and staple it to the one-hole cup, making certain that the cup faces the opposite direction from the first cup. Repeat this procedure using the other cup and straw assembly and the remaining one-hole cup.

Align the four cups so that their open ends face in the same direction either clockwise or counter-clockwise around the center cup.

Push the straight pin through the two straws where they intersect.

Push the eraser end of the pencil through the bottom hole in the center cup. Push the pin into the end of the pencil eraser as far as it will go.

Now your anemometer is ready for use!

**Explanation:** An anemometer is useful because it rotates with the wind. To calculate the velocity at which your anemometer spins, count the number of revolutions per minute.

## Mawson's exploration of Antarctica

### Biography

Douglas Mawson was born in England in 1882, and died in Australia in 1958.

A ship carrying team of explorers set sail from Hobart, Tasmania on December 2 1911. It seemed like the whole of Australia was there to see them off. The ship was the SY Aurora and Douglas Mawson would be leading the Antarctic exploration expedition. Each team planned to complete their exploration course and meet back at the hut on the coast, ready to catch the ship to sail home by January 30<sup>th</sup>. Any later would mean that they would be frozen in until the next summer.

On arrival, the men split up into several teams, each team taking a different exploration route. Mawson and his team of two companions chose the longest and most difficult route. They packed the sled with provisions for about three weeks, and set out with their team of six dogs. Their provisions included food (dried meat and biscuits), spare clothing, sleeping bags, a tent, kerosene stove and cooking utensils, tools and a rifle. The clothing of those times was not very water proof, being made of only natural materials – cotton, wool, fur and leather.

Mawson's team had to cover 300 km – about 30 km a day. The terrain was dangerous and difficult, with four dogs pulling their heavy wooden sled over an uneven terrain of ice and snow. The other two dogs pulled a smaller sled, driven along by one companion at the rear of the larger sled.

At night they would put up the tent, which was an arduous job with prevailing icy winds, sleet and snow. The team would boil up snow on their kerosene stove, drink the melted water and eat their dried meat and biscuits. They would then try to go to sleep in their fur sleeping bags. But as time went on, their bedding and clothing became wet, making it impossible to get warm. Fingers and toes started to suffer from frost bite and skin started peeling.

One day, as they were traveling, Mawson and his companion heard a noise from behind. They turned around and saw nothing but white. They backtracked to find that the companion leading the rear sled with the two dogs had disappeared into a crevasse. They shouted down the crevasse, but there was no reply. All they could hear was the whimpering of the dogs, caught on a ledge. Mawson and his companion tied all their ropes together to make the longest rope possible, but it was not long enough to perform a rescue operation. Tragically they had to walk away, unable to do anything.

With heavy hearts they continued on, but snow storms and blizzards prevented from covering any distance on some days. They were falling more and more behind their deadline – to be back at the hut by January 30<sup>th</sup>.

As time went on their food ran out, so sadly, one by one they killed their faithful dogs, all of which had names. They sat in their tent each night boiling up meat from a dog, making sure that every part of the dog was eaten, including paws, brain and liver. What they didn't know was that the dogs' liver contained toxic levels of Vitamin A, which gradually poisoned Mawson's companion. He became delirious, suffered dysentery and eventually died. Now



Mawson was on his own. The dogs had all gone. There was only a small amount of food left and still 100 km. to go. Mawson struggled on pulling the sled with his own body. By now he was physically and emotionally exhausted. The soles of his feet were lifting off due to frost bite. His face was blistered and sore. On some days he only covered as much as 5km., as he battled fatigue and blizzards. He was well over the deadline. Would the ship wait? Or was he pushing on in vain?

He was taking many risks, pulling the sled over risky snow drifts rather than going around. This risk taking had its toll. One day Mawson fell into a crevasse. He expected the sled to come crashing down on top of him, but miraculously it became jammed behind some ice and supported Mawson's weight. There he was, dangling from a rope inside the crevasse. Knots had been tied in the rope about a metre apart, so Mawson used the knots to pull himself up. He tried and failed several times. How easy it would be to just let go of the rope and fall to his death. How blissful that would be. But Mawson did not give up. He tried again and again until finally he pulled himself up out of the crevasse. Exhausted, he lay on the snow for three hours before he had enough energy to move once again. He set up the tent and rested for the night.

Day after day he pushed on, now without food. Would the ship wait? He finally saw the coast in the distance, and then the hut. But his heart sank when he saw the ship in the distance, far out to sea. He had missed the ship, now left to die of starvation in the hut. However, over a snow drift he saw the most wonderful site – two humans running towards him. The ship's captain had decided to leave a team of six men, with a year's supplies, to stay in the hut in case Mawson's team returned. One year later the ship came back for them. It was a hero's welcome. Mawson had written all these events in his diary, and many times referred to Providence – his word for a great God who knows everything, and who has given everyone a purpose in life. Sometimes it takes great perseverance to pursue the purpose that God has planned for us. Don't give up when the going's tough!

### **Activities:**

1. What were some of the most difficult problems Mawson and his team faced?
2. Why do you think these men wanted to make such an expedition?
3. Why did Mawson refer to "Providence" in his diary?
4. In difficult circumstances people can either depend on God more, or reject God. List some other people you know (in real life or in history) who have depended more on God through difficult times. Explain the nature of their difficulties.
5. Why might a person reject God because of a difficulty in life? Is it God's fault when things go wrong? Give your reasons.

## Our special planet 1

### Where is our planet?

### Student activities

Planet earth is the third planet from the sun. The earth, along with the other seven planets, travel around the sun, while at the same time spinning as they go. Here is a special way to learn the order of the eight planets:

***My Very Energetic Mother Jumps Saturdays Until Night-time***

The beginning letters stand for:

Mercury Venus Earth Mars Jupiter Saturn Uranus Neptune

The smallest planets are Mercury and Mars.

Medium sized planets are Venus, Earth, Neptune and Uranus.

Larger planets are Saturn (with rings) and Jupiter (the biggest).

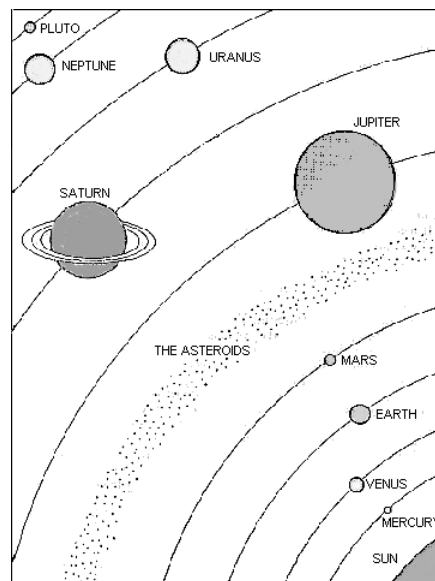
### Why is our Earth so special?

No other planet has the right conditions for life. For plants, animals and people to live, we need:

- sunlight, with times of darkness for rest
- water to drink
- air to breathe
- the right temperature
- the right weather conditions
- gravity

Draw and name the planets in the right order from the sun.

Name the six conditions for life that our planet has.



## **Our special planet 2**

### **Wonderfully designed**

No other planet has the right conditions for life. They are either too hot or too cold.

Some have water, but not in the right form. No other planet has the right kind of gases for breathing. Many have poisonous gas in their atmosphere. Air is the only gas suitable for living things. Air is a mixture of gases, but mainly Oxygen, hydrogen and carbon dioxide.

Gravity is like a magnetic force that pulls from the centre of the Earth. This means we do not float off into space. The moon has a little gravity. It has one-sixth of the earth's gravity.

Some planets have terrible storms all year round. Humans could never survive these storms. Try to find out the planet that has wild storms.

This is rather amazing! No other planet has the right conditions for life. Do you think this happened by accident or do you think a wonderful designer planned and created our planet?

God wanted some living beings to be His friends. He chose human beings on planet Earth. We are His special people. God wants us to get to know Him and be His friend.

1. What are some of the dangerous conditions on other planets that make living there impossible?
2. What gases make up air?
3. What would happen if there was no gravity?
4. What would happen if you tried to walk on the moon, where there is a little gravity?

## **Our special planet 3**

### **The earth in space**

What holds up the earth?

That question puzzled people for thousands of years. Long ago, in India, they thought the earth was resting on the backs of several large elephants. The elephants were resting on the back of a very large turtle. The turtle was either resting on a snake or swimming in a sea of milk.

Others said the earth was on the back of a catfish swimming in an ocean. According to the ancient Greeks, a god named Atlas had the difficult job of holding the earth on his shoulders.

But the Bible says that God “hangs the earth on nothing” (Job 26:7). And today we know that this is true: The earth is suspended in space. It isn’t sitting on anything!

But when the book of Job was written, people didn’t know that. How did the writers of the Bible know it? Only God could have told them.

1. What did ancient people believe about what was holding the earth in space?
2. What does the Bible say about this?
3. Why did the Israelite people of Old Testament times know some of the science of today?

## **Our special planet 4**

### **Is the Earth flat?**

Today we know that the Earth is a sphere, and not flat. People believed hundreds of years ago was that the earth was flat. If you went too far you would fall off the edge!

In the 1500s a sailor from Portugal, Ferdinand Magellan and his crew were the first to sail all around the world. That helped prove that the earth was round.

But that too was already written in the Bible long before Magellan's discovery. Isaiah 40:22 says, "God sits on His throne above the circle of the earth."

The fact that the earth is like a ball is shown in another way in the Bible. In Luke 17 Jesus tells us about when He will come to earth again for the second time. He said, "On that night two people will be in one bed; one will be taken and another left."

The next verse tells us that it will also be daytime when He comes, because people will be grinding grain, and that is always done during the daytime.

How can it be daylight and dark at the same time? If the earth is flat, it can't. But if the earth is round like a ball, it means that it's always daytime on one side and night on the other. Jesus knew this because He created the earth, and He told us about it over 2000 years ago.

1. What did most people believe about the Earth before the 1500s?
2. Who may not have believed this?

## **Our special planet 5**

### **Earth's orbit**

Planet Earth moves in a nearly perfectly circular orbit around the sun. It is not too hot and not too cold. If it was too hot, all the water would boil away. If it was too cold all our water would freeze.

For liquid water to exist on a planet, that planet must have a solid surface and an atmosphere. Our planet has both. On earth, water exists in all three states (liquid, solid ice and water vapour) and can move fairly easily from one state to another. If the earth's orbit were highly elliptical (oval-shaped), there would be large variations in temperature, making the environment unsuitable for life.

### **Earth's spin**

The earth spins on its axis once per 24-hour day, providing variation of night and day. The rotation of the earth helps to regulate the temperature around the globe so no one part becomes too hot or too cold. If the earth didn't rotate, one side would be permanently facing the sun, and would be unbearably hot, with the other in permanent frozen darkness.

### **Earth's axis**

The axis of the earth is tilted, so we experience seasons. From June to August, the northern hemisphere has summer while the southern hemisphere has winter. At the equator it is hot.

1. What shape is the orbit of the Earth?
2. What are the three states of water on Earth?
3. What would it be like if the Earth's orbit was oval-shaped?
4. What would it be like if the Earth didn't rotate?
5. In which months does winter occur in your country?
6. What is the equator and why is it always hot there?

## Our special planet 6

### The Moon:

- orbits around the earth every 29.5 days
- is vital in making the earth suitable for life
- is larger compared than any other moon in the solar system.
- Is a source of light at night (reflected sunlight)
- is the main cause of tides in the oceans of the world.

### Tides:

- Each day there are two high tides and two low tides, which repeat on an approximately 25-hour cycle.
- These tides provide oxygen to the coastal waters and river estuaries around the world. This is essential to marine life.
- If the moon was much smaller, like other moons in the solar system, the tides would be ineffective in supporting coastal life. If it were much larger, the coasts would be subject to massive destructive tides twice a day.

Write four facts about the moon.

Write two facts about tides.



## **Our special planet 7**

### **Solar Eclipses**

Although the sun is 400 times larger than the moon, it is 400 times further away, and so both look to be almost exactly the same size in the sky.

This means that on rare occasions, when the alignments are precisely correct, the moon will block out the light from the intensely bright photosphere of the sun for just two minutes or so, which enables us to observe the sun's outline. This can only be done using special glasses. Looking directly at a solar eclipse may damage your eyes.

Astronomers have learnt much about the nature of the sun, and therefore the stars, because of total solar eclipses. If the moon were much bigger or a little smaller we wouldn't see a solar eclipse. God has designed the sun and moon to be exactly the right sizes.

1. What is a solar eclipse?
2. Draw what you think it might look like.





## **Our special planet 8**

### **Early beliefs about Eclipses**

Ancient people were often afraid of the sun, moon and stars. This is because they thought these things were alive. The Egyptians believed that the stars were the souls of dead people who had become gods. Others thought that since the stars looked smaller than the moon, they must be the moon's children. Many people groups throughout history worshipped the sun and moon as gods.

Genesis 1 tells us that the sun, moon and stars were created by God. They were not gods, and they were not to be feared.

Many people in ancient times were afraid of eclipses. An eclipse happens when the sun's light is blocked by the earth or moon for a short time. Usually the moon is bright because it reflects the sun's light. But when the earth blocks that light, the moon looks as if it is disappearing. Also, when the moon comes between the earth and the sun, it looks as if the sun is disappearing.

This was very frightening to people long ago. The Chaldeans, who lived close to the Israelites, thought that eclipses happened when the moon was angry with the earth and turned its face away. The Chinese believed that an eclipse was caused by a demon or some huge animal that ate the sun.

But this is what God told Jeremiah in the book of Jeremiah in the Bible:  
"Don't be afraid of special signs in the sky, even though other nations are afraid of them" (Jer. 10:2)

1. What did some ancient people believe about eclipses?
2. What signs in the sky has God used to say something?

## **Our special planet 9**

### **Earth's atmosphere**

- Consists of 78% nitrogen and 21% oxygen
- Forms a thin sheath around the globe, held there by gravity, protecting us allowing life to exist on our planet.
- The atmosphere is about 100 km (60 miles) thick, and is similar in proportion as the skin of an apple.
- Scatters the sun's light making the blue colour of the sky
- Allows us to normally see only the sun and moon by day, and the stars at night. At night the atmosphere becomes transparent so that we can see the planets and the stars.
- Oxygen is vital for life for all air-breathing creatures, but too much oxygen would make the air dangerously combustible and too little would not provide sufficient for life to thrive.
- Contains water vapour and carbon dioxide, along with traces of other gases. Carbon dioxide is essential for plant life. Plants need carbon dioxide for photosynthesis (making their own food through their leaves). Plants take in carbon dioxide and give out oxygen.
- Helps regulate the temperature of the earth and transports water vapour to create rain and snow. This distributes water around the earth.
- Protects us from harmful sun rays.

**Write five facts about the atmosphere.**

## Our special planet 10

### Water

- The most abundant substance on the planet
- The chemical formula for which is H<sub>2</sub>O. This means two parts Hydrogen to one part Oxygen. This is a unique formula which gives water special properties for supporting life.
- Water, unlike most liquids, expands on freezing, so ice floats on water. This prevents lakes and rivers from freezing from the bottom up, so animals living in water are kept alive during winter.
- Water stops our Earth from getting too hot or too cold.
- Water keeps people and land animals cool.
- Around 72% of the earth's surface is covered in water.
- If the mountains were lowered and the ocean basins raised so the earth was a perfect sphere, the oceans would cover the Earth to a depth of around 3 km (2 miles)

1. How much of the Earth is covered with water?
2. How does water keep living things alive?
3. Ice floats on water. How does this help animals that live in water in places where lakes, rivers and seas freeze in winter?
4. What does H<sub>2</sub>O stand for?

## **Our special planet 11**

### **How amazing is that?**

The more we learn about our planet the more amazed we are at how extraordinarily well suited it is for life.

Those who believe there is a Creator God, and that God created the Earth just as He told us in the book of Genesis, are not surprised to find evidence of amazing design.

Through God's creation we see His power and intelligence. We also see how much He cares for us. So when we see such things, we realize there is a Designer who made planet Earth to be our home.

Isaiah 45:18 says, "For this is what the LORD says—He who created the heavens, He is God; He who fashioned and made the earth, He founded it; He did not create it to be empty, but formed it to be inhabited ... ."

God created the Earth as a special home for His people. He did not create other planets like Earth with life on them. If He did, God would have told us about them.

Many people believe that there is life on other planets, and claim to have seen UFOs (unidentified flying objects from space). However God tells us about all the beings that live in the universe: angels, demons and us. We can only assume that people who have strange visions of visitors from outer space are actually seeing demons. Christians do not have to fear demons because God says, "Greater is He that is within you..." (1 John 4:4). Yes God is stronger than Satan and we do not have to be afraid.

**Question:** How do we know that the Earth is special to God?

## **Our special planet 12**

### **Antarctica: Weather and Seasons**

Antarctica is a large continent that surrounds the South Pole. It is covered with sheets of ice that are several kilometres thick. Beneath the ice is rock, which can only be seen in a few coastal areas, and on some large mountains.

*Find a map of Antarctica in an atlas and draw it.*

Antarctica has not always been covered with ice. Before Noah's flood, the Earth was surrounded by a thick blanket, thicker than the atmosphere today. The blanket was made of water vapour. The Bible says that there was water above the Earth and under the Earth. This meant that even the places further from the Sun could be kept warm inside the blanket. However, after the flood, the world's weather changed and there were hot places and frozen places.

We know that Antarctica was once a warmer, wetter place, because scientists have dug below the surface and found layers of coal four metres thick. Coal is formed from trees and other plants that grew before the flood, about 6,000 years ago.

#### **Antarctica's weather**

Antarctica now is the coldest place on Earth. Temperatures rarely rise above freezing point and often fall below fifty degrees Celsius.

#### **Seasons**

In Antarctica, half the year is daylight and half the year is dark. This is because of the tilt of the Earth's axis as the Earth moves around the Sun. Summer and Spring have twenty-four hours of sunlight, while winter and autumn have twenty-four hours of darkness.

**Our special plant: 13**  
**Antarctica: Land and Sea**  
**The Land**

Antarctica is the windiest continent on Earth. The winds are very cold and very wild. It is also the world's driest continent. Water falls from the sky as snow, not rain. This snow stays on the ground as ice. Even though the land is covered with frozen water, the continent is still regarded as 'dry' because the amount of water falling from the sky per year is not very much. In other places water would run off into rivers and seas, but in Antarctica it doesn't. It just turns to ice.

There are often blizzards in Antarctica. These are a combination of very strong winds and falling or drifting snow. There are also *whiteouts*. This means you can't see ahead of you. Everything is white.

Antarctica has the world's biggest glaciers. These are huge rivers of ice. Antarctica is covered by a giant sheet of ice called the Antarctic ice-cap. This is snow, which has turned to ice which has built up over thousands of years. Under the sheet of ice is rock. Only 2% of the rock is visible. The rest is covered by snow and ice.

**The Sea**

In the sea you will find icebergs. These are floating lumps of ice. They get moved along by ocean currents. Four-fifths of the iceberg is below the surface of the ocean. As winter approaches, the ocean surface begins to freeze. This is called sea ice. It is like pancake-shaped circles of ice on top of the ocean.

**Write 2 facts about the land and 2 facts about the sea.**

## **Our special planet 14**

### **Antarctica: Explorers**

People who visit Antarctica are explorers or scientists.

The first to cross Antarctica was Captain James Cook and his team, in 1773. When he returned to England, he reported that the frozen continent was surrounded by dangerous seas, pack-ice and ice bergs, and of no use to anyone. Captain Cook also told of the many whales and seals that he had seen. This encouraged people to go to Antarctica to hunt whales and seals to make money from the oil from these animals

Several explorers followed James Cook. One was Ernest Shackleton. In 1914, Shackleton and his team set out in their boat, the Endurance. The ship was packed with dog-sleds, sleeping bags and tents, guns, maps, compasses and tools, tons of food for men and dogs, books and playing cards and scientific instruments. However, when they got close to Antarctica, they became closed in by the icy sea. They were stuck in the ice for the winter, but the small ship started to crack and buckle with the pressure of the surrounding ice. They had to abandon ship and set up camp on an ice-pack. Not long after this, their boat sank. They still had the life boats, so as Spring approached and the ice started melting, they packed the life boats and attempted to row to Elephant Island. They survived this dangerous journey. However they could not stay here forever. No one would find them. Some of the men set off for South Georgia Island where there was a whaling station. They survived another amazingly dangerous journey. However they arrived on the wrong side of the island. They had walk across icy mountains to the other side of the island. Days later they arrived at the whaling station. They looked like wild men, but were treated as heroes!

**List three difficult experiences for Shackleton and team.**

## **Our special planet 15**

### **Antarctica: scientists and tourists**

Today scientists live in Antarctica. Most come in summer when there is 24-hour daylight. Scientists live in comfortable fibre-glass apple huts. Once they used dog-sleds but now they use special motorized vehicles that travel well on the icy and rocky ground.

The scientists study weather conditions and animals. Animals living in Antarctica are penguins, seals, walruses as well as many different kinds of sea birds and sea life.

Tourists can also visit Antarctica. It is possible to fly over the continent from New Zealand. Cruise ships take tourists to Antarctica from Australia, New Zealand and South America.

### **A writing project**

Write about a visit to Antarctica. You can pretend you are either a scientist or a tourist. Think about:

What would you take with you?

What work would you do?

Where would you stay?

What animals would you see?

Include some drawings.

What are the most difficult things about the trip?

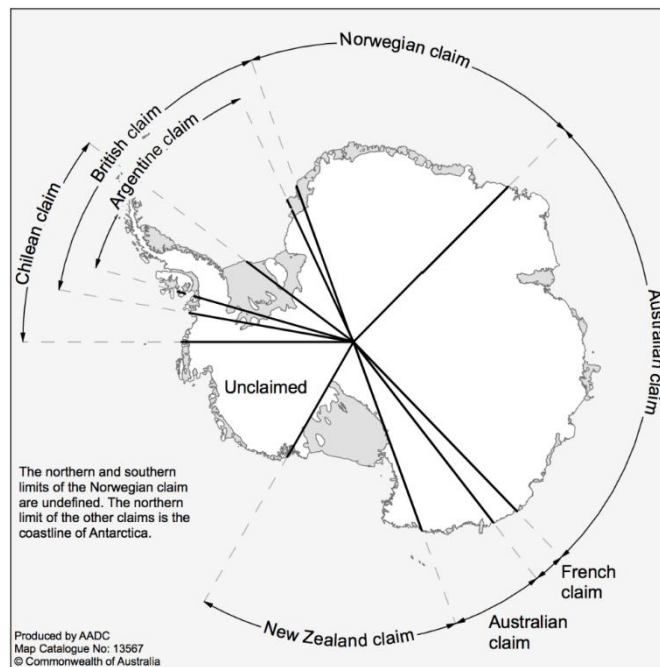
What do you enjoy most?





## Our special planet 16

### Who owns Antarctica?



1. Draw a map of Antarctica and label the countries that have claim to areas of Antarctica.
2. Make a list of Antarctic explorers, their dates and countries, from earliest to latest:

Edmund Hillary, New Zealand 1959  
James Ross Clark, England, 1839-1843  
David Edgeworth, Australia, 1909  
Robert Scott, England, 1901  
Roald Amundsen, Norway, 1911  
Ernest Shackelton, Ireland, 1901  
Jose Sobrai, Argentina, 1902

## Space 1

### 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?

### Planets in our Solar System

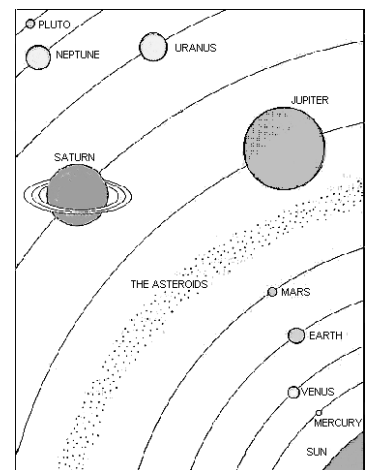
There are eight planets in our solar system.  
Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune

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 2

### The Sun

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

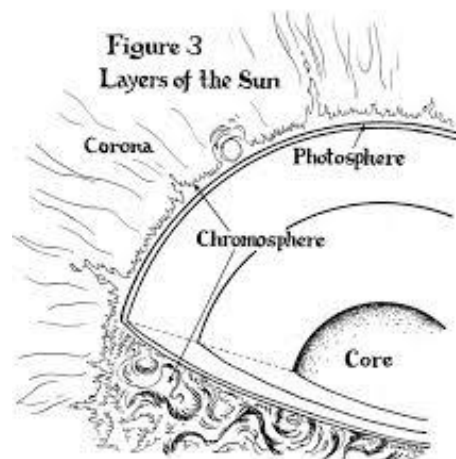
The sun is a star. To us, the Sun seems bigger than all the other stars, but this is only because it is the nearest star to Earth. The Sun is a huge ball of gases. These gases are mainly hydrogen and helium. The atoms come together and explode because of the high temperature and pressure. This is called 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 3

### 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?

## 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 4

### 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.*

### 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, (called 'phases'). It takes 30 days for the moon to go through its phases.

- 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.



## Space 5: The planets



### Mercury

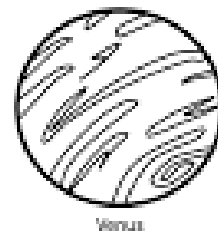
- Mercury is the smallest planet in the Solar System:
- Mercury is the most cratered planet in the Solar System:
- Mercury is only the second hottest planet. (Venus is the hottest.)
- Mercury is the closest of the eight planets to the Sun. The side of Mercury that faces the Sun is 415 degrees C. That's 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.*

### 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.*



## 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 extra terrestrial beings or UFOs because we know that God created the Earth for life and not other planets.



*Write 5 facts about Mars.*

## 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.

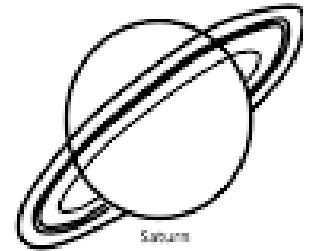
*Write 5 facts about Jupiter.*



## 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.

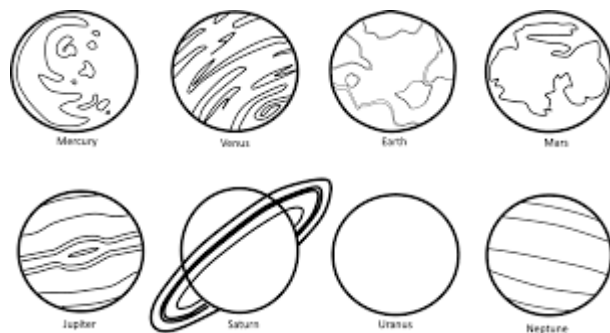
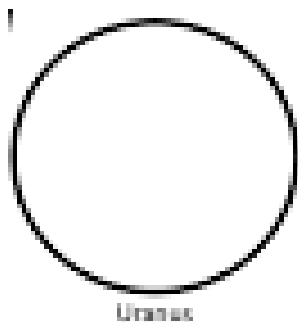
*Write 5 facts about Saturn.*



## 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.*

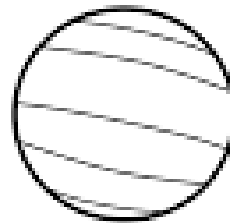




## Neptune

- 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.*



Neptune