God is Creator Teacher's Topic Guide Year 8

Topic: The Solar System **Duration: 5 weeks**

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.
Psalm 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
Psalm 19:1 The heavens declare the glory of God; the skies proclaim the work of his hands.
Psalm 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.
Psalm 104:19 - The moon marks off the seasons and the sun knows where to go down.
Psalm 102:25 - In the beginning you laid the foundations of the earth and the heavens are the work of your hands.
Psalm 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?
Psalm 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?

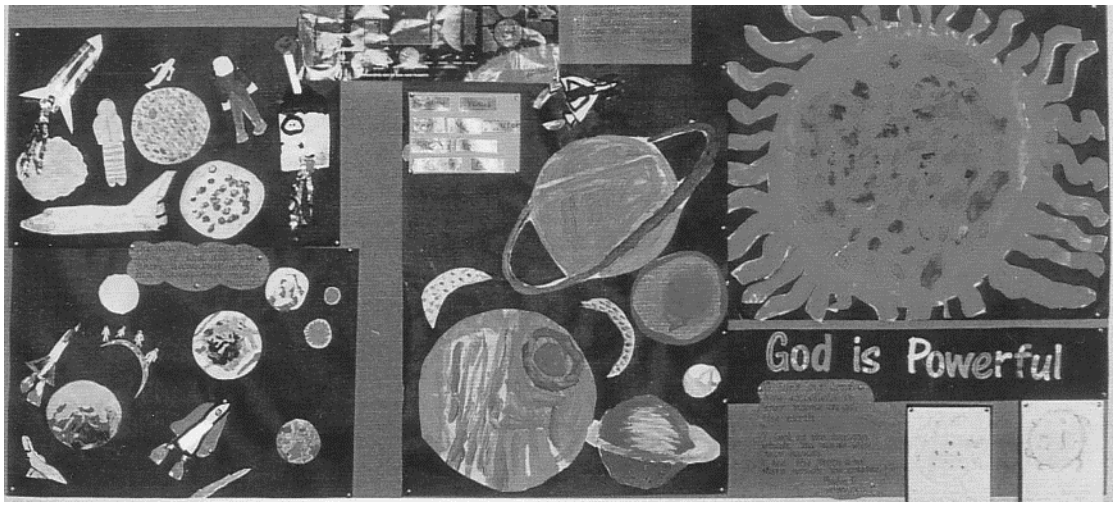
Ephesians 6:1 Children obey your parents in the Lord.
Matthew 7:12 Treat others as you would want to be treated yourself.
1 Peter 2:17 Show proper respect to everyone.

Art Year 8

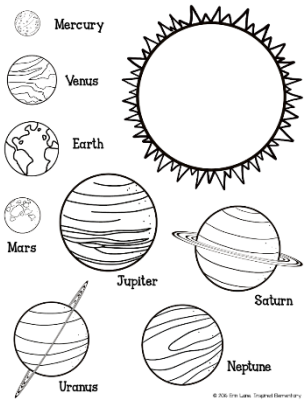
God is Creator

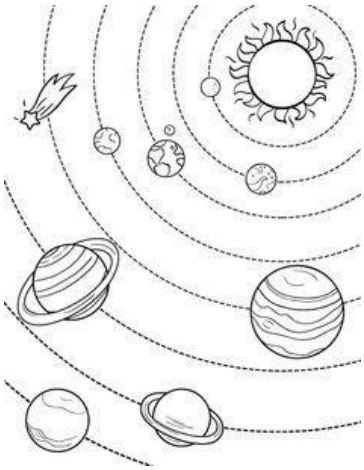
Space and the Solar System

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

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; 1¼ = Mars; 1½ = Venus; 1½ = Earth; 2 = Neptune; 2½ = 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 230º 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

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)

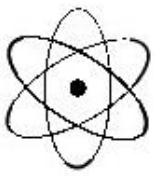
Steps

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

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

Thinking Skills Creator Yr 8

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