# Lighthouse - series

## Natural Sciences & Technology



Grade 6 Learners Guide

ACSI Association of Christian Schools International

INSTITUUT VIR CHRISTELIKE ONDERWYS

# Natural Sciences

# &

# Technology

## Grade 6

# Learner's guide



**The ICO Waterstroom series has been translated into English by Anchorage Curriculum Solutions**

INSTITUUT VIR CHRISTELIKE ONDERWYS
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## TERM 2: Matter and materials



## TERM 3: Energy and change



## TERM 4: The earth and space

# Term 1

# Life and Living things

## Values

| | |
|---|---|
| **View of God:** | A God of order. Creator of the universe. Provider. Almighty. |
| (Who is God?) | God reveals Himself in creation. |
| **View of man:** | Unique. Created in the image of God. |
| (Who am I?) | Dependent on God. |
| | My body is a temple of the Holy Spirit. |
| **View of creation:** | Cultural assignment. Stewardship. Marvel at creation. |
| (What must I do?) | |

## Knowledge

→ New words:
- Use a dictionary, the internet or any other source to look up the definition of the new words. Write it down.

→ Scientific knowledge:
- How to cultivate a balanced lifestyle.

→ Science and the environment:
- Study different ecosystems.
- Food webs and food chains.

→ Science and technology:
- Methods of and processing



## Skills

1. How to draw a natural science and technology sketch:
   - Use a grey pencil, a ruler and an eraser (try not to erase a lot). Captions are written neatly, below each other on the right-hand side. Do not colour the sketch. Work neatly. Caption lines may not cross.
2. Scientific investigation: Research.
   - Consult various sources such as textbooks, magazines and the internet. Read about the specific topic and write down what you have learned in your own words.
3. Conducting scientific investigation:
   - Test for starch.
4. Cognitive skills:
   - Write a hypothesis.
5. Understanding and understanding scientific knowledge:
   - Draw a mind map.

# Unit 1: Photosynthesis

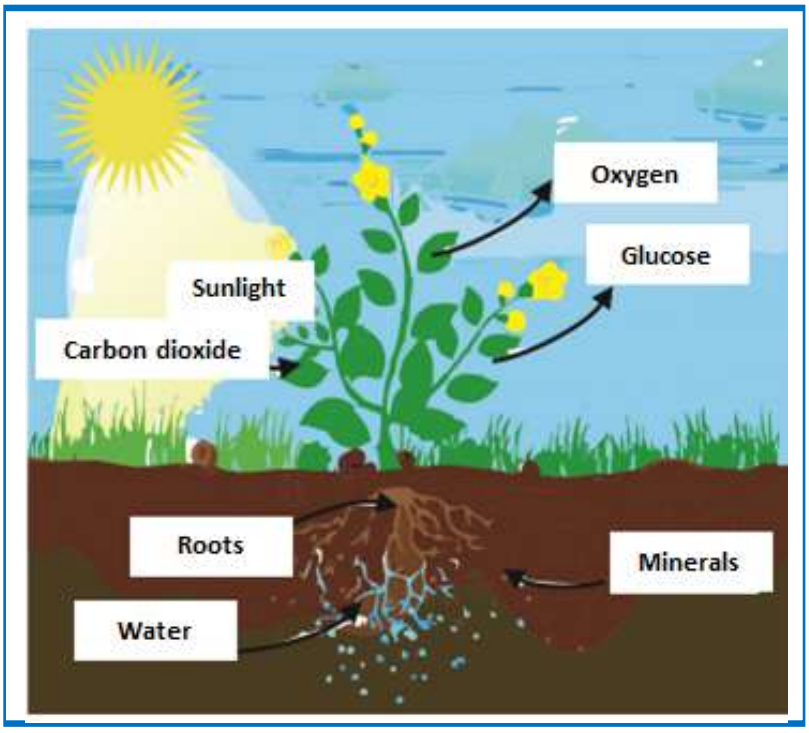
## Introduction

In Psalm 1, we read the following: "1Blessed is the one who does not walk in step with the wicked or stand in the way that sinners take or sit in the company of mockers, 2 but whose delight is in the law of the Lord, and who meditates on His law, day and night. 3 That person is like a tree planted by streams of water, which yields its fruit in season and whose leaf does not wither– whatever they do prospers." Throughout the Bible, the Lord uses the tree as a symbol of our faith, where our faith is nourished and where this proper nourishment leads. This way we as believers are taught. Just as we need the right food, including spiritual food, enough water and oxygen to grow and bear fruit, all plants also need certain ingredients to grow and produce food. We must remember that even if all conditions are ideal for a plant to grow, only God can give it growth. Truly a miracle of creation.



## 1.1 Plants and food

Plants produce their own food through a process called photosynthesis. Plants need water, carbon dioxide and sunlight for photosynthesis to take place. As humans, we have to work every day to buy food. Leaves are the breadwinner of the plant. Leaves are constantly engaged in photosynthesis to produce food for the plant for humans and animals that eat from the plant.



Plants need the following for photosynthesis to take place:

- Water - The plant's roots absorb water from the soil, then it moves through the veins to the leaves.
- Sunlight - Chlorophyll absorbs the sunlight's energy in the plant.
- Carbon dioxide - The stomata (tiny openings under the leaf) absorb the carbon dioxide from the air.
- Soil - Contains minerals and other nutrients that the plant needs during photosynthesis. Soil is also needed so that the plant can anchor and grow.

**How photosynthesis works:**

- Chlorophyll (leaf green) absorbs the energy from sunlight in the plant.
- This energy divides the water into hydrogen and oxygen.
- Oxygen is released into the air through the stomata.
- The hydrogen and carbon dioxide together produce glucose.
- The glucose (a type of sugar) is stored in parts of the plant.
- This stored glucose turns into starch.

**Oxygen and plants:**

- During photosynthesis, the plant produces oxygen. The oxygen enters the air through the stomata. Humans and animals need oxygen to live. Plants are therefore very essential for our survival.

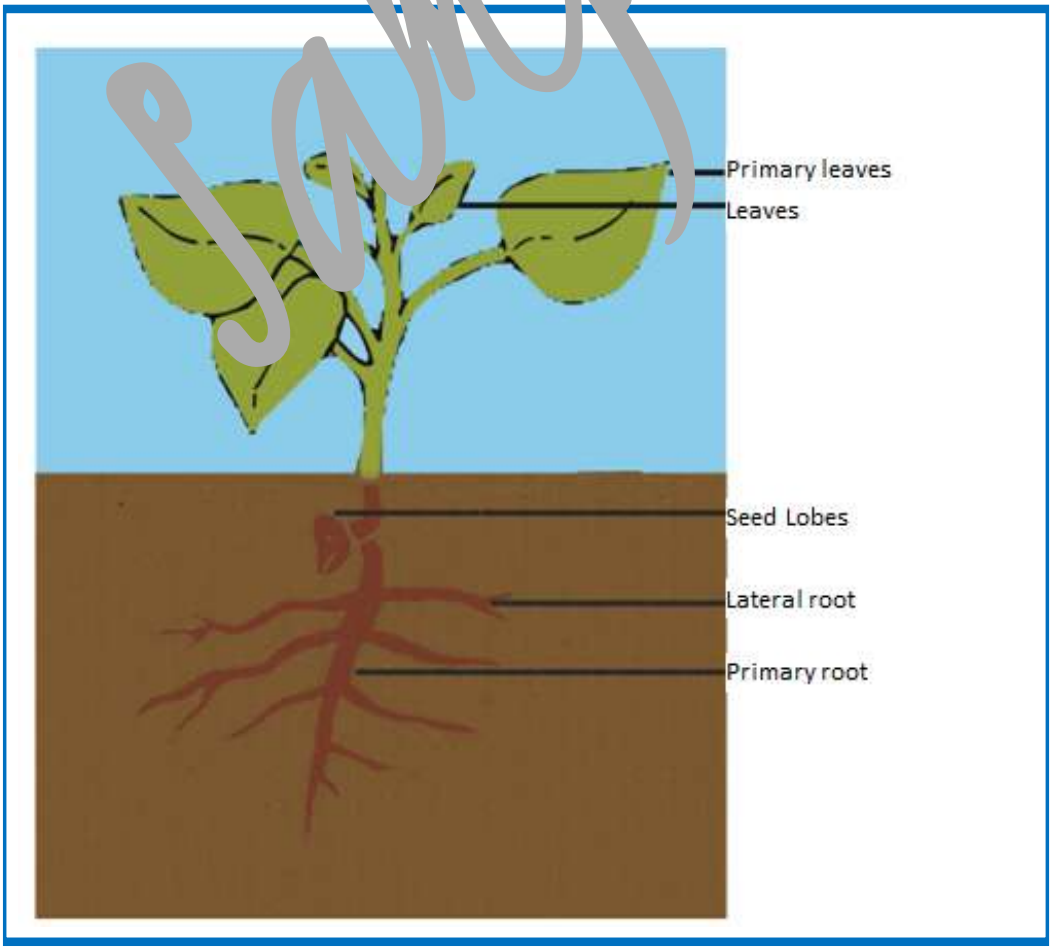
**Chlorophyll and plants:**

- Plant cells contain chlorophyll. Chlorophyll is a green pigment, and therefore, most plants are green. We also call it leaf green.
- Chlorophyll absorbs the sunlight's energy; plants can then get the energy to produce food.
- Without chlorophyll, the plant cannot produce food.

## Food and plants:

The food that plants produce is produced as glucose, and then starch is stored in the plant. Plants form glucose stored as starch in their fruits, roots, leaves, stems or seeds.


## Parts of a plant:



**How can we test for starch?**

We use an iodine solution to test if there is starch in a plant or food. An iodine solution is brown in colour, but when added to starch, the colour changes to blue-black.
The iodine solution will not change colour if the food does not contain starch.

## Activity 1: Test for Starch

**You will need:** iodine solution, dripper, some sa[illegible]ers, b[illegible]ed rice, potatoes, bread, cake flour, a banana, flour (maizena), [illegible]e a[illegible] fried egg

**Step 1:** Write a hypothesis. A hypothesis is a pre[illegible]inary [illegible]ssum[illegible]tion or idea that still needs to be tested. It is used as a ba[illegible] for [illegible]urther [illegible]ve[illegible]tigation to prove or disprove the hypothesis. You need [illegible] w[illegible]te d[illegible]own which [illegible]f the above items you think contain starch and which d[illegible]nc[illegible]

**Step 2:** Write down your metho[illegible] st[illegible]p by step [illegible]w are y[illegible]going to perform this experiment?

**Step 3:** Record y[illegible] results i[illegible] tabl[illegible]ive y[illegible]r ta[illegible]e the following headings: Food, Observati[illegible]s star[illegible]h p[illegible]sen[illegible]?

**Step 4:** Was your h[illegible]othes[illegible] c[illegible]r[illegible]? Write a short p[illegible]ragraph about your conclusion.

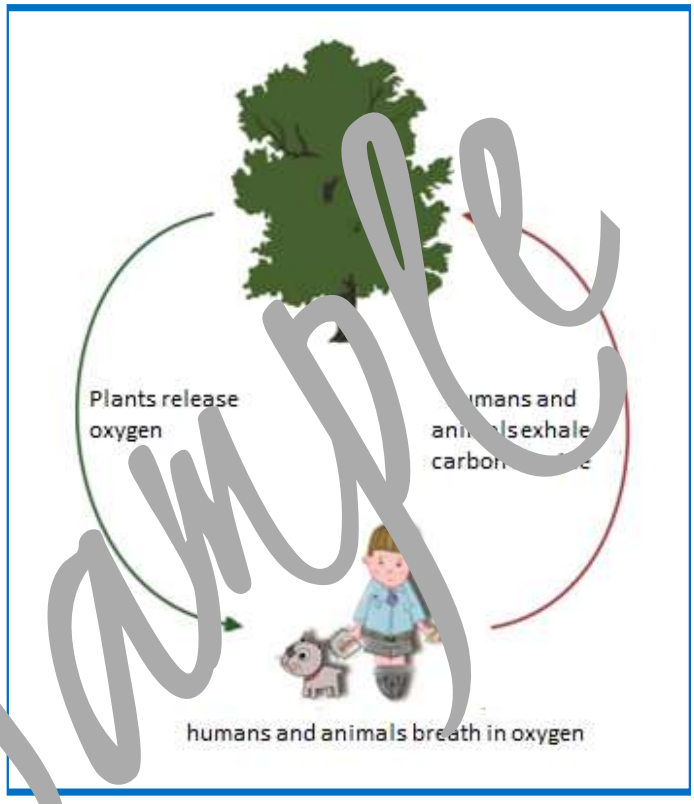


## Activity 2: Plants and F[illegible]od

1. Write the definition of the following words in your workbook:
    a. photosynthesis
    b. chlorophyll
    c. stomata
    d. pigment
2. Draw a labelled sketch to explain how photosynthesis takes place.
3. Draw a labelled sketch about the parts of the plant.

## 1.2 Plants and air

Carbon dioxide is a gas that can be harmful to us. Plants take carbon dioxide out of the air. Plants are therefore beneficial because they help to purify the air. During photosynthesis, plants release oxygen into the air. Humans and animals inhale oxygen and exhale carbon dioxide.






## Activity 3: Plants and air

1. Write down the seven life processes that all living organisms can perform. (You learned these processes in Grade 4.)
2. What three things do plants need for photosynthesis?
3. Do research on oxygen and plants and then write a paragraph. Find out how many plants are needed to give one person oxygen for a year. Also, write a few sentences to explain why it is important for us to plant and protect plants. Motivate your answer from the Bible.

## Term 2

# Mater and Materials

## Values

| | |
|---|---|
| **View of God:** (Who is God?) | Creator. Provider. Caregiver. Almighty. |
| **View of man:** (Who am I?) | Ability and command given by God to delve into creation. Created in the image of God. |
| **View of creation:** (What must I do?) | Cultural assignment. Stewardship. Develop and cultivate the earth. |

## Knowledge

→ **New words:**

- Use a dictionary, the internet or any other source to look up the definition of the new words. Write it down.

→ **Scientific knowledge:**

- Phases of matter.

→ **Science and society:**

- The importance of wetlands.

→ **Execution of scientific knowledge and problem-solving:**

- Water pollution and its prevention
- Processes to purify water

## Skills

1. How to draw a Science and Technology sketch:
   - Use a grey pencil, a ruler and an eraser (try not to erase too much).
   - Captions are written neatly and below each other on the right. Do not colour in the sketch.
   - Work neatly. Label lines may not cross.
2. Understand and connect ideas: Research.
   - Consult various sources such as textbooks, magazines and the internet. Read about the specific topic and write down what you have learned in your own words.
3. Apply scientific knowledge:
   - Examine mixtures.
   - Make sugar crystals.
4. Science and technology:
   - Make water filters to improve water quality.

# Unit 1: Solids, liquids and gases

## Introduction

We drink it, wash laundry with it, cook with it, swim in it and use it to water our gardens. Yes, it is water, the tasteless and colourless liquid that is such a big part of our lives. We need water to live. Water helps us absorb important minerals and nutrients into our bodies, and it helps us excrete toxic substances. Water can exist in all three phases of matter, solid, liquid and gas. The earth consists of 70% water. Of this water, 97% consists of salt water (the sea) that is not drinkable for us, 2% of the water is frozen, and therefore, there is a meagre 1% of this water that is usable.

God made water so that we could quench our thirst. In Job 36, verses 27 and 28, reference is already made to the water cycle, "[27]He draws up the drops of water, which distill as rain to the streams; [28]the clouds pour down their moisture, and abundant showers fall on mankind." Even the textbooks you use derive their name from water. The textbooks are based on the Afrikaans series "Waterstroom", meaning water stream. Christ is the core of our curriculum. From Him and through Him and to Him are all things. He is the living water. As humans, we must always strive to increase our knowledge of creation. It is part of the cultural mission. Therefore, knowledge is also like a stream of water that flows constantly. Now you also understand where our tap water comes from. The composition of matter is a miracle of creation which testifies of God's providence. To understand parts of it, we will dig a little deeper into the properties of matter and especially look at matter as part of mixtures and solutions.



### 1.1 Arrangement of particles

Matter exists in three different phases, solid, liquid and gas. Solids retain their shape. Liquids take the form of the container in which they are. Gases fill the entire space of the container in which it is contained. In Grade 4, you did the experiment on the next page. Do you still remember what the results were?

**Water facts:**

A faucet that drips continuously (1 drop every second) spills about 30 litres of water per day.

An ordinary garden sprayer can spray 1000 litres of water per hour.

Pure water is tasteless. Mineral salts are dissolved in water which gives the water a taste.

## Fun outing:

Move with your teacher to the rugby field and follow the teacher's instructions.

**Molecules in a solid**

Stand tight against your mates and straighten your arms. Hold the hands of the partner next to you but try not to bend your arms or body. You must stand up straight. Now try to jump around and move while standing upright between your mates.

**Molecules in a liquid**

You still have to hold hands but stand a little further apart, and you may now bend your arms. Now try to move around and jump around.

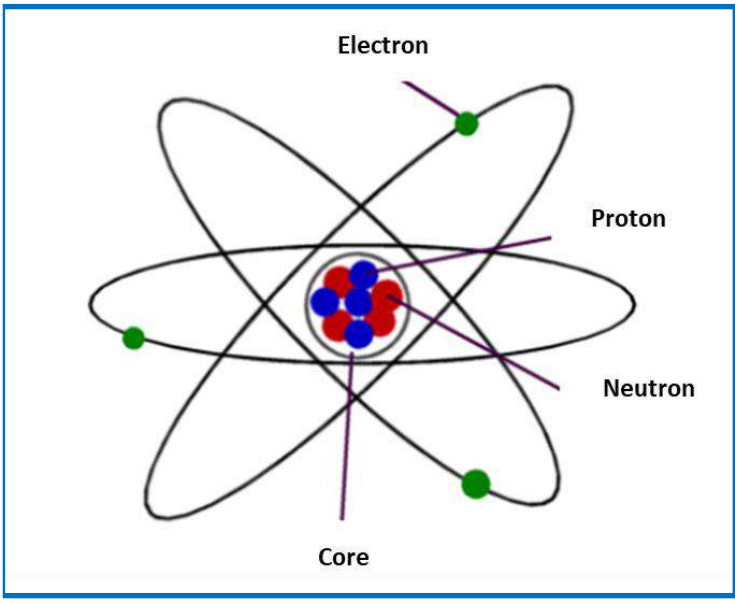
**Molecules in a gas**

Now, let go of your partner's hands and run and jump around.

All matter is made up of tiny particles called atoms. Two or more atoms together form a molecule. Molecules cannot be seen with the naked eye and must be studied under a microscope.



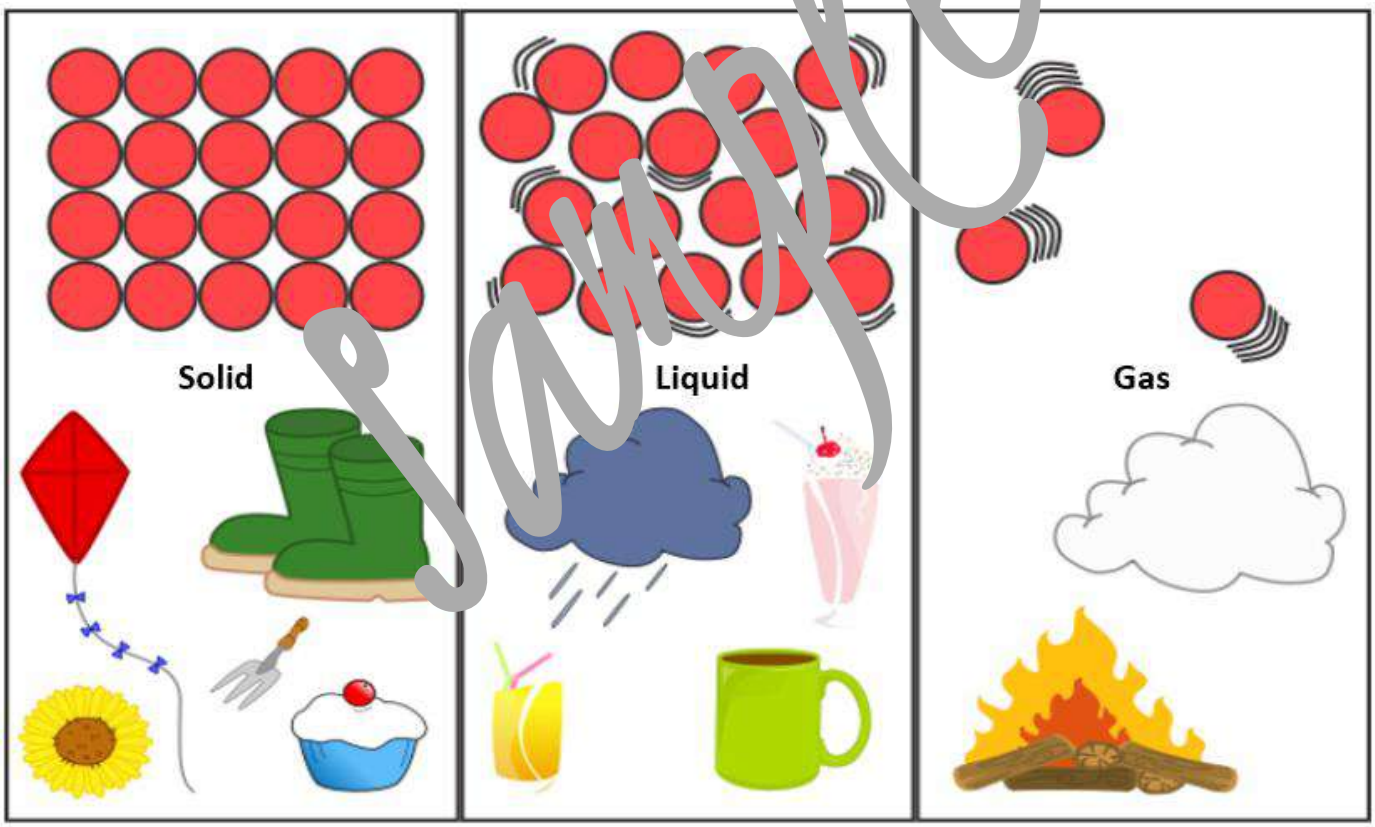
**The Atom:**



Atoms in a **solid** are tightly packed together. These atoms cannot move and cannot be compressed. Each atom has a fixed position, and therefore, the object retains its shape. Solids have a high density.

Atoms in a **liquid** are also close together and cannot be compressed. The Atoms do not have fixed positions and are constantly moving around. Liquids take the form of the container in which they are contained. Liquids have a medium density.

Atoms in a **gas** can be compressed because the atoms are far apart. The atoms move around freely and fill the entire container in which they are placed. The gas will move out and spread into space when the container is open. Gases have a low density.






## Activity 1: Arranging of particles

**Answer the following questions in your workbook:**

1. Make a summary of the properties of a solid, liquid and gas.
2. Sketch the atoms in a solid, liquid and gas in your summary.
3. Write one paragraph about what you have discovered about solids, liquids and gases.

# Unit 2: Mixtures

## 2.1 Mixtures of materials

When we mix materials, we give the material new properties. The materials together are called a mixture. Just think of a mixture of flour, milk, eggs and a pinch of salt. With this mixture, we can bake delicious pancakes. The properties of the pancakes are different from the properties of the flour (solid) or the milk (liquid). We can therefore mix materials to our advantage. Some mixtures can be easily separated again. A mixture of stones and water can be separated by removing the stones, but a pancake mixture cannot be separated again.

There are different ways we can separate mixtures from each other. We can sort it by hand, sieve, filter, settle, decant or extract by magnet.

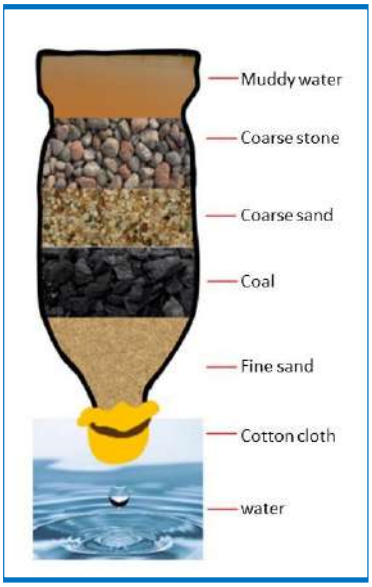
### 1. Sorting by hand

When substances in a mixture can be easily separated from each other, we can separate them by hand. The sweets in the picture can easily be separated by hand and sorted into the correct containers.

### 2. Sifting

A mixture of rice and flour can easily be poured through a sieve to separate the flour and the rice. The rice will remain in the sieve, and the flour will fall through the holes. When a mixture consists of solids, and one is very fine, it can be easily separated by sieving the mixture.

### 3. Filtering




When particles are even smaller, we can separate them by filtration. This method works very well when you want to separate a mixture of a solid and a liquid. Water and soil (mud) can be separated by this method. The water is filtered, and all the larger particles in the water will remain in the filter. Only the clean liquid will come out underneath.

There are different filters for different purposes. An air filter removes the dust molecules from the air to give us cleaner air. Water filters clean our water, and then we can boil it and drink it. The picture shows what a homemade water filter looks like.

### 4. Settlement

When you mix certain substances and let the mixture stand for a while, the substances will separate. In a mixture of sand and water, the sand will move down, and the water will stay on top. The water can then carefully be removed so that only the mud remains.

### 5. Decanting

Also used to separate a liquid and a solid. The solid can form a precipitate, and then the liquid is carefully poured out so that only the solid remains.

## Activity 2: Mixtures

Answer the following questions in your workbook:

1. Let us examine some mixtures. You will need a container of "smarties", flour, fine sand, coarse sand, rice and water.

   1.1 Mix the following materials together (each mixture in a separate bottle):

   a. Flour and water

   b. Fine sand and water

   c. Rice and water

   d. Fine sand and coarse sand

   e. Tomatoes and flour

   1.2 Which method would you use to separate the following mixtures?

   a. Smarties

   b. Flour and water

   c. Muddy water

   d. Rice and flour

   e. Fine sand and coarse sand

   f. Smarties and flour

2. Crude oil is a mixture. Research crude oil. What does crude oil consist of, and what is it used for?

3. Air is a mixture. Do research to see which gases air consists of and write them down.

# Term 3

# Energy and Change

## Values

| | |
|---|---|
| **View of God:** (Who is God?) | God creates the earth out of nothing. Almighty. Never-ending. Provider. |
| **View of man:** (Who am I?) | Created with gifts to explore creation. |
| **View of creation:** (What must I do?) | Cultural assignment. Discover. To the glory of God and my neighbour. Expansion of creation. |

## Knowledge

→ **New words:**

- Use a dictionary, the internet or any other so[illegible]e to [illegible]k up the definition of the new words. Write it down.

→ **Scientific knowledge:**

- Electrical circuits.
- Circuit diagrams.

→ **Science and Technology:**

- Conductors and non-cond[illegible]ctors
- High Voltage [illegible]e[illegible]tricity.
- Ways to generat[illegible]electr[illegible]ity

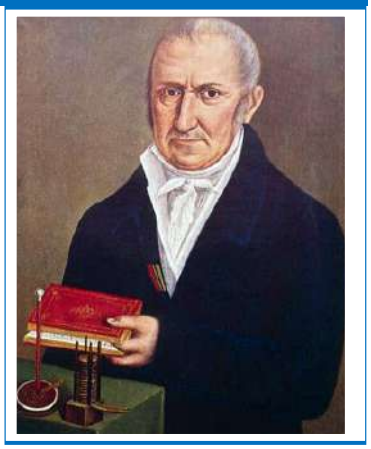


## Skills

1. **How to draw a Science an[illegible] Technology sketch:**
   - Use a grey pencil, a ruler and an eraser (try not to overdo it). Labels are written neatly in pen and placed below each other on the right hand side. Do not colour the sketch. Work neatly. Label lines may not cross.
2. **Understand and connect ideas: Research**
   - Consult various sources such as textbooks, magazines and the Internet. Research the specific topic and write down what you have learned in your own words.
3. **Exporting science and technology:**
   - Problem solving.
4. **Science, technology and society:**
   - Build a simple circuit.
   - Follow the technological process.

# Unit 1: Electric Circuits

## Introduction



The invention of electricity is a wonderful skill that is part of the cultural mission that man received in Genesis 2:15. Through the ages, God has given people gifts to develop technology. God wants to be served by this, and He also instructs us to help our neighbour with it. Inventing electricity has dramatically simplified our lives, which we can be very grateful for. Yet, we must be careful that technology, especially electricity development, does not displace God, our neighbour and creation.

One such invention that has dramatically helped man is the invention of the battery. It also meant the beginning of circuits. Alessandro Volta invented the battery in the late 1800s. The first circuit was created using a battery and electrolyte (a unique solution that can conduct electricity). It was the first working circuit. It helped to discover that certain metals could also conduct electricity. The first circuits were constructed and used primarily to provide light. These were first simple circuits all used batteries as their energy source.

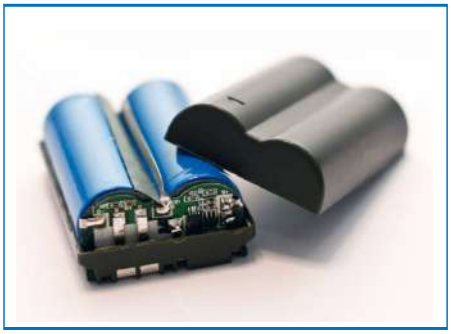
Today, electricity is part of daily human existence. Our circuits work with electricity coming from the power stations or batteries (cells). Other ways of generating electricity have also been found. Wind turbines and solar panels are good, clean and sustainable energy sources used nowadays.



## 1.1 A simple circuit

A simple circuit usually consists of the following components:

1. **An energy source** - a cell or a battery. A battery consists of two or more cells.
2. **A conductor** - A material through which electricity can be conducted.
3. **A device** - A light bulb or bell will indicate to us whether there is a flow of electricity that is converted to light or sound energy. A circuit does not need a device to work.



Chemical energy in a cell or battery is converted to electrical energy. It then moves from the negative pole of the battery down the conductor to the positive pole.

A circuit can also have a switch. When you sleep, you want the lights off. A switch interrupts the current, so the electric charge can not flow to the positive pole through the conductor. That is why the light is off. When you press the switch again, the circuit is complete, and the electric charge can flow again. The light will then go on.

## Activity 1: A simple circuit

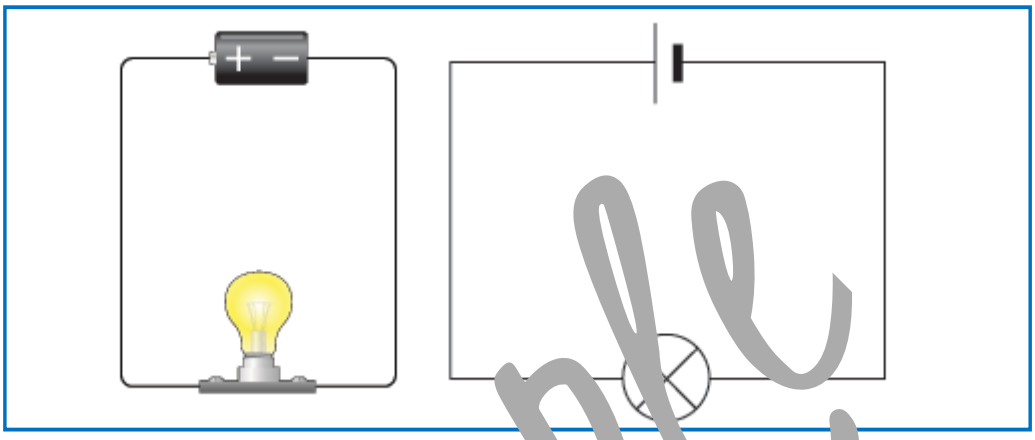
1. Which three components does a circuit need to work?
2. You are going to build a simple circuit in class. Your teacher will verify to see if your circuit is working at the end.
3. **You will need:**
   2 cells, battery holder, insulated electrical wire, flashlight bulb and a light bulb holder.

   a. Can you switch the light bulb on?
   b. What is the input and output energy?
   c. Draw a neat, labelled pencil sketch of your circuit.
   d. How can a switch be inserted into the circuit? What materials would you use to do this?

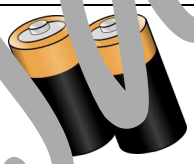
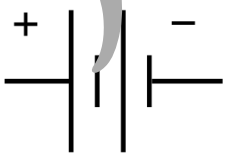
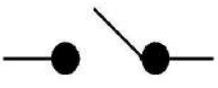
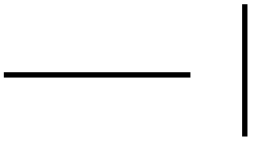
4. Use a paper clip, insulating tape, a wooden block and 2 thumbnails to make a switch for your circuit. The teacher will explain to you how to do this.
   a. What do you observe? When is the light bulb on, and when is it off?
   b. Draw your circuit again, but this time, add the switch.

## 1.2 Circuit diagrams

Every component in a circuit has a symbol. The symbols help us to draw circuits more simply. Look at the example below. On the left is an ordinary circuit. On the right is the drawing using symbols. Always use a sharp grey pencil and a ruler when you draw a sketch in science.



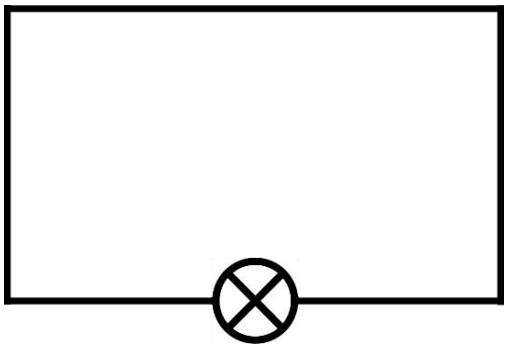


| Component | Sketch | Symbol | Function |
|---|---|---|---|
| Cell |  |  | The energy source for a circuit. |
| Battery |  |  | The energy source for a circuit. |
| Lightbulb |  |  | Electrical energy is converted into light and heat energy. |
| Open switch |  |  | Prevent the charge from flowing. |
| Closed switch |  |  | Let the charge flow. |
| Conductor |  |  | Conduct electricity |

## Activity 2: Circuit Diagram components

Study the following circuits. For each one, explain whether the light bulb will glow or what can be done so that the light bulb will glow.

1.



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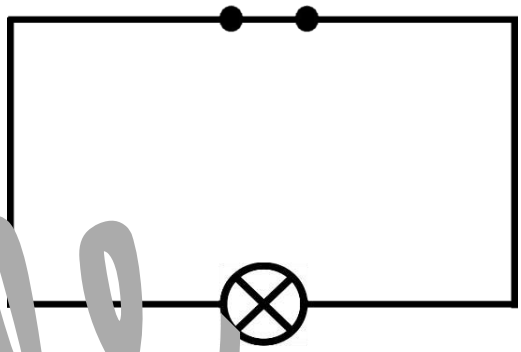
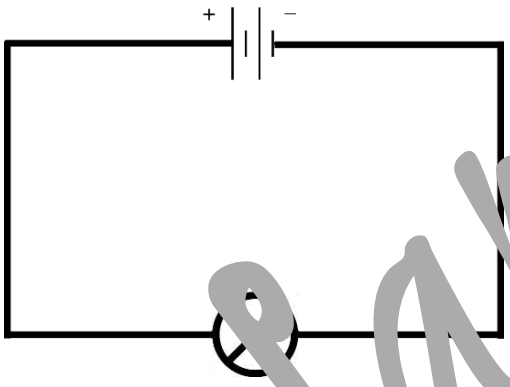
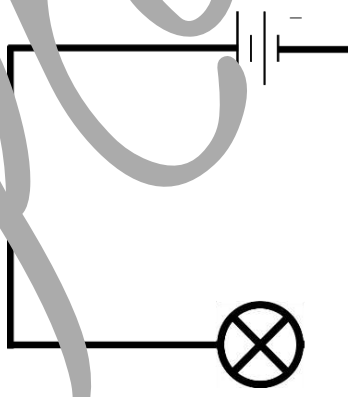


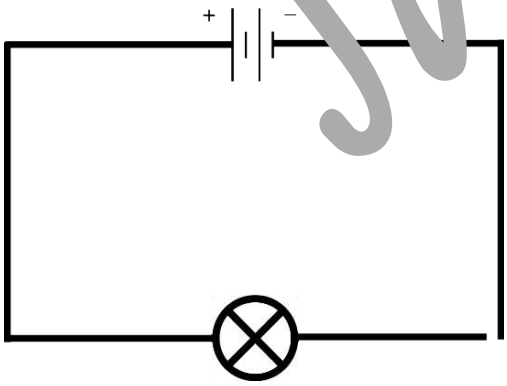
3.



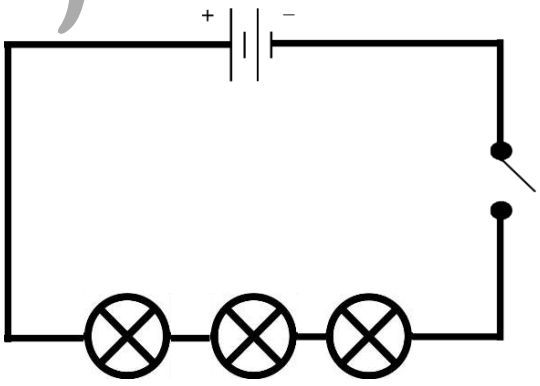

4.



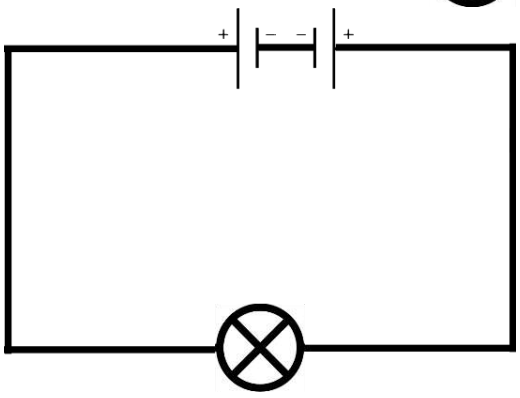

5.




6.

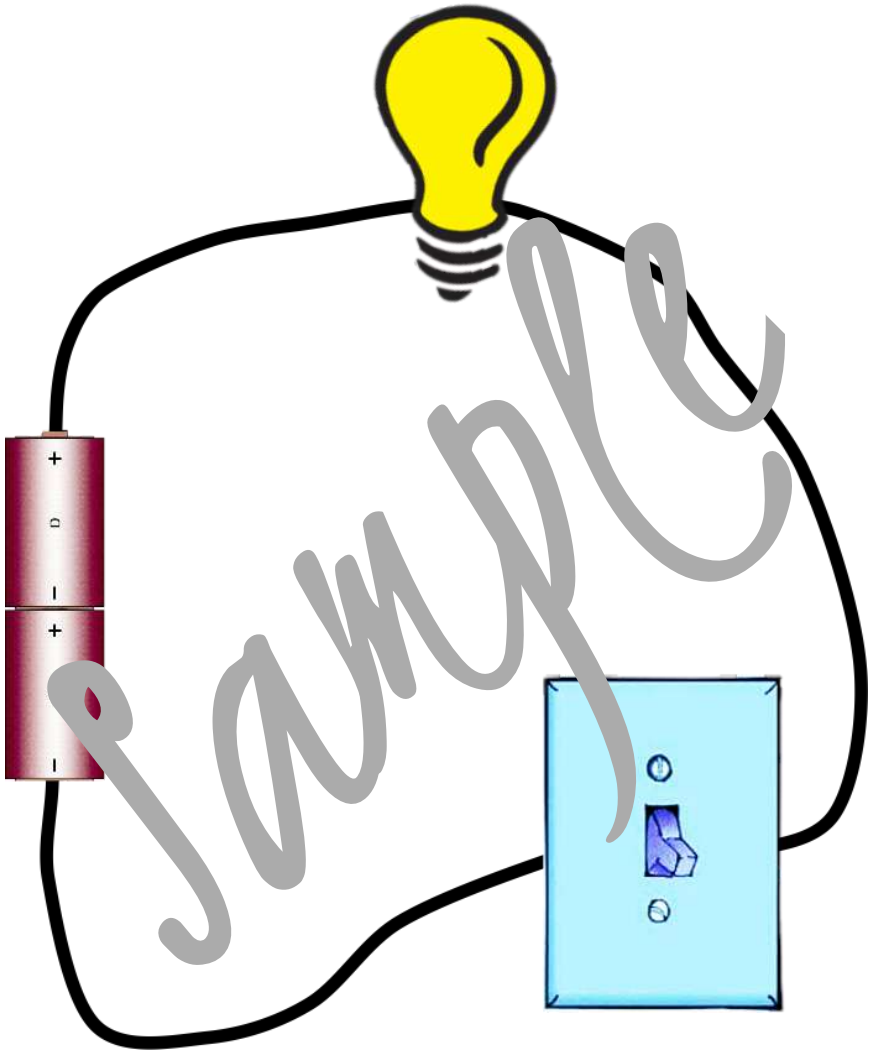



7.



## Activity 3: Circuit Diagram components

1. Study the circuit diagram below. Draw the circuit in your workbook using the correct symbols.






**2. Write the definition of the following words:**

a. Energy source
b. High Voltage electricity
c. Electric cell
d. Battery
e. Clean energy sources
f. Switch
g. Input energy
h. Output energy
i. Conductor
j. Device

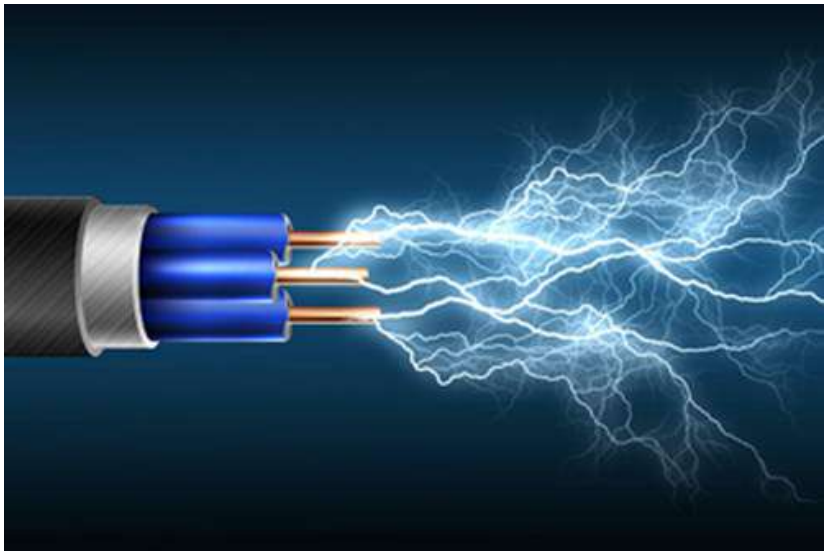
## Activity 4: Circuit Diagram components

1. **Draw the following circuits in your workbook:**
    a. A circuit diagram with one cell and one light bulb.
    b. A circuit diagram with one battery, two light bulbs and a closed switch.
    c. A circuit diagram with two batteries, four light bulbs and a closed switch.
    d. A circuit diagram with three cells, two light bulbs and an open switch.

2. **What is the function of each of the following components?**
    a. A conductor
    b. An electric cell
    c. A switch
    d. A light bulb

3. **Research circuits.**
    What devices can still be inserted in a simple circuit? Draw a simple circuit with a battery, switch and a device (not a light bulb). Make sure what the symbol for the device looks like before inserting it into your circuit diagram.





## Term 4

# Planet Earth and Space

## Values

| | |
|---|---|
| **View of God:** (Who is God?) | God reveals His Eternal Power and Divinity in creation. God's hidden counsel and will and His revealed counsel and will are evident in creation. |
| **View of man:** (Who am I?) | Dependent on God. The ability to understand is from God. |
| **View of creation:** (What must I do?) | Cultural assignment. Stewardship. Discover. Name. |

## Knowledge

→ **New words:**

- Use a dictionary, the Internet or any other source to look up the definition of the new words. Write it down.

→ **Scientific knowledge:**

- The sun, planets and asteroids.
- The earth and the moon in space.

→ **Exporting sciences and technology:**

- What a telescope does.
- Systems to explore the moon and Mars



## Skills

1. **How to draw a Science and Technology sketch:**
   - Use a grey pencil, a ruler and an eraser (try not to overdo it). Labels are neatly written in pen and placed below each other on the righthand side. Do not colour the sketch. Work neatly. Label lines may not cross.
2. **Scientific investigation: Research**
   - Consult various sources such as textbooks, magazines and the internet. Research the specific topic and write what you have learned in your own words.
3. **Export of sciences and technology**
   - Build a scale model of our solar system

# Unit 1: The solar system

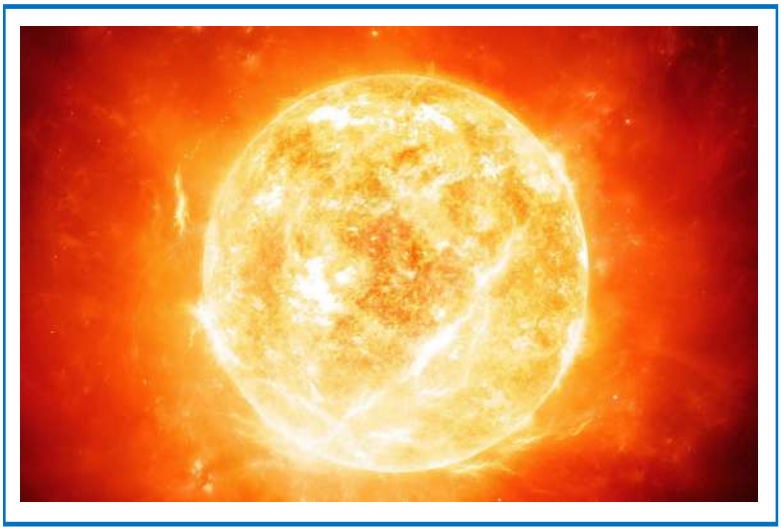
## Introduction

When there are no clouds in the sky, we can see countless stars in the sky. It is impossible to count how many stars there are. Yet Psalm 147 verse 4 says that the Lord determines the number of stars and that He gives them all names. God also knows each of us by our names. He wrote our names on the palm of his hand. God is in control of everything. He carefully gave each star a place and named it. Just as no hair will fall from your head without His will, He governs and rules over every heavenly body according to His Holy will that nothing happens without His disposition.



### 1.1 The sun, planets and asteroids

Stars consist of burning gases. The sun is also a star but is much closer to the earth than the other stars you see in the sky. When stars burn, they give off heat and emit light. The other stars are just as big as the sun, but they are much farther away, so they appear smaller. The sun is 150 million kilometres from the earth, and it takes the sun's rays 8 minutes to reach the earth. The sun is the centre of our solar system.



The earth, planets and other celestial objects revolve around the sun. Temperatures on the sun's surface can reach up to about 6000 °C.

## Activity 1: Planet Earth and Space

1. Match the definition on the right with the word on the left. Write the word with the correct definition next to it.

| Word | Definition |
|---|---|
| Telescope | Everything in space. |
| Universe | It takes the earth 365¼ days to orbit the sun once. |
| Solar system | An imaginary line through the earth around which the earth rotates. |
| Orbit | An object that rotates around another object on the fixed orbit. |
| Revolution | A natural satellite orbiting the earth. |
| Rotation | The path along which each planet orbits the sun. |
| Imaginary axis | Giant balls of gas burning. |
| Satellite | It takes the earth 24 hours to revolve one time around its own imaginary axis. |
| Moon | An instrument used to look at objects in the universe. |
| Stars | The earth and other planets orbiting the sun. |

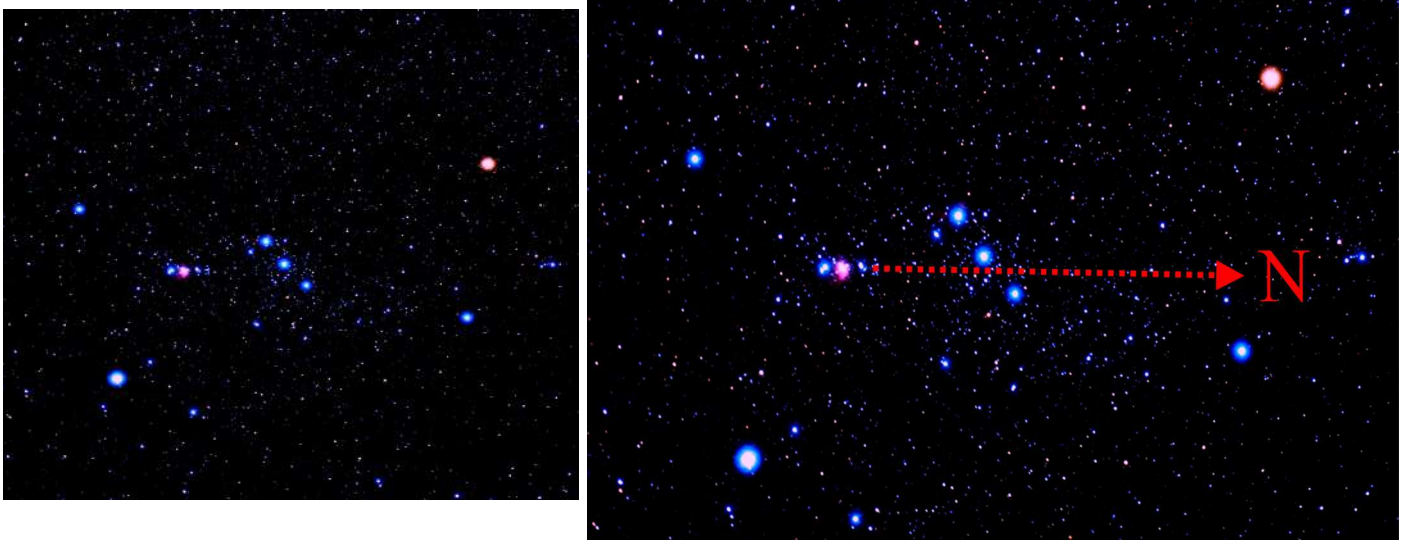
2. **Answer the following questions:**
   a. What type of energy is released by the burning gas of a star?
   b. What does the earth consist of? (rocky / gases)
   c. How long does it take the earth to rotate once around its own axis?
   d. How long does one revolution of the earth around the sun take?
   e. What is the biggest difference between the outer and inner planets?
   f. Write down the order of the planets from the sun.

Many years ago, people used the sky to point them in the right direction and to tell time. They also kept a close eye on the sky and recorded changes as they noticed them. By studying the sky, they discovered that stars do not move but only stay in one place, just like the sun. Stars that are close to each other are called constellations. The Southern Cross constellation is used to indicate south and the Orion constellation to indicate north.

Study the picture below to see how the people use the Southern Cross to indicate direction. The photo on the left shows what the Southern Cross looks like in the night sky, and the photo on the right shows how to use the cross to indicate direction.



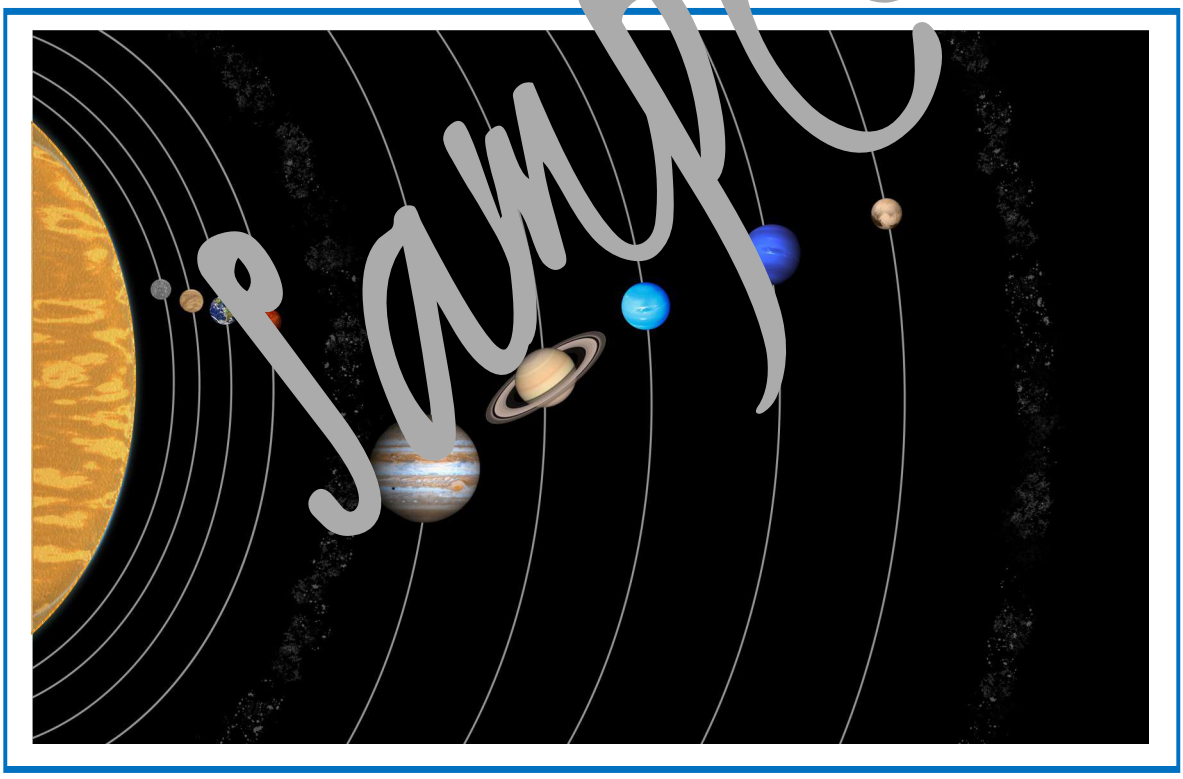

The photos below show us the Orion constellation. There are three stars in a row that is called Orion's belt. These stars form the line that must be followed to get true north.



Through studying the sky, the people observed that certain celestial bodies were moving. They noticed that these moving objects were close to a star one night, and the object was a little further away the next night. Years later, people with better telescopes were able to study the sky and determined that these moving objects were actually planets orbiting the sun.

The technology with which we are studying the universe is constantly changing and improving, which means that we can study the sky better. Nine planets are orbiting the sun, including the dwarf planet Pluto. Pluto was officially classified as a dwarf planet in 2006. Since then, many dwarf planets have been discovered in our solar system. Research is constantly being done. New things are discovered all the time.





The four inner planets are rocky like the earth. The next four planets are gas giants. All the planets move in their own orbits around the sun. After Mars, there is a strip full of small rocky objects that also orbit the sun. These objects are called asteroids. Asteroids are mostly found in the asteroid belt between Mars and Jupiter. Asteroids are attracted to the earth by the earth's gravity. When the asteroid enters the earth's atmosphere, it starts to burn out due to the friction in the air.

## Meteors

Meteors are also rocklike objects in space, but meteors do not revolve around the sun. A meteor can be attracted to the earth and start burning as soon as it enters the atmosphere. The streak of light that the meteor makes when it burns out is called a shooting star by some people, but it's actually a meteor that burns out in the atmosphere. Sometimes the meteor does not burn out completely and can then hit the earth. When the meteor hits the earth, we call it a meteorite.

One of the largest meteorites ever found on Earth is the Hoba meteorite in Grootfontein, Namibia. The meteorite weighs about 60 tons and consists mainly of iron. You can also see the big hole that the meteorite made in the earth in the picture below. This hole is called a crater.

## Activity 2: Research assignment

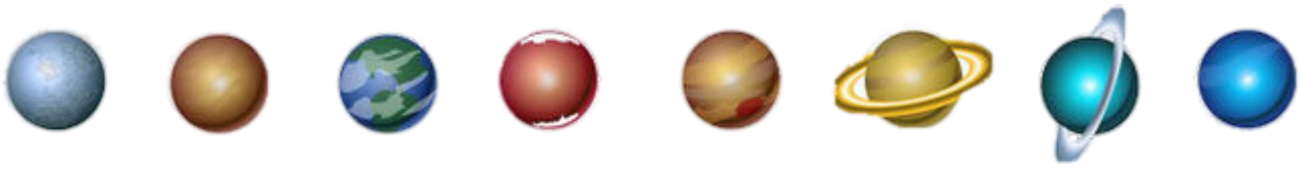
Research the first eight planets from the sun. Do the assignment in your workbook or as your teacher instructs you. Bring the information to school and then complete the following information about each of the planets:

a. Size (perimeter).
b. Distance from the sun.
c. Average temperature.
d. Does the planet have moons? How many?
e. An interesting fact about the planet.
f. A sketch or picture of the planet.

Rubric:

| | 4 | 3 | 2 | 1 |
|---|---|---|---|---|
| The learner brought information to school and completed the assignment at school | | | | |
| Research has been done on each of the eight planets | | | | |
| All information is complete | | | | |
| There is an interesting fact about every planet | | | | |
| The assignment was done correctly | | | | |



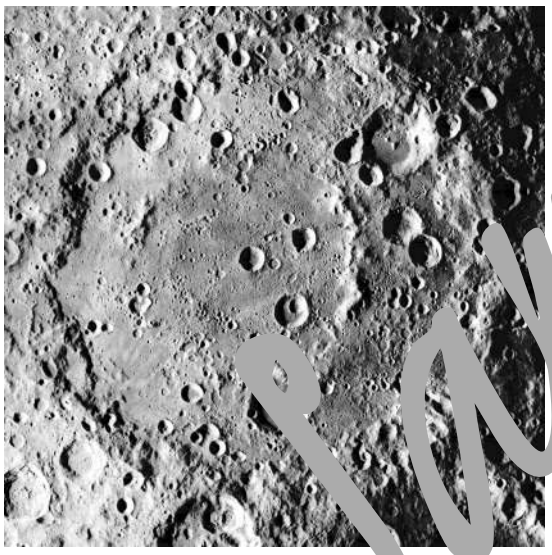


## 1.2 Moons

Moons do not give off light or heat but only reflect the light of the sun. Mercury and Venus are the only two planets that do not have moons. All the other planets have moons.

The earth's moon is very mountainous, and huge craters can be found on the moon's surface. There is no air or water on the moons. We can see the craters clearly. Even the footprints of the first lunar landing can be seen because there is no wind on the moons to blow the dust away. It does not rain on the moons, so there is no erosion.

The surface of the moons





## Activity 3: Moon

1. What is a crater?
2. Why is there no erosion on the moon?
3. Why can the craters be clearly seen?
4. Where does the moon get its light from?
5. How long does it take the moon to orbit the earth once?

Not all planets take the same amount of time to orbit the sun. Each planet's orbit is unique and moves at its own speed. The farther the planet is from the sun, the longer it takes for the planet to orbit the sun.

| Planet | Revolution (Earth days) | Rotation about own axis | Number of moons |
|---|---|---|---|
| **Mercury** | 88 days | 59 days | 0 |
| **Venus** | 225 days | 43 d | 0 |
| **Earth** | 365 ¼ days | 24 urs / 1 day | 1 |
| **Mars** | 687 days | hours | 2 |
| **Jupiter** | 11.9 years | 10 ours | 63 |
| **Saturn** | 29.5 years | 0 ho rs | 60 |
| **Uranus** | 84 year | 3 hours | 27 |
| **Neptune** | 164. years | 1 hours | 13 |



## Activity 4: Solar syst m

At the nearby nursery school, he teacher wants to show her class what the solar system looks like. You need to mak a olar system model so that the teacher can show it to her class.

Use the technological process to solve this problem. All steps must be submitted with your task. Also, study the assessment table on the next page so that you know exactly what is expected of you.

The following should be clearly visible on your model:

- The sun and the first eight planets
- Each planet's correct colour and size compared to the sun (a scale model)
- The distance that each planet is from the sun

On the next page, there are some examples that you can study and use for ideas to create your own solar system.

## Activity 4: Solar system (continues)




**Rubric:**

| | |
|---|---|
| 1. The technological process was followed and submitted. | /6 |
| 2. Sun and planets are clearly visible. | /3 |
| 3. Sequence of planets. | / 2 |
| 4. Colour of planets. | / 3 |
| 5. Size of planets and physical characteristics, for example, rings around Saturn. | / 3 |
| 6. Additional information or effort was made (Asteroid Belt / moons / stars). | / 2 |
| 7. Project was handed in on time. | / 1 |
| **Total:** | /20 |

Sample

# Grade 6 Learners Guide

ACSI
Association of Christian Schools International

INSTITUUT VIR
CHRISTELIKE ONDERWYS