Geography Year 1

SECTION 2

THE SOLAR SYSTEM

THE EARTH AND ITS NEIGHBOURHOOD

The Earth and its Features

Introduction

This section discusses the vastness of our solar system. It begins with an examination of our primary star, the Sun, around which all other celestial bodies in the system orbit. You will study the main features of the eight planets, ranging from the inner planets, such as Earth and Mars, to the gaseous giants like Jupiter and Saturn, and extend to the remote, icy domains of Uranus and Neptune.

This section can be linked to the topic of solar systems in general science at the senior high school level and social studies at the junior high school level. You will also gain a deeper understanding of the Sun and the characteristics of each of the planets.

At the end of this section, you should be able to:

- Describe the solar system and its constituents.
- Discuss the characteristics of the planets in the solar system.

Key Ideas

- The solar system consists of the Sun, planets, and other heavenly bodies.
- The components of the solar system include the Sun, planets, comets, asteroids, meteorites, and satellites.
- There are eight planets.

THE SOLAR SYSTEM AND ITS CONSTITUENTS

The meaning of the solar system

The solar system consists of the Sun, the planets, and other heavenly bodies. It is one of the million stellar systems in the Earth's galaxy or nebula, known as the *Milky Way*. Galaxy or Nebula refers to a cluster or group of billions of stars, together with gases and dust, held together by gravitational forces.

Components of our solar system

A component simply means a part of a whole. That part combines or joins with other parts to form a bigger one. So when we say the components of the solar system, it simply means parts that make up the solar system or constituents of the solar system. The components are discussed below:

- **Sun**: The Sun is the star at the centre of the solar system and all other planets revolve around it in an elliptical orbit. It is the largest and brightest object in the solar system. The Sun consists of 70% hydrogen, 28% helium, and 2% of the remaining consists of carbon, oxygen, iron, neon, and other elements. It has a surface temperature of about 6000°C.
- **Planets:** They are spherical objects that circle around the Sun and are massive or dominant in their region of space. There are eight planets. Mercury is the closest to the Sun followed by Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune which is the furthest from the Sun.
- **Comets:** They are small icy or frozen bodies in space that shed gas and dust.
- **Asteroids**: They are small rocky objects that orbit the sun.
- **Meteorites:** They are the solid body of rock and iron that orbits the sun. They range in size from tiny particles to boulders.
- **Satellites:** They are smaller heavenly bodies that revolve around the planets. The moon is the only natural satellite of the Earth. It takes the moon approximately 27 days to orbit around the earth. The average distance from the Earth to the moon is 384,400km.

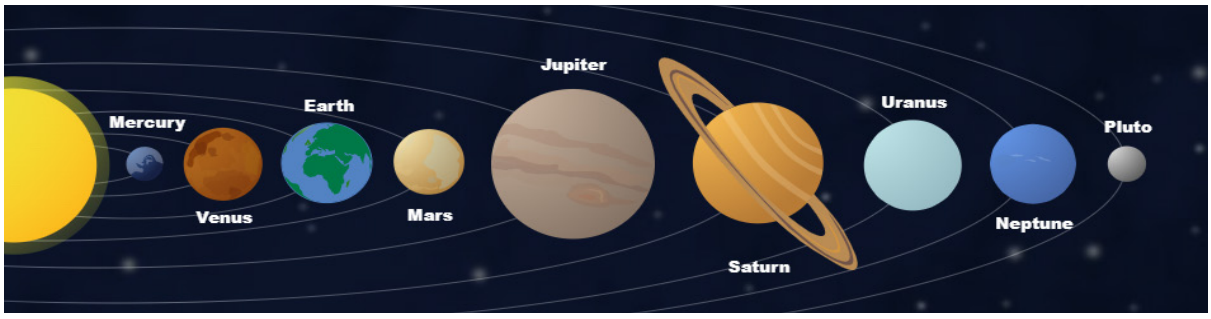


Fig. 2.1: The solar system in diagram

The planets are in their elliptical orbit round the Sun. Observe the diagram carefully. Try and draw it in your notebook.

CHARACTERISTICS OF THE EIGHT (8) PLANETS

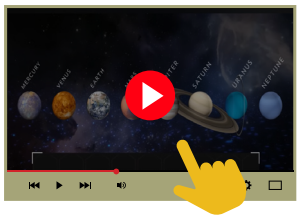
The planets have the following characteristics:

1. **Mercury**:
   - First in order of distance from the sun
   - Smallest planet
   - Takes 88 Earth days to complete one revolution on its orbit
   - Has the shortest orbit around the sun
2. **Venus**:
   - Spherical in shape
   - Hottest planet
   - Similar in size and mass to Earth, has a thick atmosphere
   - It takes Venus 225 days to complete its revolution.
3. **Earth**:
   - The only known planet that supports life
   - It is spherical in shape
   - Takes 365¼ days to complete one revolution on its orbit
4. **Mars**:
   - Also called the red planet
   - It is the fourth planet in terms of its position from the sun
   - It is spherical in shape
   - It takes Mars 687 days to make a revolution around the sun
5. **Jupiter**:
   - Largest planet in the solar system
   - It has rings around it
   - Made up of gases
   - Its distance from the sun is 772,800,000 km
6. **Saturn**:
   - Second largest planet in the solar system
   - It takes 29 Earth years to make one complete revolution on its orbit
   - It is composed of gases, predominantly hydrogen
7. **Uranus**:
   - Third largest planet
   - The only planet that rotates on its sides - at nearly 90°
   - The coldest in the solar system
   - It takes Uranus 88 years to complete its orbit
8. **Neptune**:
   - The planet that is farthest away from the sun
   - It is the fourth largest in the solar system
   - It has an average distance of 4.5 billion km away from the sun

IMPORTANCE OF THE SOLAR SYSTEM AND THE SUN

- The Sun provides heat to the planets. The Sun heats the Earth, providing it with the right temperature for living beings to survive.
- The Sun provides light to the Earth. Light helps provide energy to the Earth through electromagnetic energy. It also helps humans as well as animals to see day and night. The light also helps plants to grow by powering the process of photosynthesis.
- The solar system, particularly the Sun, drives the water cycle and influences the climate. The Sun's heat causes evaporation and transpiration, leading to cloud formation and, eventually, rainfall. This cycle is essential for sustaining most life on Earth.
- The solar system, through the Sun, provides an important source of energy on the planets. On Earth, some of the energy produced through electricity is directly or indirectly from the Sun, which is called solar energy.
- The Sun's gravity helps keep the planets in the solar system in a stable orbit around the sun.
- The solar system on the planet Earth provides a habitable home for living organisms. You see, we survive on the planet Earth because it has ideal conditions for living organisms like you and me.

Visit the link below to watch a video on the solar system:



If you cannot access the video, check your school, local library or an internet café near your home.

Activity 2.1

1. Make a table that shows two characteristics of each of the eight planets in our solar system.
2. Use a pencil and ruler to draw the table neatly with planets in order from smallest to largest.
3. Make a list of the benefits the Sun provides for our Earth.

   Benefits: The Sun is responsible for day and night, solar power, gravity, keeping Earth in the same orbital path around the sun, powering the water cycle to produce rain, powering the process of photosynthesis.
4. Study each planet individually; from the closest to the farthest from the Sun. Analyse their unique features such as size, composition, atmosphere, and their satellites.

Review Questions

1. List three other constituents of our solar system, apart from the Sun and planets.
2. Make a list that places the planets in their correct order, nearest to furthest from the Sun.
3. Make a list that places the planets in order of size, smallest to largest.
4. A way of remembering the planets in order from the closest to the furthest away from the Sun is the sentence ‘My Very Educated Mother Just Served Us Nkwan’. Each starting letter represents a planet. Make up your sentence to help you remember the planets in order of size.
5. State two key characteristics of each of the eight (8) planets.

Answers to Review Questions

1. Asteroids, comets, satellites or the moons of planets, meteorites.
2. Mercury is the closest to the sun followed by Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.
3. Mercury, Mars, Venus, Earth, Neptune, Uranus, Saturn, Jupiter.
4. Any sentence that can be easily remembered.
5. Any characteristic that relates to that particular planet.

Extended Reading

- https//science.nasa.gov (Further reading on characteristics of the solar system)
- Eyes on the Solar System: A real-time solar system visualization using planetary science data.
- The YouTube link is on exploring our planets in the Solar System: https://youtu.be/lcZTcfdZ3Ow

References

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Acknowledgements

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