# Lesson 2: SOLAR SYSTEM

### Objective

* Introduce students to solar system and familiarize them with 8 planets- their order, size and their names.

### What is the Solar System?

Our solar system is made up of many parts. It is a combination of a single star and planets, moons and other objects that orbit around it. Think of it like a neighborhood. The solar system is our neighborhood, but we are also part of a bigger galaxy called the Milky Way--just like a neighborhood might be part of a bigger city.

We are one of hundreds, and maybe even thousands, of solar systems in our galaxy. The Sun is our star that rotates at the very center of our solar system. It's huge, hot and very bright. The Sun gives the solar system light and heat, which both make it possible for there to be life on Earth. Around the Sun, eight planets orbit in different patterns.

### The Planets

Our solar system has eight main planets that rotate around the Sun. Planets are large bodies in space that orbit a star. There are four inner planets and four outer planets. The inner planets are Mercury, Venus, Earth and Mars. The outer planets are Jupiter, Saturn, Uranus and Neptune.

The inner planets are smaller and have rocky surfaces. The Earth is an inner, rocky planet that sits at just the right distance from the sun, which is how it is able to support life

### Moon

Moon is the natural satellite of the earth, visible (chiefly at night) by reflected light from the sun and thought to have formed about 4.51 billion years ago.

The day on which the whole disc of the moon is visible is known as the full moon day. Thereafter, every night the size of the bright part of the moon appears to become thinner and thinner. On the fifteenth day the moon is not visible. This day is known as the ‘new moon day’. The next day, only a small portion of the moon appears in the sky. This is known as the crescent moon.

Neil Armstrong was the first human to land on Moon.

### Mercury

The planet mercury is nearest to the Sun. Because Mercury is very close to the Sun, it is very difficult to observe it, as most of the time it is hidden in the glare of the Sun. It is the smallest planet of our solar system. Mercury has no satellite of its own.

### Venus

Venus is earths nearest planetary neighbor. Sometimes Venus appears in the eastern sky before sunrise. Sometimes it appears in the western sky just after sunset. Therefore it is often called a morning or an evening star, although it is not a star.

### Earth

The Earth is the only planet in the solar system on which life is known to exist. Earth is 149.6 kilo-meters from the sun. The Sun is the source of almost all energy on the Earth.

### Mars

Mars is the second-smallest planet in the Solar System after Mercury. Mars appears slightly reddish and, therefore, it is also called the red planet. Mars is approximately half the diameter of Earth with a surface area only slightly less than the total area of Earth's dry land.

### Jupiter

Jupiter is the largest planet of our solar system. It is so large that about 1300 earths can be placed inside this giant planet. However, the mass of Jupiter is about 318 times that of our Earth.

Jupiter has a large number of satellites. It also has faint rings around it. You can easily recognize Jupiter as it appears quite bright in the sky.

### Saturn

Beyond Jupiter is Saturn which appears yellowish in color. What makes it unique in the solar system is its beautiful rings. These rings are not visible with the naked eye. You can observe them with a small telescope. Saturn also has a large number of satellites.

### Uranus

The seventh planet from the sun with the third largest diameter in our solar system, Uranus is very cold and windy. The ice giant is surrounded by 13 faint rings and 27 small moons as it rotates at a nearly 90-degree angle from the plane of its orbit. This unique tilt makes Uranus appear to spin on its side, orbiting the sun like a rolling ball.

### Neptune

Neptune is the outermost planets of the solar system. They can be seen only with the help of large telescopes.

The first four planets, Mercury, Venus, Earth and Mars are much nearer the Sun than the other four planets. They are called the inner planets. The inner planets have very few moons. The planets outside the orbit of Mars, namely Jupiter, Saturn, Uranus and Neptune are much farther off than the inner planets. They are called the outer planets. The outer planets have large number of moons.

### Comets

Comets are also members of our solar system. A Comet appears generally as a bright head with a long tail. The tail of a comet is always directed away from the sun

Many comets are known to appear periodically. One such comet is Halley’s Comet, which appears after nearly every 76 years. It was last seen in 1986.

### Meteors

A meteor is usually a small object that occasionally enters the earth’s atmosphere. At that time it has a very high speed. It glows and evaporates quickly. That is why the bright steak lasts for a very short time.

Some meteors are large and so they can reach the Earth before they evaporate completely. The body that reaches the Earth is called a meteorite.

Asteroids  
There is a large gap in between the orbits of Mars and Jupiter. This gap is occupied by a large number of small objects that revolve around the Sun. These are called asteroids. Asteroids can only be seen through large telescopes.

### Distance of Various Planets from Sun

|  |  |
| --- | --- |
| **Planet Name** | **Distance from Sun(in Millions KM)** |
| Mercury | 57.91 |
| Earth | 149.6 |
| Mars | 227.9 |
| Venus | 108.2 |
| Jupiter | 778.5 |
| Saturn | 1429 |
| Uranus | 2817 |
| Neptune | 4498 |

### Glossary

Asteroid: An asteroid is a large, irregularly shaped object in space that orbits our Sun.

Celestial object: Celestial body is any natural body outside of the Earth's atmosphere.

Comet: A celestial object consisting of a nucleus of ice and dust and, when near the sun, a ‘tail’ of gas and dust particles pointing away from the sun.

Dwarf Planet: A celestial body resembling a small planet but lacking certain technical criteria that are required for it to be classed as such.

Galaxy: A system of millions or billions of stars, together with gas and dust, held together by gravitational attraction.

Meteor: A small body of matter from outer space that enters the earth's atmosphere and appears as a streak of light.

Milky Way: Milky Way is a galaxy that contains our Solar System.

Moon: The natural satellite of the earth, visible (chiefly at night) by reflected light from the sun.

Orbit: An orbit is a path. It's the way something goes around an object in space. The moon goes in orbit around Earth.

Planet: A celestial body moving in an elliptical orbit around a star.

Solar System: The collection of eight planets and their moons in orbit round the sun, together with smaller bodies in the form of asteroids, meteoroids, and comets.

Star: A star is a huge glowing ball of hot gas, mainly hydrogen and helium.

Sun: The star around which the earth orbits.

### Lesson Summary

* The solar system consists of eight planets and a host of asteroids, comets and meteors.
* Jupiter is the largest planet of the solar system.
* Mercury is the smallest planet in our solar system.
* Mercury is the planet which is closest to the sun & smallest planet in our solar system.
* Neptune is the planet farthest from the sun.

### Keywords

ASTEROIDS, COMETS, METEORITES, METEORS, SOLAR SYSTEM, STAR

### Queries

1. What is the total number of planets in our solar system?

Answer - Eights planets are in our solar system

1. Which is the nearest planet from Sun?

Which planet is closest from Sun?

What is the name of the planet that is nearest from the Sun?

What is the name of the planet that is closest from the Sun?

Answer - The nearest planet from Sun is Mercury

1. Which is the brightest planet in the night sky?

During the night time which is the brightest planet in our Solar system?

At night which is the brightest planet in our Solar system?

Answer - Venus is the brightest planet in the night sky

1. Which is the largest planet of our Solar System?

Which is the biggest planet of our Solar System?

What is the name of the biggest planet in our Solar System?

Answer - Jupiter

1. What is the name of the planet which is farthest from the Sun?

Which planet is most distant from the Sun?

Answer - Neptune is farthest from the sun

1. What is the name of the planet which appears yellowish in color?

Which planet appears yellow in color?

Name the planet that appears yellow in color?

Answer - Saturn

1. Which planet appears “Red” in Color?

What is the name of the planet which appears red in color?

Name the planet that appears red in color?

Answer - Mars

1. What is the source of light & heat for earth?

What is source for earth’s light & heat?

Answer - Sun gives solar system light & heat

1. Who is the first person to land on Moon?

What is the name of first person to land on Moon?

Answer - Neil Armstrong was the first person to land on Moon.

1. Which galaxy is solar system a part of?

What is the name of the galaxy our Solar System is a part of?

Answer - Solar System is a part of bigger galaxy called Milky-Way

1. What is Milky-Way?

Explain Milky-Way?

Can you explain in brief about Milky-Way?

Answer – Solar System is a part of a bigger galaxy called the Milky Way

1. What is the name of the star that rotates at the very center of our solar system?

Name the star that rotates around the earth?

Answer – Sun

1. What all planets constitute inner Planets?

What is the name of planets that constitute inner planets?

List down the inner planets?

Answer - The inner planets are Mercury, Venus, Earth and Mars

1. What all planets constitute Outer Planets?

What is the name of planets that constitute outer planets?

List down the outer planets?

Answer - The outer planets are Jupiter, Saturn, Uranus and Neptune.

1. After the full moon day, on which day is the moon not visible?

Answer – Fifteenth Day

1. Which planet has no satellite of its own?

Name the planet that has no satellite of its own?

Answer – Mercury

1. Which planet is earths nearest planetary neighbor?

Which planet is earth’s neighbor?

Answer - Venus

1. Which planet is often called a morning or an evening star, although it is not a star?

Name the planet that is not a star and is called a morning or evening star?

Answer - Venus

1. Which is the only planet in the solar system on which life is known to exist?

Name the only planet in our Solar System where life is known to exist?

Answer – Earth

1. What makes Saturn unique & easy to recognize?

What makes Saturn easily recognizable?

What is the one unique thing about Saturn?

Answer – Saturn is unique because of its rings.

1. Which planet has faint rings around it?

Which is the planet with faint rings around it?

Name the planet with faint rings around it?

Answer – Jupiter

1. Which planet is most of the time is hidden in the glare of the Sun?

Which planet is not visible due to Sun’s Glare?

Which planet becomes invisible due to Sun’s glare?

Answer – Mercury

1. What are the names of two outermost planets of the solar system?

What are the name of two planets that are farthest from Sun?

Answer – Uranus & Neptune

1. What is the unique thing about ‘New Moon Day’?

What is ‘New Moon Day’?

Answer – Moon is not visible on this day.

1. What is crescent moon?

Explain crescent Moon?  
Define crescent moon?

Answer – The next day after ‘New Moon Day’, only a small portion of the moon appears in the sky. This is known as the crescent moon.

1. What is the exact distance of Earth from the Sun?

What is the distance between Earth & Sun?

Answer – 149.6 Million Kilometers

1. What is the exact distance of Mercury from the Sun?

What is the distance between Mercury & Sun?

Answer – 57.91 Million Kilometers

1. What is the exact distance of Mars from the Sun?

What is the distance between Mars & Sun?

Answer – 227.9 Million Kilometers

1. What is the exact distance of Venus from the Sun?

What is the distance between Venus & Sun?

Answer – 108.2 Million Kilometers

1. What is the exact distance of Jupiter from the Sun?

What is the distance between Jupiter & Sun?

Answer – 778.5 Million Kilometers

1. What is the exact distance of Saturn from the Sun?

What is the distance between Saturn & Sun?

Answer – 1429 Million Kilometers

1. What is the exact distance of Uranus from the Sun?

What is the distance between Uranus & Sun?

Answer – 2817 Million Kilometers

1. What is the exact distance of Neptune from the Sun?

What is the distance between Neptune & Sun?

Answer – 4498 Million Kilometers

### Quiz

1. What is the name of the planet which is farthest from the Sun?

Which planet is most distant from the Sun?

Neptune

2. What is the name of the planet which appears reddish in color?

Which planet appears red in color?

Name the planet that appears red in color?

Answer - Mars

3. What is a constellation?

Define Constellation?

Explain a constellation?

Answer - A group of stars that appear to form a pattern in the sky is known as a constellation

4. What is Milky-Way?

Explain Milky-Way?

Can you explain in brief about Milky-Way?

Answer – Solar System is a part of a bigger galaxy called the Milky Way

5. Who was the first human to land on Moon?

What is the name of first person to land on Moon?

Answer - Neil Armstrong

### Questions (Permutations & Combinations)

Glossary section consists of information related to Asteroid, Celestial Objects, Comets, Moon, Milky Way, Meteors, Moon, Milky Way, Orbit, Planet, Solar System, Sun. Glossary based questions can be asked in below ways:

Define Asteroid?

What is an Asteroid?

Explain what is an asteroid?

Give information about Asteroid?

What is your understanding of Asteroid?

What information do you have about Asteroid?

### Script

Printouts of chapter text are handed over to participants. After this information related to demo is verbally laid out by Cognizant team.

Actor **User** refers to person who would be demonstrating this demo.

Actor **Guru** is the name given to Bot/Google Home.

**User:** Hey Guru! How are you today?

**Guru (BOT):** Very well, thank you! What about you?

**User:** Fine Thank You. I need information about Solar System. Can you help me?

**Guru (BOT):** Yes. I will explain you in detail about Solar System & you can ask me questions anytime.

**User:** Will you validate my understanding?

**Guru (BOT):** Yes, I can take a quiz for that. Let’s start. By the end of “Solar System” chapter you will understand basic information about solar system and get familiarized with 8 planets- their order, size and their names.

**Scenario 1**:

**Guru (BOT)**: Starts by reading out the “Solar System” section from the chapter text.

After the text is read out, **Guru (BOT)** asks “Do you want to check your understanding of Solar System”?  
  
**User** – Yes

**Guru (BOT)**: “What are the total number of planets in our Solar System”?  
  
**User** – Eight (8)   
  
**Guru (BOT)** validates the answer & replies if it’s correct or not. In case it’s wrong **Guru (BOT)** reads out the correct answer.

After this **Guru (BOT)** says “Can we move to the next section?”

**User** - Yes

**Guru (BOT)** reads out the “Planets” Section.

After reading out the “Planets” section; **Guru (BOT)** pauses to ask the user if they have any question

**User** – “What all planets constitute Inner Planets?”

**Guru (BOT):**“Mercury, Venus, Earth and Mars”.

**User** - “What all planets constitute Outer Planets?”

**Guru (BOT):** Jupiter, Saturn, Uranus and Neptune.

**Guru (BOT)** says Jupiter is the biggest planet in our Solar System.

**User** – What information do you have about Asteroids?

**Guru (BOT)** reads out the chapter text related to Asteroids.

**User –** Tell me about Moon?

**Guru (BOT)** takes user to scenario 2.

Probable Question related to Scenario 1

1. What is the total number of planets in our solar system?

Answer - Eights planets are in our solar system

1. What all planets constitute Inner Planets?

Answer - The inner planets are Mercury, Venus, Earth and Mars

1. What all planets constitute Outer Planets?

What is the name of planets that constitute outer planets?

List down the outer planets?

Answer - The outer planets are Jupiter, Saturn, Uranus and Neptune.

1. What is an Orbit?

Define Orbit?  
Explain Orbit?

Answer - An orbit is a path. It's the way something goes around an object in space. The moon goes in orbit around Earth.

1. What is Milky-Way?

Explain Milky-Way?

Can you explain in brief about Milky-Way?

Answer – Solar System is a part of a bigger galaxy called the Milky Way

1. Which galaxy is solar system a part of?

What is the name of the galaxy our solar system is a part of?

Answer - Solar System is a part of bigger galaxy called Milky-Way

After this question we jump to Scenario 2

**Scenario 2**:

**Guru (BOT)** reads out the text related to Moon

**User** - “What is New Moon Day”  
  
**Guru (BOT)** replies with the specific answer from “Queries Section?”

**Guru (BOT)** jumps to the planets part

**Guru (BOT):** What is the planet nearest to the Sun?

**User -** Mercury

**Guru (BOT)** reads out the text related to eight planets.

**User** - “Why is human life possible only on Earth?”

**Guru (BOT)**: “Because of right amount of distance from the Sun”

**User** - “Can you tell me the distance of Neptune from Sun”?

**Guru (BOT)** replies with the answer

**User –** What orbits around the sun besides planets?

**Guru (BOT) –** But out there are comets, asteroids and more. **Guru (BOT)** takes user to scenario 3.

Probable Question related to Scenario 2

1. Which planet is farthest from the sun?

Which planet is most distant from the Sun?

Answer - Neptune is farthest from the sun

1. What is the name of the planet which appears “Yellowish” in color?

Which planet appears Yellow in color?

Name the planet that appears yellow in color?

Answer - Saturn appears yellowish in color

1. Which planet appears “Red” in Color?

Answer - The planet which appears reddish in color is Mars

1. What is the source of light & heat for earth?

Answer - Sun gives solar system light & heat

1. Who is the first person to land on Moon?

Answer - Neil Armstrong was the first person to land on Moon.

1. Which planet has no satellite of its own?

Answer – Mercury

1. Which planet is earths nearest planetary neighbor?

Answer - Venus

1. Which planet is often called a morning or an evening star, although it is not a star?

Answer - Venus

1. Which is the planet in the solar system on which life is known to exist?

Answer – Earth

**Scenario 3**:

**Guru (BOT)** reads out Information related to Asteroid, Meteors & Comets.

**User** asks about Mars.  
**Guru (BOT)** reads out text from Mars section.

**Guru (BOT)** reads out distance of various planet from the sun.

**Users** -“Give a brief summary of all these topics”?

**Guru (BOT)** reads out the Summary from the lesson text.

**Guru (BOT)** asks “Do you want to take the quiz?”  
**User** - Yes  
**Guru (BOT) -** It takes users to the quiz section & checks users understanding.

Probable Questions for Scenario 3

1. What is the exact distance of Earth from the Sun?

Answer – 149.6 Million Square Kilometers

1. What is the exact distance of Mercury from the Sun?

Answer – 57.91 Million Square Kilometers

1. What is the exact distance of Mars from the Sun?

Answer – 227.9 Million Square Kilometers

1. What is the exact distance of Venus from the Sun?

Answer – 108.2 Million Square Kilometers

1. What is the exact distance of Jupiter from the Sun?

Answer – 778.5 Million Square Kilometers

1. What is the exact distance of Saturn from the Sun?

Answer – 1429 Million Square Kilometers

1. What is the exact distance of Uranus from the Sun?

Answer – 2817 Million Square Kilometers

1. What is the exact distance of Neptune from the Sun?

Answer – 4498 Million Square Kilometers

**Note**:

1. Whenever a user asks a question, the related text from the chapter should be the answer.

For Example: If the users asks “Tell me about planet Venus”?  
  
Answer should be the Venus text.

1. At any time a user can ask to move from one topic to another
2. Probable questions related to Scenario 3 are basically definitions which have already been covered