

# Stars and the Solar System



**1. Which of the following is NOT a member of the solar system?**

- (a) An asteroid
- (b) A satellite
- (c) A constellation
- (d) A comet

**Ans:** (c) A constellation

A constellation is not a member of the solar system because it is a group of stars forming a definite shape whereas an asteroid, satellite, and comet are a part of the solar system.

**2. Which of the following is NOT a planet of the sun?**

- (a) Sirius
- (b) Mercury
- (c) Saturn
- (d) Earth

**Ans:** (a) Sirius

Sirius is not a planet of the sun but a star. The planets of the sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

**3. Phases of the moon occur because**

- (a) we can see only that part of the moon that reflects light towards us.
- (b) our distance from the moon keeps changing.
- (c) the shadow of the Earth covers only a part of the moon's surface.
- (d) the thickness of the moon's atmosphere is not constant.

**Ans:** (a) we can see only that part of the moon that reflects light towards us. Phases of the moon occur because the source of light of the moon is the Sun, it does not have its light and hence, it reflects the light coming from the sun and we can only see that part of the moon that reflects light towards us.

**4. Fill in the blanks:**

- (a) The planet which is farthest from the sun is \_\_\_\_\_.

**Ans:** The planet which is farthest from the sun is Neptune.

- (b) The planet which appears reddish in colour is \_\_\_\_\_.

**Ans:** The planet which appears reddish in color is Mars.

**(c) A group of stars that appear to form a pattern in the sky is known as a \_\_\_\_\_.**

**Ans:** A group of stars that appear to form a pattern in the sky is known as a Constellation.

**(d) A celestial body that revolves around a planet is known as a \_\_\_\_\_.**

**Ans:** A celestial body that revolves around a planet is known as a satellite.

**(e) Shooting stars are actually not \_\_\_\_\_.**

**Ans:** Shooting stars are actually not stars.

**(f) Asteroids are found between the orbits of \_\_\_\_\_ and \_\_\_\_\_.**

**Ans:** Asteroids are found between the orbits of Mars and Jupiter.

**5. Mark the following statement as true (T) or false (F).**

**(a) Pole star is a member of the solar system.**

**Ans:** True

Stars are a member of the solar system.

**(b) Mercury is the smallest planet in the solar system.**

**Ans:** True

Mercury is the smallest planet and all other planets are larger than mercury.

**(c) Uranus is the farthest planet in the solar system.**

**Ans:** False

Neptune is the farthest planet in the solar system.

**(d) INSAT is an artificial satellite.**

**Ans:** True

INSAT is a man-made satellite.

**(e) There are nine planets in the solar system.**

**Ans:** False

There are eight planets in the solar system. The planets of the sun are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune.

**(f) Constellation Orion can be seen only with a telescope.**

**Ans:** False

During winters, the constellation Orion is visible with naked eyes.

**6. Match items in column A with one or more items in column B.**

A	B
(i) Inner planets	a) Saturn
(ii) Outer planets	b) Pole star
(iii) Constellation	c) Great Bear
(iv) Satellite of the Earth	d) Moon
	e) Earth
	f) Orion
	g) Mars

**Ans:** Inner planets are the first four planets closest to the Sun-Mercury, Venus, Earth, and Mars.

Therefore, (i) Inner planets – e) Earth, g) Mars

Outer planets are the last four planets closest to the Sun – Jupiter, Saturn, Uranus, and Neptune

Therefore, (ii) Outer planets – a) Saturn

A constellation is a group of stars forming a definite shape.

Therefore, (iii) Constellation – c) Great Bear, f) Orion

A satellite of the earth is the moon.

Therefore, (iv) Satellite of earth – d) Moon

**7. In which part of the sky can you find Venus if it is visible as an evening star?**

**Ans:** The part of the sky where we can find Venus if it is visible as an evening star is the west side of the sky.

**8. Name the largest planet of the solar system.**

**Ans:** The largest planet of the solar system is Jupiter and the smallest planet is Mercury.

**9. What is a constellation? Name any two constellations.**

**Ans:** A constellation is a group of stars forming a definite shape. The two constellations are:

- Orion: It is located on the celestial equator and is visible throughout the world. It is a constellation in the night sky.
- Great Bear: It is located in the northern sky.

**10. Draw sketches to show the relative position of prominent stars in****(a) Ursa Major**

**Ans:** Ursa major is located in the northern sky.

The sketch of the Ursa Major is:



Ursa Major

**(b) Orion**

**Ans:** Orion is located on the celestial equator and is visible throughout the world. It is a constellation in the night sky.

The sketch of the Orion is:



Orion

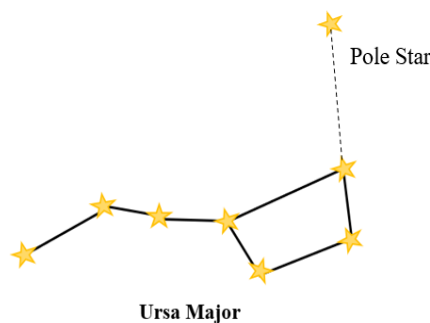
**11. Name two objects other than planets that are members of the solar system.**

**Ans:** The two other objects other than planets that are members of the solar system are:

- (i) Stars: Stars are celestial bodies made up of gases; they are huge in size and have very high temperatures
- (ii) Asteroid: Asteroids are small, rocky objects that orbit the sun.

**12. Explain how you can locate the Pole Star with the help of Ursa Major.**

**Ans:** We locate the Pole Star with the help of Ursa Major with the help of the three stars at the end of Ursa Major. To do so, create a straight line passing through the last three stars and extend that line in the north direction. The star seen in that direction is the Pole star.



**13. Do all the stars in the sky move? Explain.**

**Ans:** No, the stars in the sky do not move because the Pole star is located above the axis of rotation of the Earth in the north direction. And hence it appears to be stationary and all other stars in the sky appear to move from East to West.

**14. Why is the distance between stars expressed in light years? What do you understand by the statement that a star is eight light-years away from the Earth?**

**Ans:** Stars are very far away from each other and the standard km notation of the distance seems unrealistic to use for denoting the distance between stars and hence, a much convenient and larger unit is used for expressing these distances which are known as light-years. It helps to make calculations and imagination easy.

One light-year denotes the distance traveled by light in one year.

$$1 \text{ Light Year} = 9.46 \times 10^{12} \text{ km}$$

A star is eight light-years away from the Earth means that a star is

$$8 \times 9.46 \times 10^{12} = 7.568 \times 10^{13} \text{ km away from the Earth.}$$

**15. The radius of Jupiter is 11 times the radius of the Earth. Calculate the ratio of the volumes of Jupiter and the Earth. How many Earths can Jupiter accommodate?**

**Ans:** The shape of Earth and Jupiter is a sphere. Let the radius of Earth be  $R_E$  and the radius of Jupiter be  $R_J$ .

$$\text{Given, } R_J = 11 \cdot R_E \quad \dots\dots(1)$$

We know that the volume of a sphere of the radius  $r$  is  $\frac{4}{3} \pi r^3$ . Therefore,

$$\text{The volume of Earth, } V_E = \frac{4}{3} \pi R_E^3 \quad \dots\dots (2)$$

$$\text{The volume of Jupiter, } V_J = \frac{4}{3} \pi R_J^3$$

$$\text{But from (1), } R_J = 11 \cdot R_E. \text{ Hence, Volume of Jupiter, } V_J = (11)^3 \frac{4}{3} \pi R_E^3 \quad \dots(3)$$

From (2) and (3), the ratio of the volumes of Jupiter and the Earth is

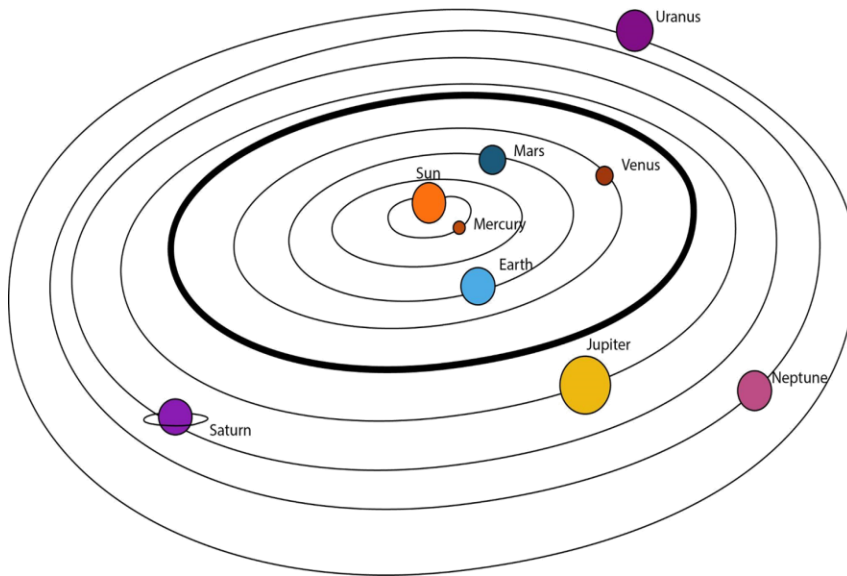
$$\frac{V_J}{V_E} = \frac{(11)^3 \frac{4}{3} \pi R_E^3}{\frac{4}{3} \pi R_E^3}$$

$$\Rightarrow \frac{V_J}{V_E} = (11)^3$$

$$\therefore \frac{V_J}{V_E} = 1331$$

This means that Jupiter can accommodate 1331 earth.

**16. Boojho made the following sketch of the solar system. Is the sketch correct? If not, correct it.**



**Ans:** The figure of the solar system is incorrect because

- a) The positions of Mars and Venus are interchanged.
- b) The positions of Uranus and Neptune are interchanged.
- c) The asteroid belt which is between Mars and Jupiter should be present between Jupiter and Saturn.

The correct figure is:

