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The Solar System

- 1.The solar system consists of the sun, the eight planets and their satellites (or moons), and thousands of other smaller heavenly bodies such as asteroids, comets and meteors.
 - 2.The sun is at the centre of the solar system and all these bodies are revolving around it.
 - 3.The gravitational pull of the sun keeps all the planets and other objects revolving round it. Thus, the motion of all the members of the solar system is governed mainly by the gravitational force of the sun.
 - 4.Planets revolve around the sun in elliptical orbit.
 - 5.In the solar system the planet nearest to the sun is Mercury and the planet farthest from the sun is Neptune (not Pluto).
 - 6.The size of solar system has been estimated to at about 105 A.U.
 - 7.The solar system is dominated by the sun which accounts for almost 99.9% of the matter in the whole solar system.
 - 8.The sun is also the source of all the energy in the solar system.
 - 9.Pluto is a dwarf planet.
 - 10.Mercury, Venus, Earth, Mars are called terrestrial planets and Jupiter Saturn, Uranus and Neptune are called gaseous planets.
- Members of the Solar System

The Sun

- 1.The Sun is at the centre of the Solar System.
- 2.Its size is thirteen lakh times as that of the Earth.
- 3.It is the nearest star to the Earth.
- 4.It is an ultimate source of energy for life on Earth.
- 5.Its diameter is 14 lakh kms.
- 6.It is composed of 71% Hydrogen, 26.5% Helium and 2.5% other elements.

7. Hydrogen and Helium are the main gases present in the Sun.
8. Within the Sun, hydrogen is converted to Helium due to nuclear fusion releasing a tremendous amount of heat and light.
9. It has a surface temperature of about 6000°C .
10. The temperature at the centre is around $15,000,000^{\circ}\text{C}$.
11. Shining surface of the sun is called photosphere, it appears like a disc, radiates energy and acts as a source of energy.
12. The outer layer of sun's atmosphere made up of thin hot gases, is called Corona. Corona is visible only during a total eclipse of the sun (or with a special solar telescope called Coronagraph).
13. The planet travels with the sun through millions of stars in our galaxy at a speed of about 70,000 km per hour.
14. The Sun is about 150 million kms away from the Earth.
15. Light (at the speed of 300,000 km per second) takes about 8.5 minutes to reach the Earth from the Sun.

The Planets

1. These are opaque bodies which continuously revolve around and are lighted by the Sun.
2. There are eight planets in the Solar system.
3. A ninth planet has been recently discovered by NASA named as Carla.
4. The sequence of planets according to their distance from the Sun is Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune.
5. The sequence of planets according to their size (in descending order i.e. from big to small) is Jupiter, Saturn, Uranus, Neptune, Earth, Venus, Mars, Mercury.
6. Jupiter is the biggest and mercury is the smallest planets of our solar system.

Classification of Planets

1.The eight planets have been divided into two groups. All the planets of a particular group have some common features. 'Terrestrial planets' or 'Rocky planets' and 'Jovian planets' or 'Gaseous planets' (Gas giants) are the two groups of planets.

2.The four planets nearest to the Sun - Mercury, Venus, Earth and Mars are called terrestrial planets, because their structure is similar to the earth.

3.Other four planets — Jupiter, Saturn, Uranus and Neptune are called Jovian planets.

4.Planets are classified into the following two groups inner and outer planets. These are separated by asteroid belt. :

Some Notable Facts About Various Planets and Satellites

Mercury

1.Mercury is the closest planet to the Sun.

2.It is extremely hot planet.

3.The planet has no water on it.

4.Mercury planet has no gases like CO₂, N₂, H₂ and O₂ which can act as building blocks of life.

5.Mercury planet has no protective blanket like Ozone around it to prevent us from harmful radiations.

Venus

1.Venus is the second planet in distance from the Sun. This planet is nearest to the Earth and is also the brightest planet.

2.Venus is known as the "Evening Star" as well as "Morning Star".

3.Venus is surrounded by a thick cloud cover, hence known as the "Veiled Planet" ('veil' means unclear / cover).

4.Venus is like the Earth in size and mass, and hence also known as the "Earth's twin". It also rotates clockwise like Uranus.

5.Venus is the hottest planet (even hotter than Mercury) of our Solar System, due to its veil of cloud.

6.Venus has no water on it. There is no sufficient oxygen on the Venus.

The Earth

1.Earth is the largest of the inner planets.

2.The Earth is $23\frac{1}{2}^{\circ}$ tilted on its axis and thus makes $66\frac{1}{2}^{\circ}$ angle.

3.It takes 23 hours 56 minutes and 4.091 seconds to rotate on its axis.

4.It takes 365 days, 5 hours and 48 minutes to revolve around the Sun.

5.Earth is known as the "watery planet" or the "blue planet" due to the presence of huge amount of water on it.

6.Earth is the only known planet which provides sustenance or life on it. It has a large quantity of oxygen which supports life.

7.The earth has all the essential elements like carbon (in the form of CO_2), hydrogen (H_2), nitrogen (N_2) and oxygen (O_2) which act as building blocks for the origin of life.

8.The earth is neither too hot nor too cold. It has 'Goldilock Zone' .

9.'Goldilock Zone' is the habitable zone of solar system where all conditions are available for life to sustain.

10.The earth has a lot of water in the form of lakes, rivers and oceans for the growth and survival of life.

11.The earth has enough oxygen gas in its atmosphere for the survival of living beings through breathing.

12.The earth has a protective blanket of ozone layer high up in its atmosphere to save life from the harmful ultraviolet radiations coming from the sun.

The Moon

1.The Moon is the only satellite of the earth.

2.It has a diameter of 3475 km. and its circumference is 10864 km. while its orbit is elliptical.

3.The maximum distance (apogee) of the moon from the earth is 4,06,000 km. and the minimum distance (perigee) is 3,64,000 km.

4. It takes 27 days, 7 hours and 43 minutes to rotate on its axis (this period of about 27 1/2 days is called the sidereal month) and approximately the same period of time it takes to revolve around the earth. The moon's period of revolution with reference to the sun is about 29.53 days (29 days, 12 hours, 44 minutes and 2.8 seconds). This period is called a synodic month.

5. Only 59 per cent of the total surface of the moon is visible from the earth.

6. The bright part of the moon is full of mountains whereas the dark patches are low lying plains.

7. 'Sea of tranquility', made of the plain of dust particles, is on the rear side of the moon which always remains dark.

8. The highest mountain on the moon is Liebuty mountain, which is 10,660 meter high.

9. The moon has no atmosphere, no twilight and no sound.

10. The temperature during daytime is about 100°C and during night it drops down to about -180°C.

11. The light from the moon takes 1.3 seconds to reach the earth.

12. The size of the Moon is one-fourth (1/4th) the size of the Earth.

13. Gravitational pull of Moon is one-sixth (1/6th) that of the Earth.

14. Mainly silicon, iron, magnesium etc. elements are found on the Moon's surface.

15. The study of the Moon is called "Selenology".

16. Moon is also known as the fossil planet.

Mars

1. Iron-rich red soil and pink sky of Mars give it the name, "Red Planet".

2. Phobos and Demos are two satellites of Mars.

Jupiter

1. Jupiter is the largest planet of the Solar System.

2. Jupiter is also known as winter planet as its average temperature is very low (-148° C).

3. Gannymeda, satellite of Jupiter is the largest satellite in the Solar System.

Saturn

1. Saturn is the second largest planet in the Solar System.

2. Saturn has bright concentric rings which are made up of ice and ice-covered dust particles which revolve around it.

3. Titan is the largest satellite of Saturn.

Uranus

1. Uranus is about four times the size of the Earth. This planet appears greenish in colour because of methane gas present in its atmosphere. >- Uranus was discovered in 1781 by Sir William Hersiel.

2. Uranus is the 7th planet from the Sun.

3. Uranus is the first planet to have been discovered by the use of a telescope. Uranus is the third biggest planet of the Solar System.

4. Uranus is extremely cold, having surface temperature—190°C and is surrounded by 13 rings namely zeta (ζ) / R1986U2,6,5,4, alpha (α), beta (β), eta (ϵ), gamma (γ), delta (δ), lambda (λ), epsilon (ϵ), nu (ν) and mu (μ).

5. Uranus rotates from east to west on its axis, which is opposite to other planets except Venus.

6. The axis of Uranus has large inclination so that it appears to be lying down, hence it bears the name "A Planet on its Side".

Neptune

1. Neptune is the 8th planet of the Solar System.

2. The temperature on the surface of Neptune remains low.

3. Neptune is very similar to Uranus and can be considered as its twin

4. Neptune is surrounded by methane rings of sub zero temperature.

Pluto is not a Planet now

1. On the basis of the new definition of planet given by the IAU (International Astronomical Union), the world's top institution on space science research, leading astronomers participating in IAU's meet at Prague (Czech Republic) on August 24, 2006, declared that Pluto would no longer remain a planet.

2. Under the IAU's new guidelines, the number of planets in the Solar System has thus been reduced from nine to eight. Its merits mentioning here that, prior to this decision, Pluto had been holding the planetary status since its discovery in 1930 by Clyde Tombaugh.

3. Now, with the omission of Pluto from the Solar System, its membership has been restricted to the eight "classical" planets, namely Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune.

Pluto Gets a Numerical Denomination

1. Weeks after it was demoted to a sub-planetary status, Pluto was given a new name to reflect its new status as a dwarf planet in September 2006. The former 9th planet was assigned the asteroid number 134340 by the Minor Planet Centre (MPC), the official organisation responsible for collecting data about asteroids and comets in our Solar System.

2. Pluto's companion satellites, Charon (Pluto's largest moon), Nix and Hydra are considered part of the same system and will not be assigned separate asteroid numbers. Instead, they will now be called 134340 I, II and III respectively.

3. Before losing its planetary status on 24th August, 2006 Pluto was the outermost planet of the Solar System.

Asteroids (or Planetoids)

1. Asteroids are also known as minor planets.

2. They are objects that revolve around the Sun.

3. They are mostly found between the orbits of Mars and Jupiter. They are a belt of debris which failed to assemble into planets and keeps on revolving around the Sun. This has come to be called as 'asteroid belt'.

4. More than 5000 asteroids have been identified.

5. Asteroids may be spherical, elongated or irregular in shape.

6. All asteroids rotate on their axis, every 5 to 20 hours. Certain asteroids may have satellites.

7. Trojan asteroids are found in two clouds moving in the orbit of Jupiter, one moving ahead of it and the other moving behind it.

8. Scientists believe that these asteroids occupy a place where a planet could have existed but was prevented from its formation by the disruptive gravitational force of the nearby giant planet, Jupiter.

Meteors and Meteorites

1. Meteors and Meteorites are also called shooting stars.

2. Meteors are fragments of rocks coming towards the earth, formed due to the collision of asteroids with one another.

3. Meteors are usually small, and due to the heat produced by air resistance, bum up before they reach the Earth's surface.

4. When meteors are large and do not bum up completely, they land on the Earth's surface and are known as Meteorites.

5. All meteorites are believed to originate in the asteroid belt, where a sudden collision may send them towards the Earth and the Earth's gravity attracts them towards its surface.

Comets

1. Visitors of the Solar System.

2. Comets (the name derived from the Latin words Stella cometa meaning "hairy star") are among the most spectacular and unpredictable bodies in the Solar System.

3. Comets move around the Sun in regular orbits, but their orbits are elongated ellipses that it takes them hundreds and, sometimes, even thousands of years to complete one revolution around the Sun.

4. Comets are made up of frozen gases which hold together rocky and metallic materials.

5. A comet becomes visible only when it travels close to the Sun.

6. Its ice melts and the gas and dust is swept back into a tail.

7. The tail always points away from the Sun. So when it is travelling away from the Sun it is led by its tail.

Features of a Comet

1. A comet is characterised by a long luminous tail, which emits light.

2. But this is visible only when the comet's orbit passes close to the Sun. >- When the comet travels close to the Sun, the ice melts to a head of gas called a Coma.

3. The Sun's radiation sweeps this into a gas tail.

4. Dust particles are also swept back to form a dust tail.

Stars

1. Stars are heavenly bodies made up of hot burning gases, thus shining by their own light.

2. Stars seem to be fixed with respect to each other. In fact they are in rapid motion but they are at such great distance that relative changes in position become noticeable only over the centuries.

3. According to NASA Proxima Centauri is the closest star to the Earth after the Sun. It is about 4.24 light years away.

4. Pole star (or Polaris), Sirius, Vega, Capella, Alpha centauri, Beta centauri, Proxima centauri, Spica, Regulus, Pleiades, Aldebaran, Arcturus, Betelgeuse, and of course the Sun are some of the important examples of the stars.

Facts about Stars

1. There are billions and billions of stars in the sky but only about 2000 stars can be seen with the naked eye on a clear moonless night.

2. There are 1022 stars in the Universe.

3. About 8000 stars are visible from the Earth with naked eye. Out of this, 4000 stars are visible in the Northern Hemisphere and 4000 in the Southern Hemisphere.

4. In either hemisphere, only 2000 stars are visible at any given time.

5. The other 2000 are located in the day-time sky and the brightness of the Sun renders them invisible.

Constellations

- 1.To enable astronomers to identify roughly the position of the stars, the sky has been divided into units. These units are known as Constellations.
- 2.These constellations were named in the honour of mythological characters.
- 3.At present 88 constellations are recognized.

Galaxy

- 1.A large group of stars, dust and light gases, bound together by their own gravity, is called a galaxy.
- 2.There are 1011 galaxies in the universe.
- 3.We live on the outer edge of a spiral type of galaxy called the Milky Way, which is about 100,000 light years in diameter and is rotating slowly.

Earth's Galaxy : The Milky Way

- 1.The Milky Way is a large spiral-shaped galaxy.
- 2.It spans about 100,000 light-years across and is about 10,000 light-years thick at the centre.
- 3.It is called the Milky Way because it appears as a soft glowing light of billions of stars. These stars are so far that they can be seen only in constellation, not separately.
- 4.Galileo discovered that this band of light was produced by countless individual stars which a naked eye cannot see.
- 5.It takes about 250 million years to complete one revolution.

Light year

- 1.Large distances in outer space are measured in light years.
- 2.A light year is the distance light travels in one year at the speed of 299,792,458 metres per second or roughly 300,000 km per second (3×10^5 km/s or 3×10^8 m/s)
- 3.One light year is equal to 9,461,000,000,000 km (9.461×10^{12} km).

4.No star, apart from the Sun, is close enough to Earth to appear as anything but a point of light.

Andromeda : Earth's closest Galactic neighbour

1.Andromeda is a spiral galaxy and also our closest neighbour.

2.It appears as a fuzzy patch of light and contains millions of stars.

3.It is the farthest object that can be seen with the naked eye.

4.Along with the Milky Way, it belongs to a group of galaxies known as the Local Group, which in turn is a part of Virgo Cluster of groups.

5.Like stars, galaxies are grouped into clusters. Some clusters contain thousands of galaxies.

6.About 30 galaxies, along with the Milky Way and the Andromeda are grouped together in one cluster called the Local Group.

7.Clusters may group together into upper clusters.

8.Super clusters are also spread randomly throughout the universe.

Nebulae

1.Nebulae are huge interstellar clouds of gas and dust that appear as faint, misty patches of light scattered all over the sky.

2.They appear either as bright luminous clouds or as dark patches against a brighter background.

3.A nebula depends for its luminosity upon the presence of stars that have either arisen from it or are contained in it.,

4.If the stars are extremely hot, the hydrogen in the nebula is ionized and emits a certain amount of light of its own.

5.If a star is less hot, the nebula shines only by reflection.

6.If there are no suitable stars, the nebula does not shine and remains dark and can be detected only because it blots out the light of the stars beyond.



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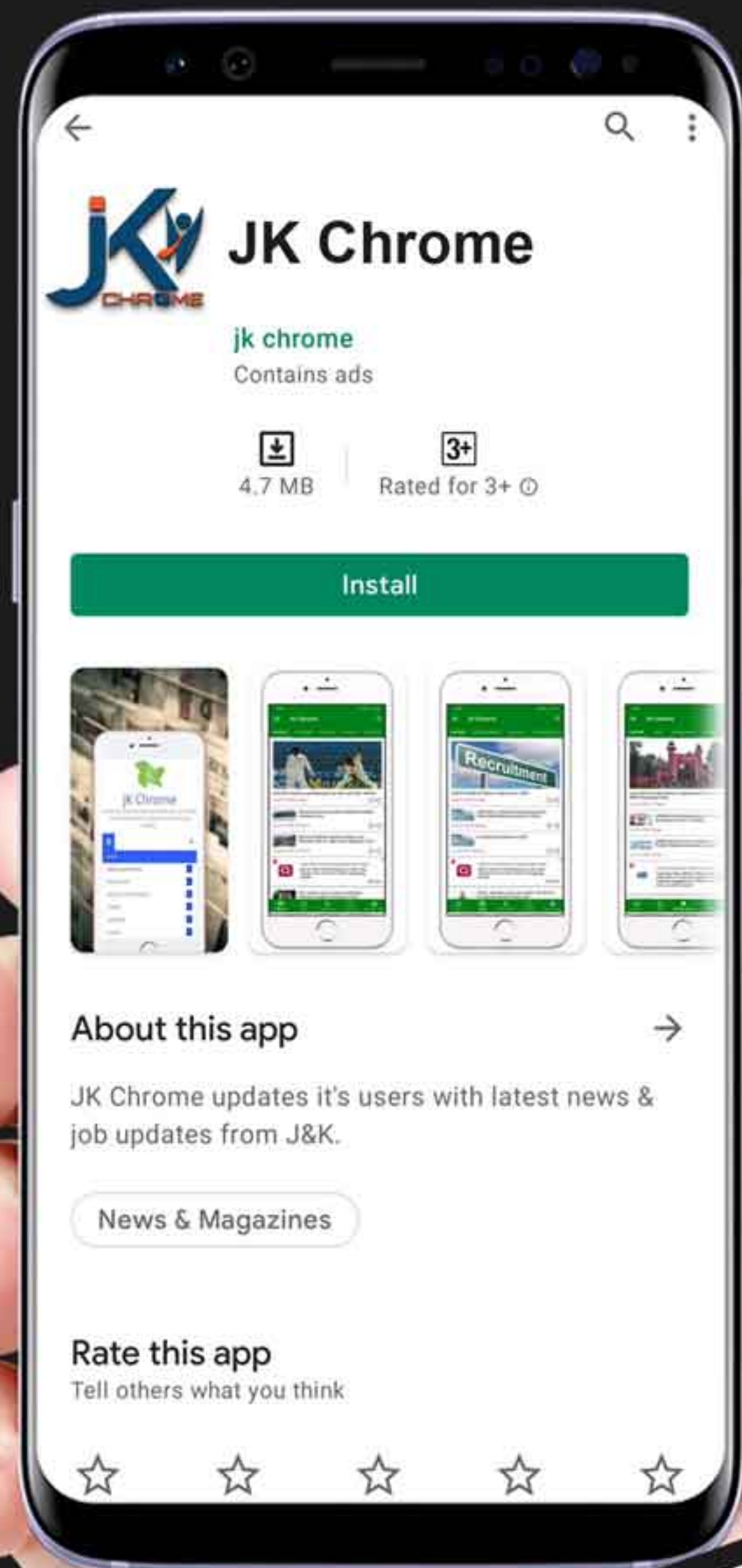
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