Eclipses :- Types of eclipses - Solar eclips - total and partial solar eclipse - lunar eclips - total and partial lunar eclips - transits.

The Sun :- Physical and orbital data - Solar atmosphere - photosphere - chromosphere - Solar corona - Prominence - sunspots - 11 years solar cycle - solar flares.

Eclipses :-

Anywhere from four to seven times a year, our Earth, Moon and Sun line up just right to create the cosmic-scale shadow show known as an eclipse.

The Moon's orbit around Earth is tilted relative to Earth's orbit around the sun.

There are two types of eclipses:

(i) Lunar eclipses

(ii) Solar Eclipse

During a Lunar eclipses, Earth's shadow obscures the Moon.

During a solar eclipse the Moon blocks the sun from view.

Lunar Eclipses :-

Lunar eclipses occur at the full moon phase. when Earth is positioned Precisely b/w the Moon and Sun, Earth's shadow falls upon the surface of the Moon, dimming it and sometimes turning the lunar surface a striking red over the course of a few hours.

Each lunar eclipse is visible from half of Earth.

There are three different types of lunar eclipses :-

Total lunar eclipse :-

The Moon moves into the inner part of Earth's shadow or the umbra. Some of the sunlight passing through Earth's atmosphere reaches the Moon's surface, lighting it dimly.

Colors with shorter wavelengths - the blues and violets - scatter more easily than colors with longer wavelengths like red and orange.

The more dust or clouds in Earth's atmosphere during the eclipse the redder the Moon appears.

Partial lunar eclipse :-

An imperfect alignment of sun, Earth and Moon results in the Moon passing through only part of Earth's umbra.

The shadow grows and then recedes without ever entirely covering the Moon.

Penumbral eclipse :-

The Moon travels through Earth's Penumbra or the faint outer part of its Shadow.

The Moon dims so slightly that it can be difficult to notice.

Solar Eclipses :-

Solar eclipses happen only at the new moon phase, when the Moon is b/w Earth and Sun.

During a solar eclipse, the Moon casts a shadow on Earth, and blocks or partially block our view of the Sun.

Though solar eclipses happen as often as lunar eclips

During a solar eclipse the Moon's shadow on Earth's surface is only about 300 miles (480 km) wide.

The shadow consists of two parts the Umbra, where the sun is completely blocked ~~and the penumbra, where the and the~~

There are four types of solar Eclipses.

(i) Total solar Eclipse
(ii) Annular solar Eclipse
(iii) Partial solar Eclipse.
(iv) Hybrid solar Eclipse.

Total solar Eclipse.

A total solar eclipse happens when the moon passes b/w the sun and Earth, completly blocking the face of the sun.

People located in the center of the Moon's adow when it hits Earth will experience a del eclipse.

⇒ A total solar eclipse can see the Sun's corona, the outer atmosphere which is usually obscured by the bright face of the Sun.

⇒ A total solar eclipse where viewers can momentarily remove their eclipse glasses for the brief period of time when the Moon is completely blocking the sun.

⇒ The Next total solar eclipse in the U.S will be on April 8, 2024.

Annular solar Eclipse -

An annular solar eclipse happens when the moon passes b/w the sun and Earth but it is near its farthest point from Earth.

Because the moon is farther away from Earth it appears smaller than the sun and does not completely cover the sun.

As a result the moon appears as a dark disk on top of a larger, bright disk, Creating a ring around the Moon

Partial solar Eclipse :-

A partial solar eclipse happens when the moon passes b/w the sun and Earth as the Sun, Moon and Earth are not perfectly aligned up.

During a total or annular solar eclipse People outside the area covered by the Moon's inner shadow see a partial solar eclipse.

- Hybrid solar eclipse :-

Earth surface is curved sometimes an eclipse can shift b/w annular and total as the Moon's shadow moves across the globe. This is called a hybrid solar eclipse.

Sun :-

Its orbit is b/w 24,000 and 26,000 light years away from the galactic center.

The sun takes about 225 million to 250 million years to orbit one-time around the galactic center.

The sun's energy travels to Earth at the speed of light in the form of electromagnetic radiation (EMR).

physical properties :-

Temperature top 27 million °F (15 million °C) and it's about 86,000 miles (138,000 kilometers) thick. The density of the sun's core is about 150 grams per cubic centimeter (g/cm^3)

That is approximately 8 times the density of gold (19.3 g/cm^3) or 13 times

the density of lead ($11.3\ g/cm^3$)

Orbital of the sun :-

The sun takes about 226 million years to orbit the center of our Galaxy, and it orbits at a speed of about 230 km/s.

Observation data :-

Mass	1.9885×10^{20} Kg
	4.3839×10^{30} lb
	332,950 Earths
Average density	$1.408\ g/cm^3$
	0.0509 lb/cu in
	$0.255 \times$ Earth
Age	4.6 billion years
Equatorial surface gravity	$274\ m/s^2$
	$900\ ft/s^2$. $28 \times$ Earth

physical characteristics

Equatorial radius	696,000 km 432 000 mi 109 x Earthradii
surface area	6.09×10^{12} km^2 2.35×10^{12} sq mi 12,000 x Earth
Volume	1.412×10^{18} km^3 1,300,000 x Earth
Mass	1.9885×10^{30} kg 4.3839×10^{30} lb 332,950 Earths
Temperature	15,700,000 K (center) 5,772 K (photosphere) 5,000,000 K (corona)

Orbital characteristics

Mean distance from Milky way Core	26,660 light-years

Galactic period	225 - 250 million years.
Velocity	251 km/s (156 mi/s) orbit Galactic center.
	20 km/s (12 mi/s) to Stellar neighborhood
	370 km/s (230 mi/s) to cosmic microwave backgro
Obliquity	7.25° (ecliptic)
	67.23° (galactic plane)
Right ascension North pole	286.13° (286° 7' 48"
Declination of North pole	63.87° (63° 52' 12" N)
Sidereal rotation Period	25.05 days (equator)
	34.4 days (poles)
Equatorial rotation Velocity	1.997 km/s.