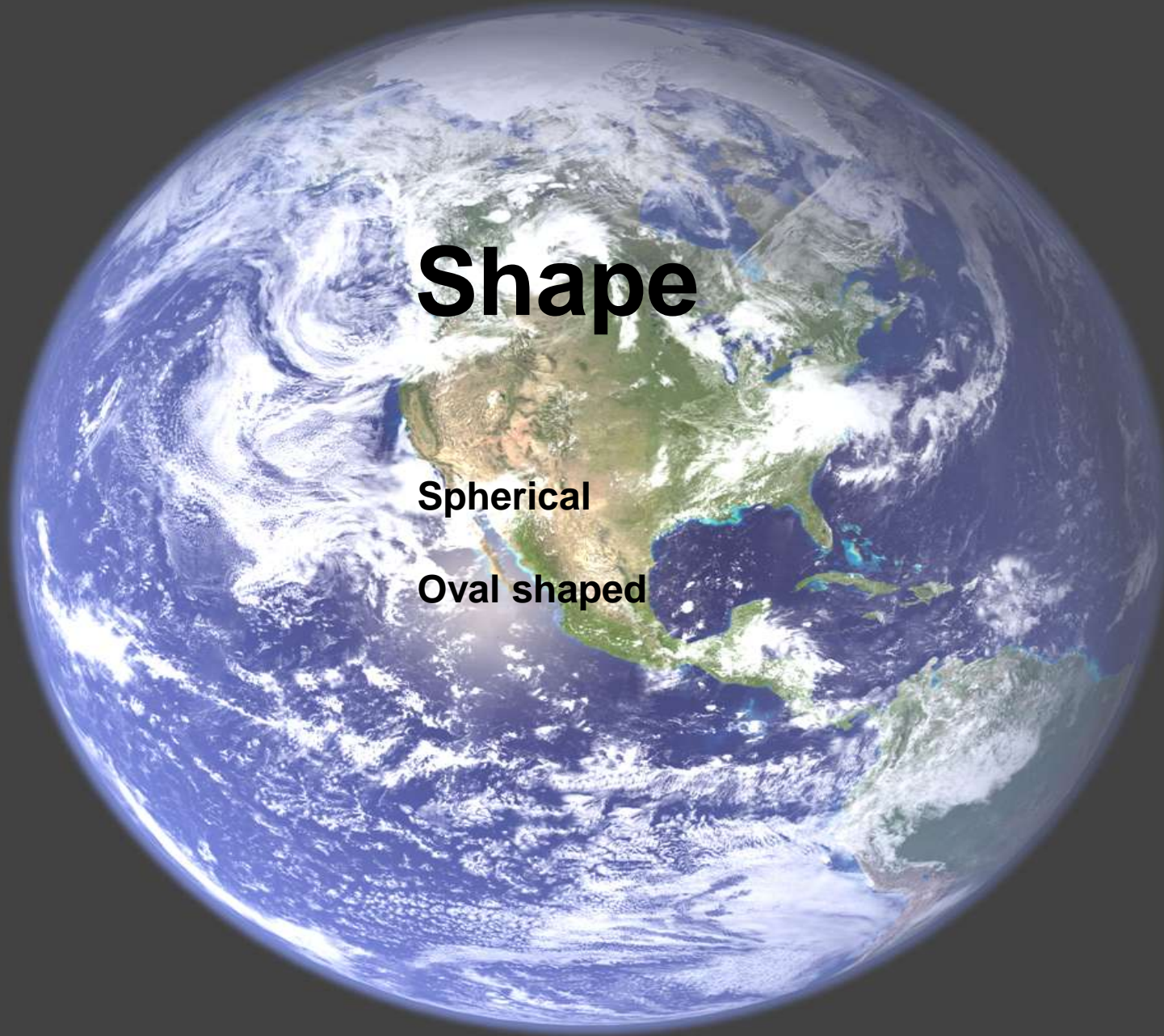
A large, bright orange and yellow sun with a textured surface, set against a dark red background. The sun's surface is covered in numerous small, bright spots and larger, irregular patches of white and yellow, giving it a granular appearance. The background is a deep, dark red color, which makes the sun stand out prominently. The overall image has a slightly grainy, high-contrast quality.

The Sun – Earth – Moon System

Planet Earth





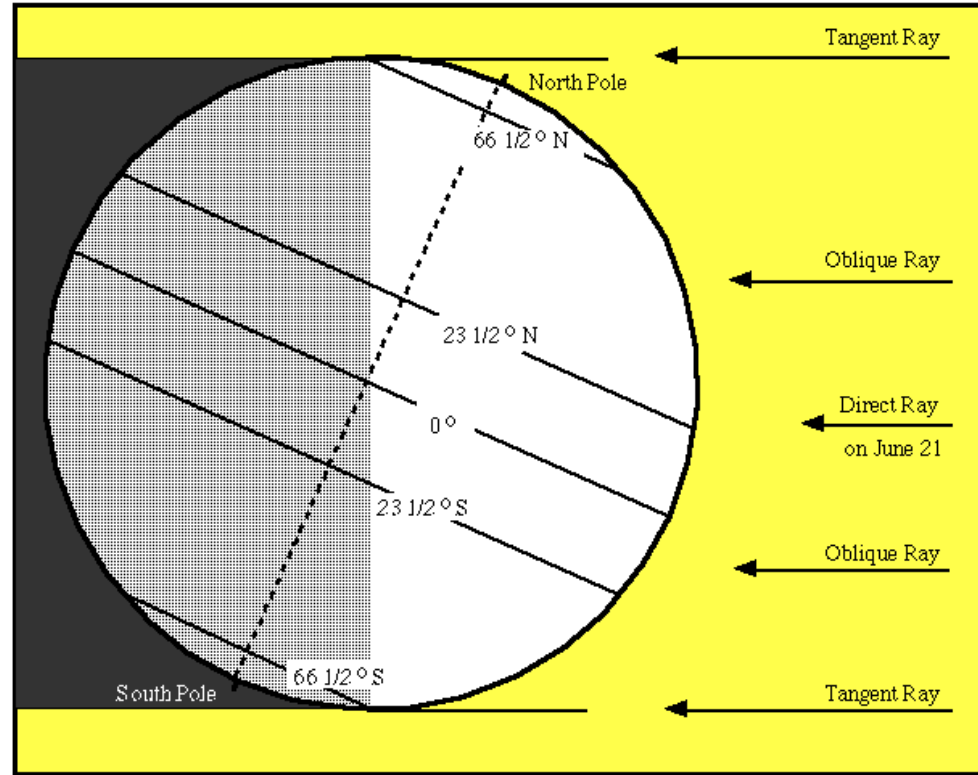
Shape

Spherical

Oval shaped

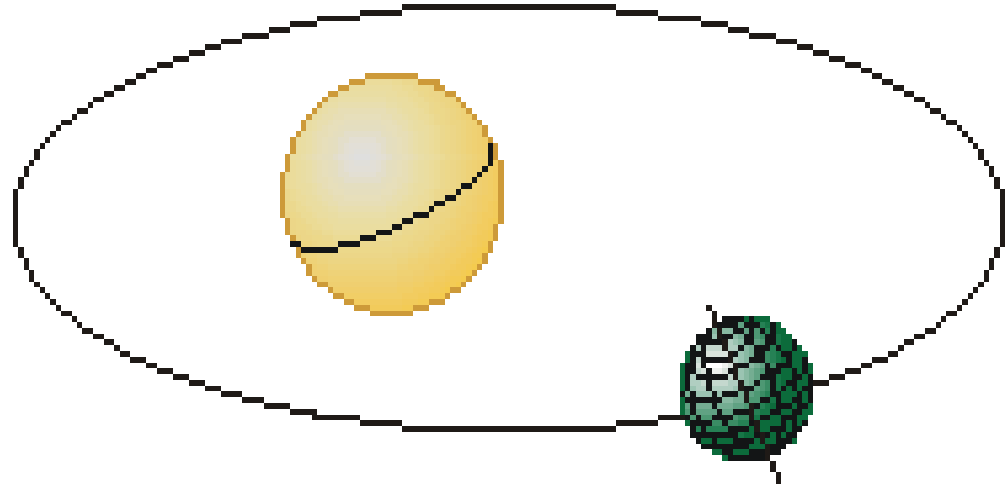
Rotation

- **West to east***
- **Fifteen degree /hour***
- **Rotation is just less than 24 hours**
- **Magnetic field**
 - North and south magnetic poles
 - Protect the earth from solar wind*



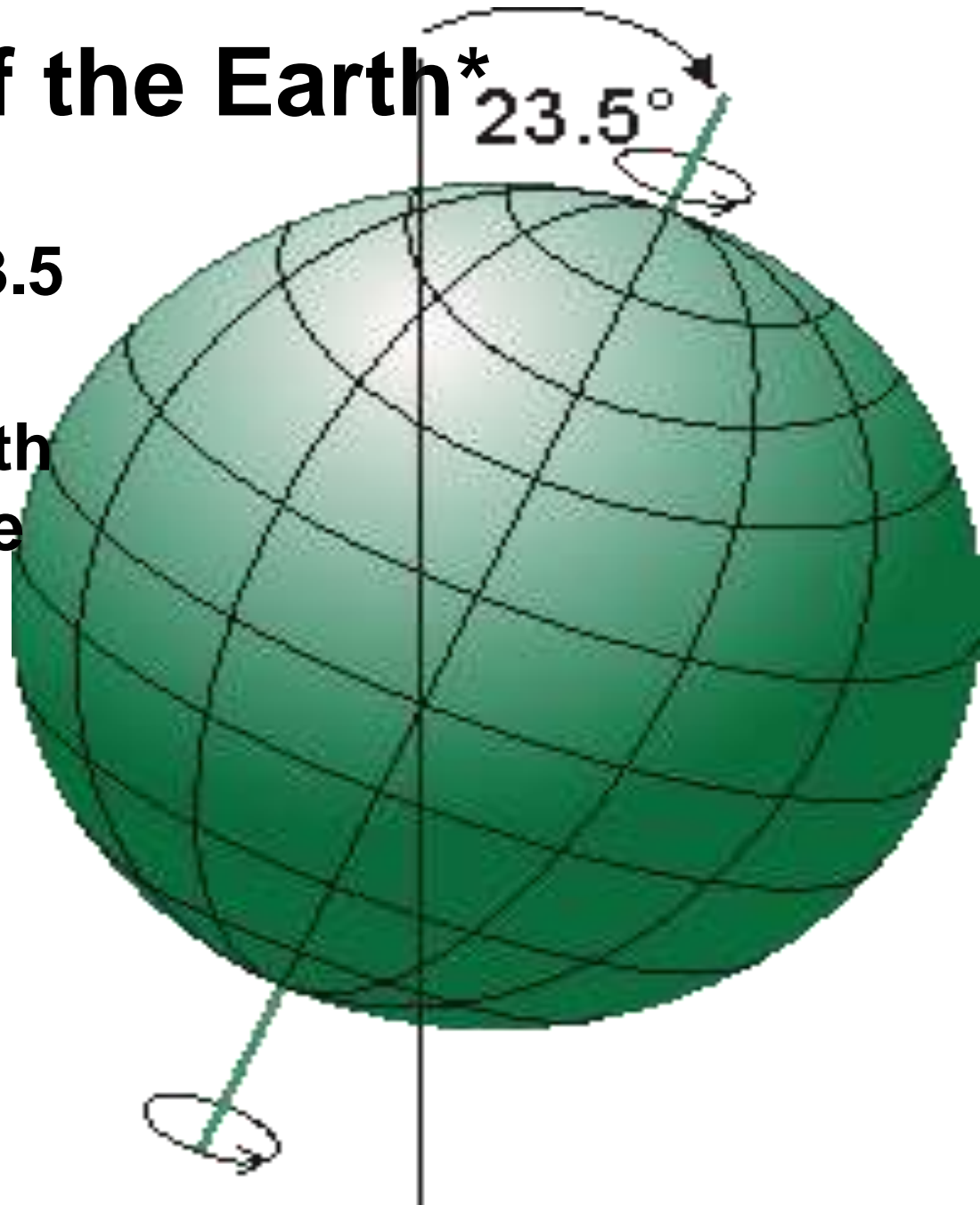
Earth's revolution*

- **Earth's orbit around the sun**
- **Shape is elliptical**
- **365.25 days**
- **Closest to the sun on January 3**
- **Farthest from the sun on July 4**



Tilt of the Earth*

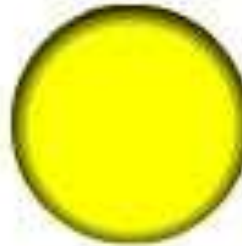
- Tilts on its axis 23.5 degrees
- This tilt of the earth is what causes the seasons



Equinox*

- Autumnal Equinox
9/22 or 9/23
- Spring Equinox
3/20 or 3/21

March 21



Sept. 23

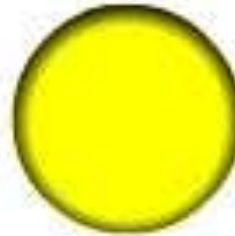


Solstice*

- Summer 6/21 or 6/22
- Winter 12/21 or 12/22



June 22



Dec 22



Quiz

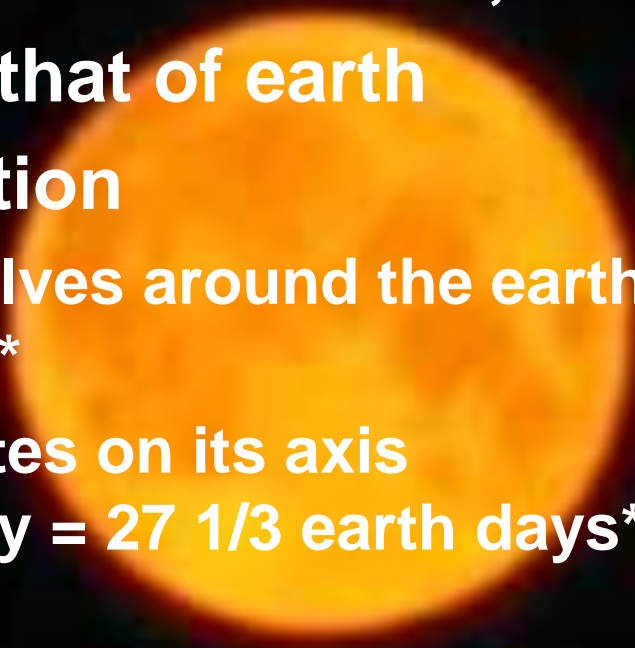
1. How much does the earth tilt on its axes?
2. What direction does the earth rotate?
3. When is the earth closest to the sun?
4. What season does the solstice start when the sun is pointing at the tropic of cancer?
5. Which equinox starts the first day of Spring?

The moon

- Space object nearest to earth
- Romans called it Luna which means shining
- From the word Luna we get the word lunar, which refers to the moon

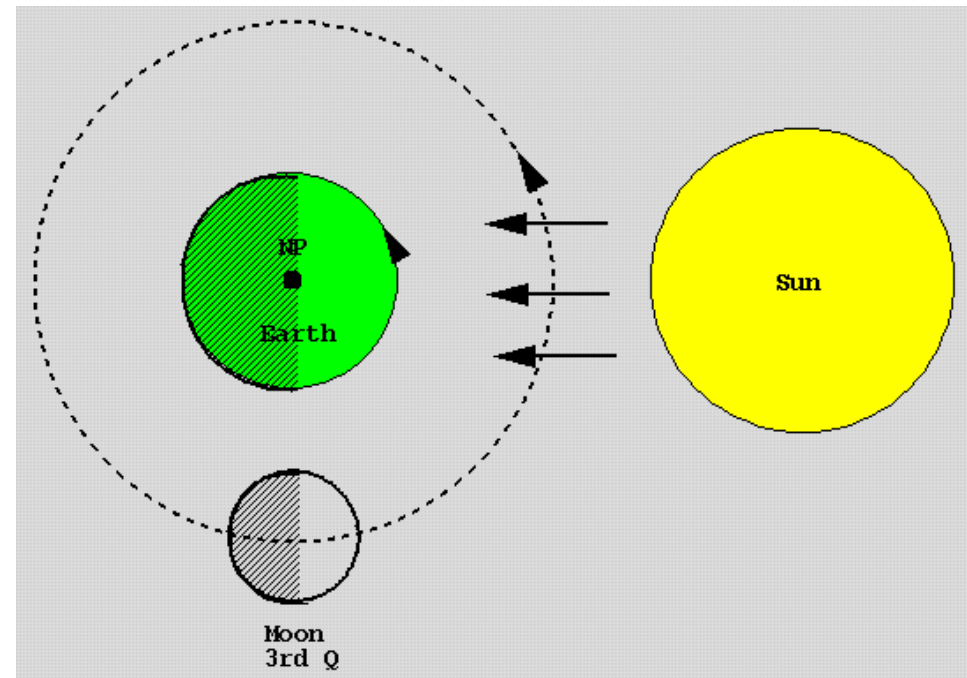


Features of the moon

- **Diameter – 3,476 km in diameter**
 - **Distance from earth - 384,400 km**
 - **Gravity 1/6 that of earth**
 - **Moon's motion**
 - **Moon revolves around the earth in $27 \frac{1}{3}$ earth days***
 - **Moon rotates on its axis**
1 moon day = $27 \frac{1}{3}$ earth days*
- 

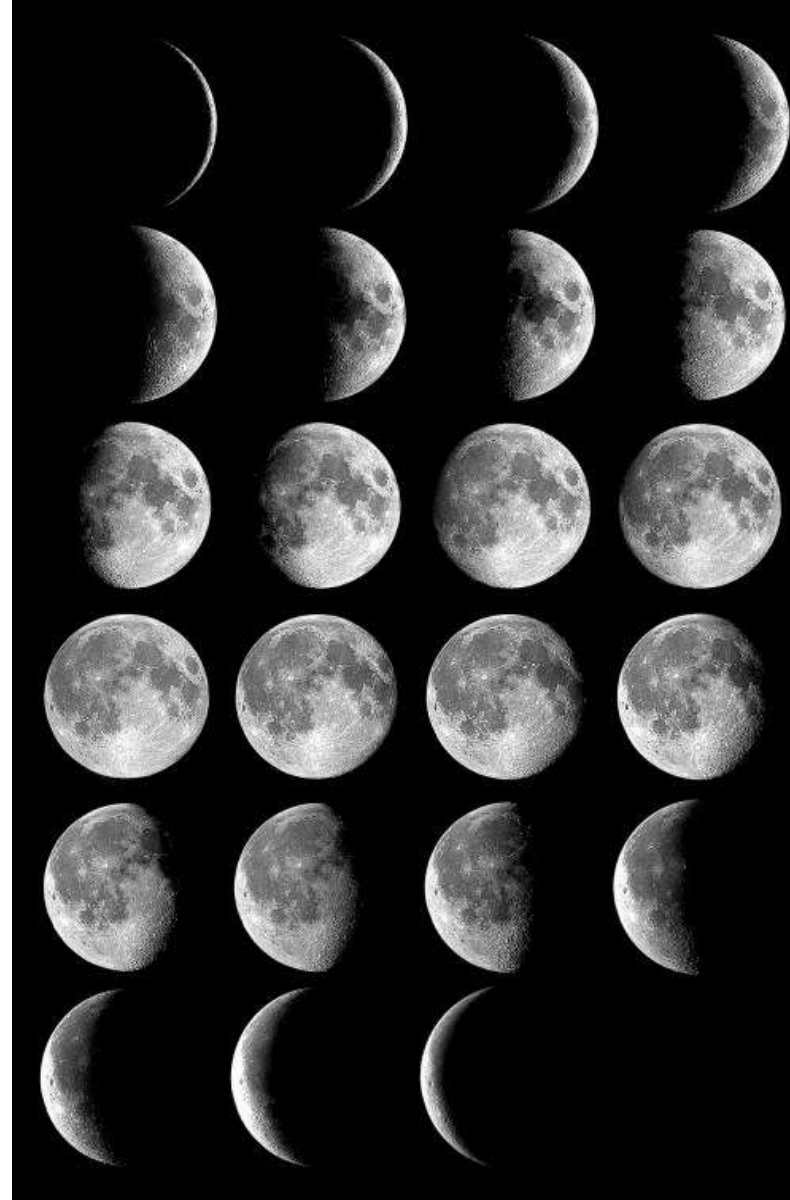
Phases of the moon

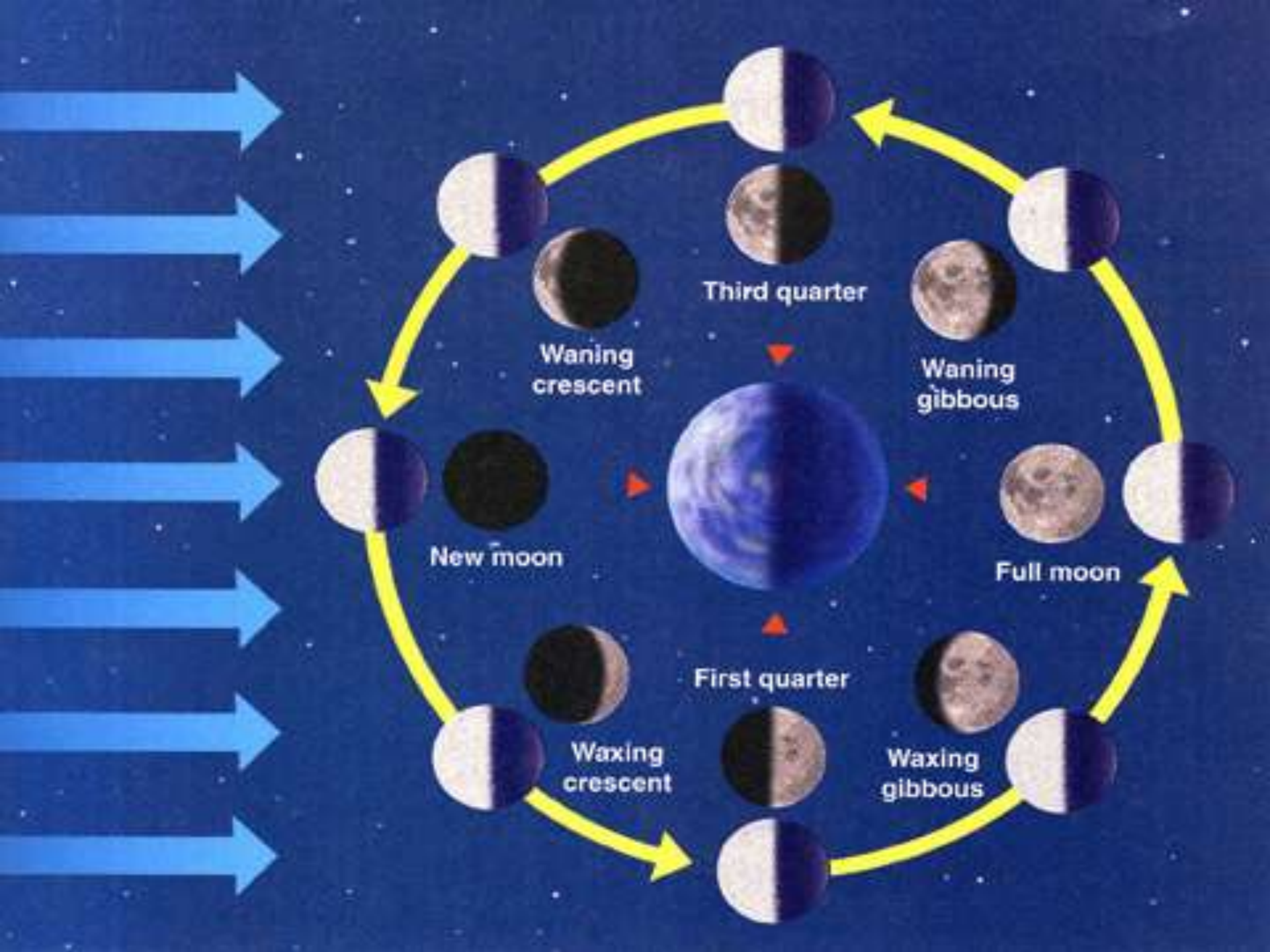
- The moon is $\frac{1}{2}$ illuminated most of the time (except during a lunar eclipse)
- The moon phases we see depend on how much of the illuminated side we see, not on how much is illuminated*
- The moon revolves from west to east at 1300 / day
 - This causes the moon to come up 50 minutes later each 24 hour period*



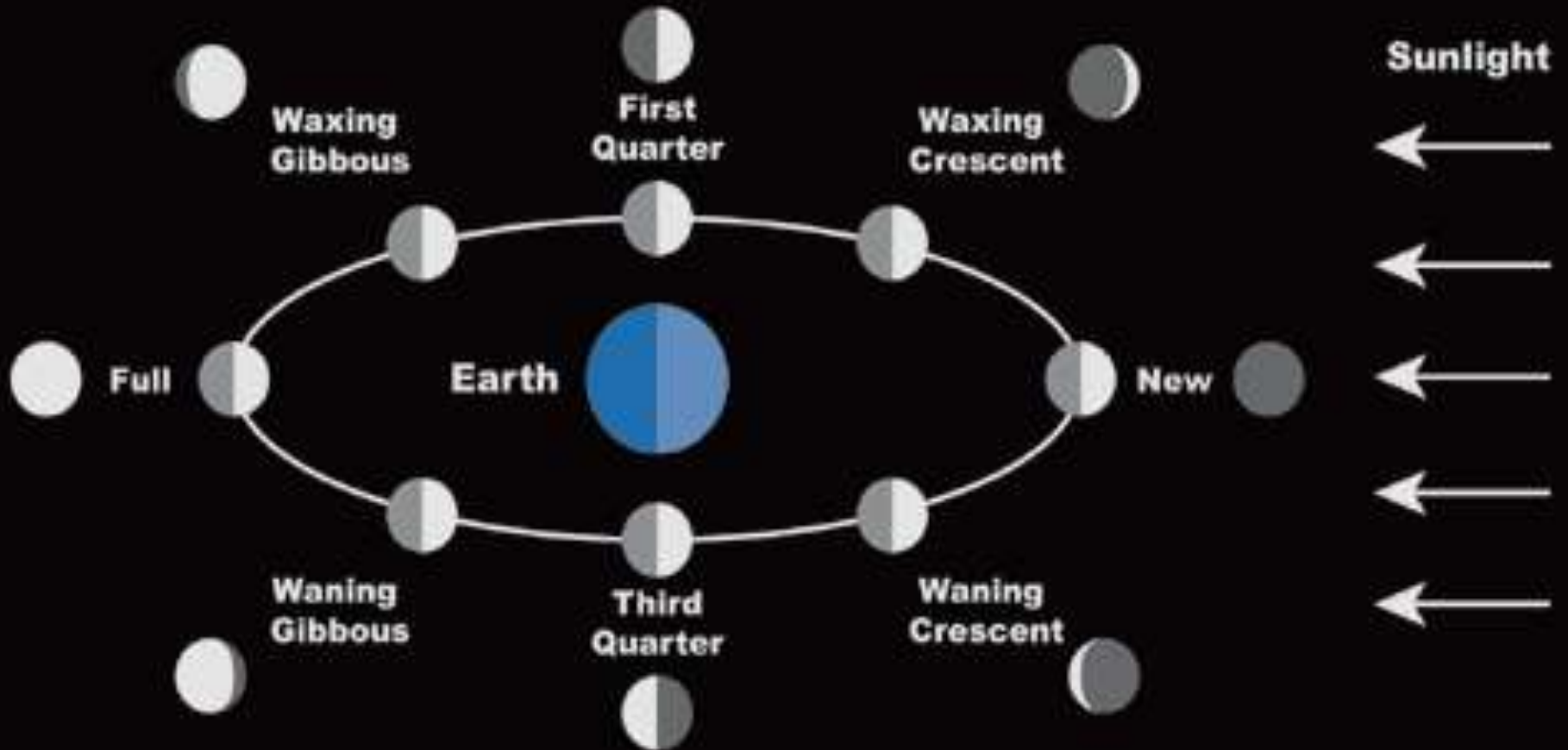
Phases of the Moon

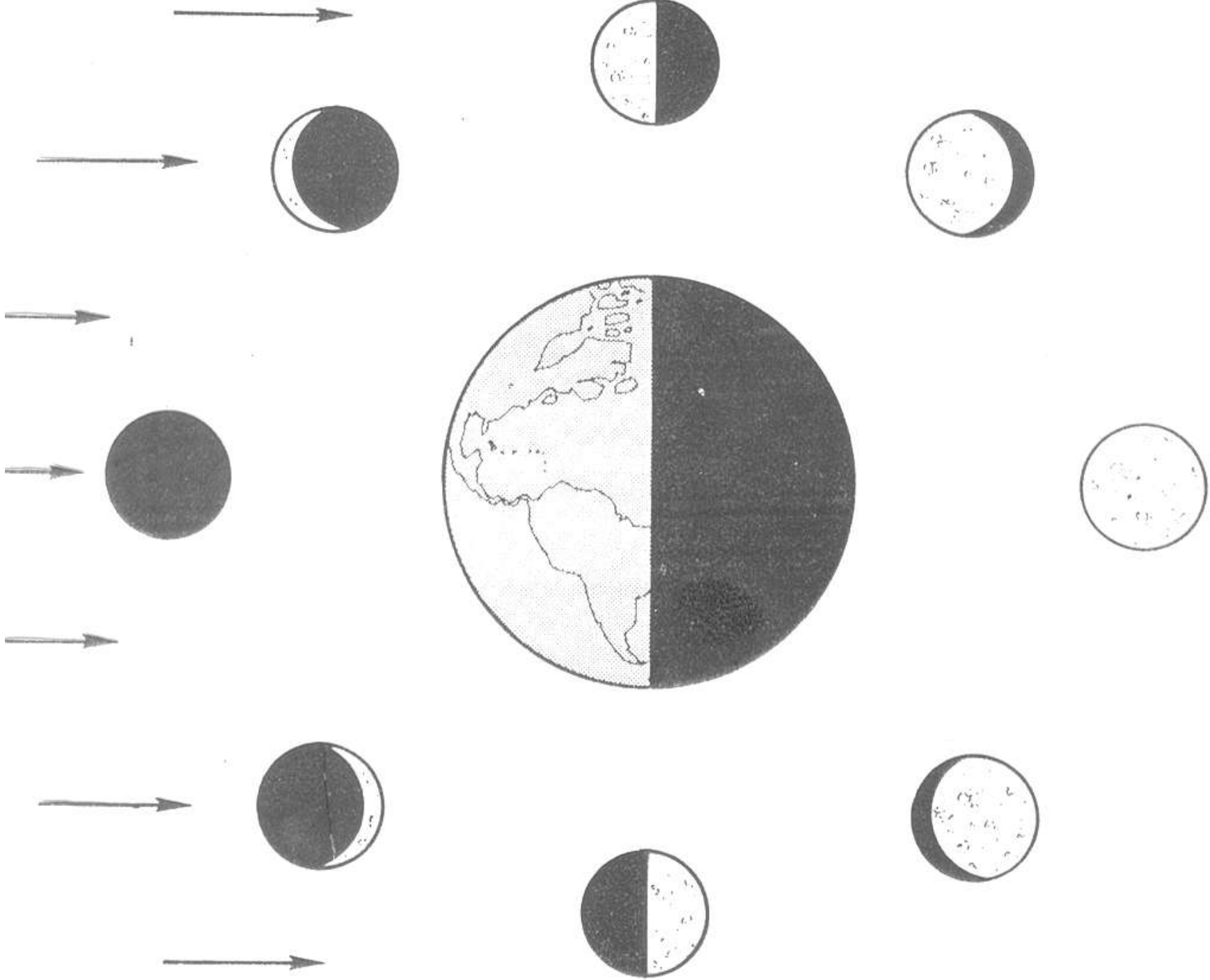
- The movement of the earth and moon are the reason the moon appears to have phases
- The names of the moon phases using the (DOC)* Method
- New moon – the moon is between the sun & earth
- Waxing Crescent moon
- First Quarter is $\frac{1}{2}$ of the moon showing
- Waxing Gibbous
- Full
- Waning gibbous
- Last quarter
- Waning crescent

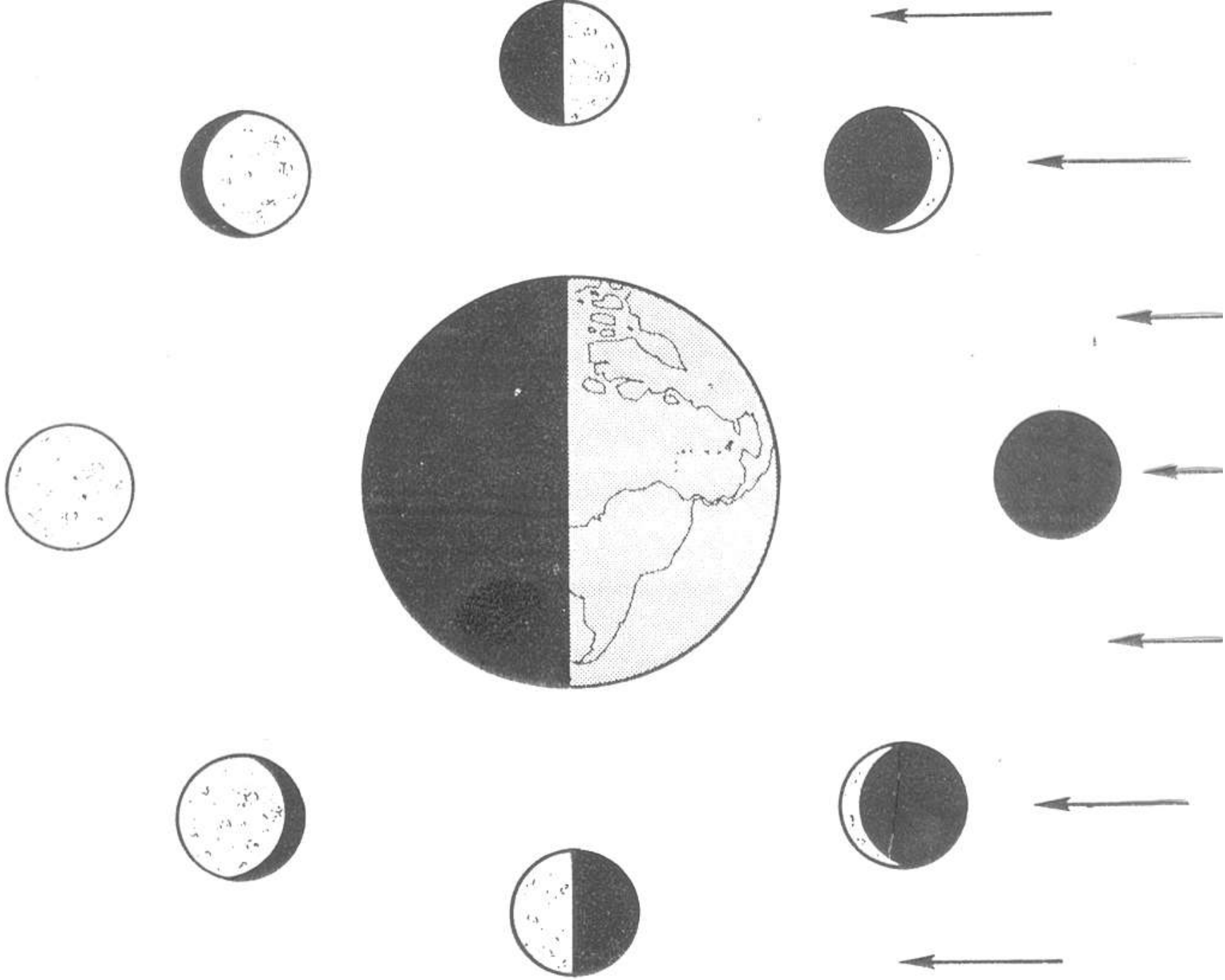


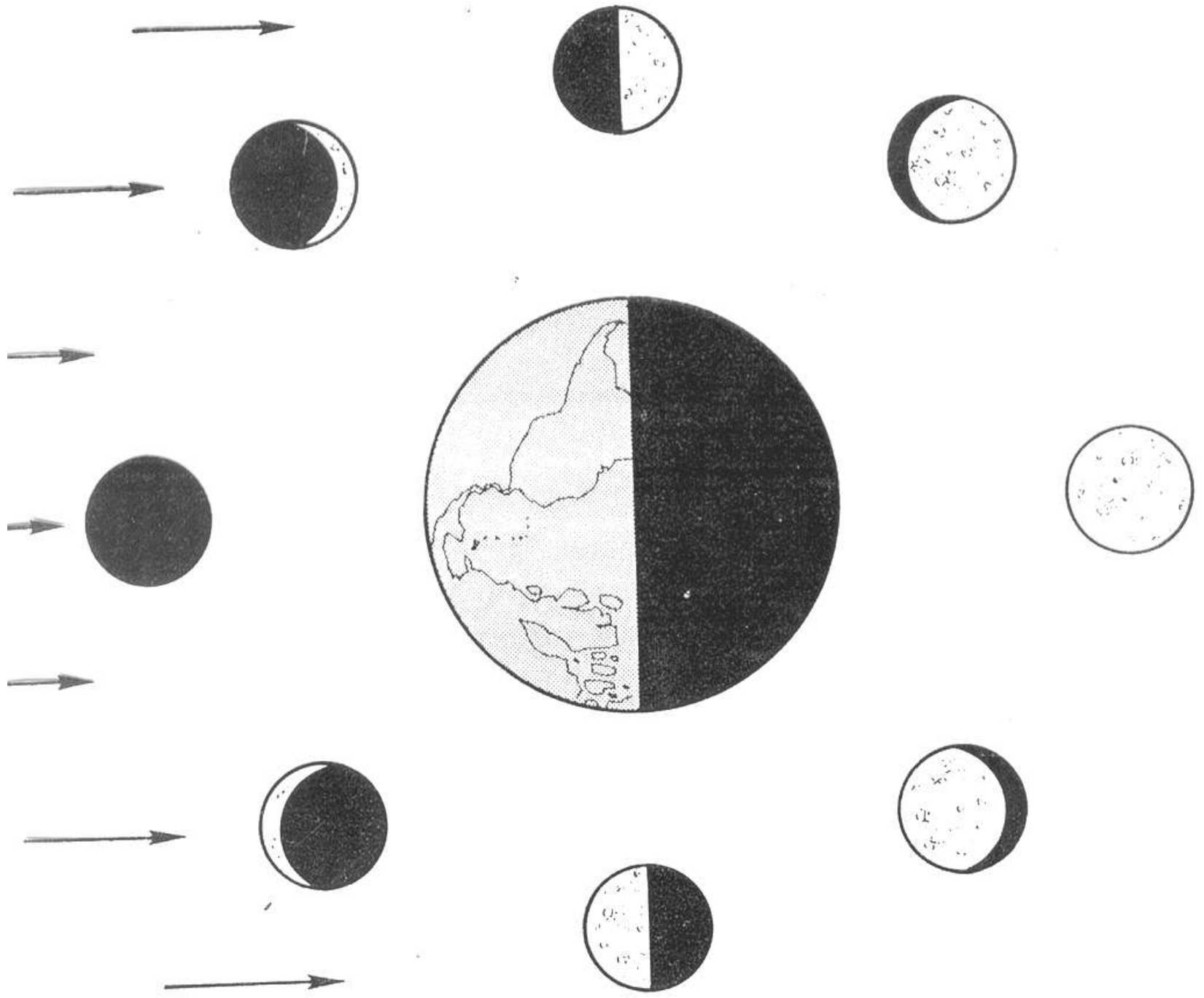


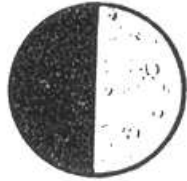
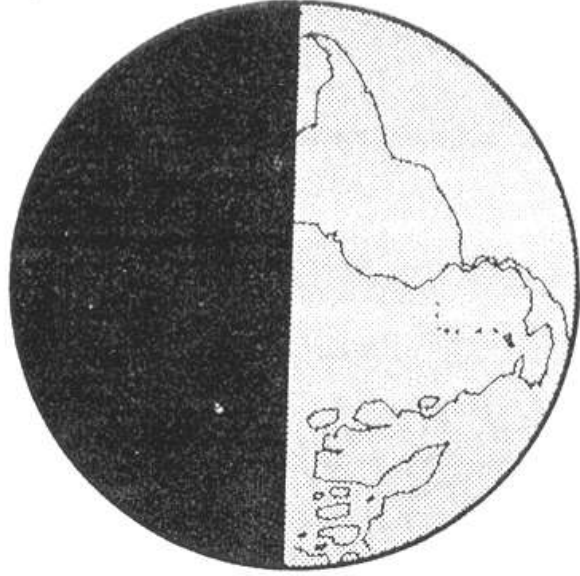
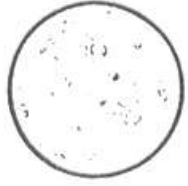
Phases of the Moon











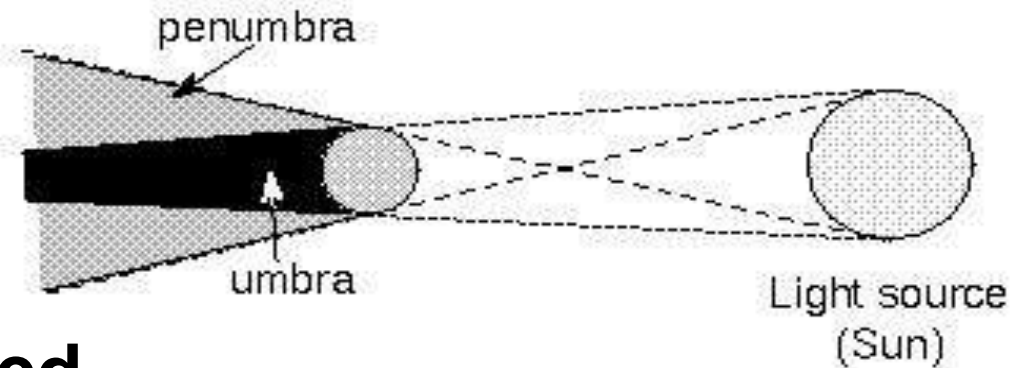
Eclipses

- The result of shadows cast by the earth and the moon
- There is a main shadow and a partial shadow
 - The main shadow **is** the umbra*
 - The partial shadow is the penumbra*



Lunar eclipse

- **When the moon moves into the earth's shadow Umbra**



The moon is darkened

The moon looks like a copper red disc

The red tone of the moon is caused by the atmosphere of the earth bending the sun rays

Lunar Eclipse



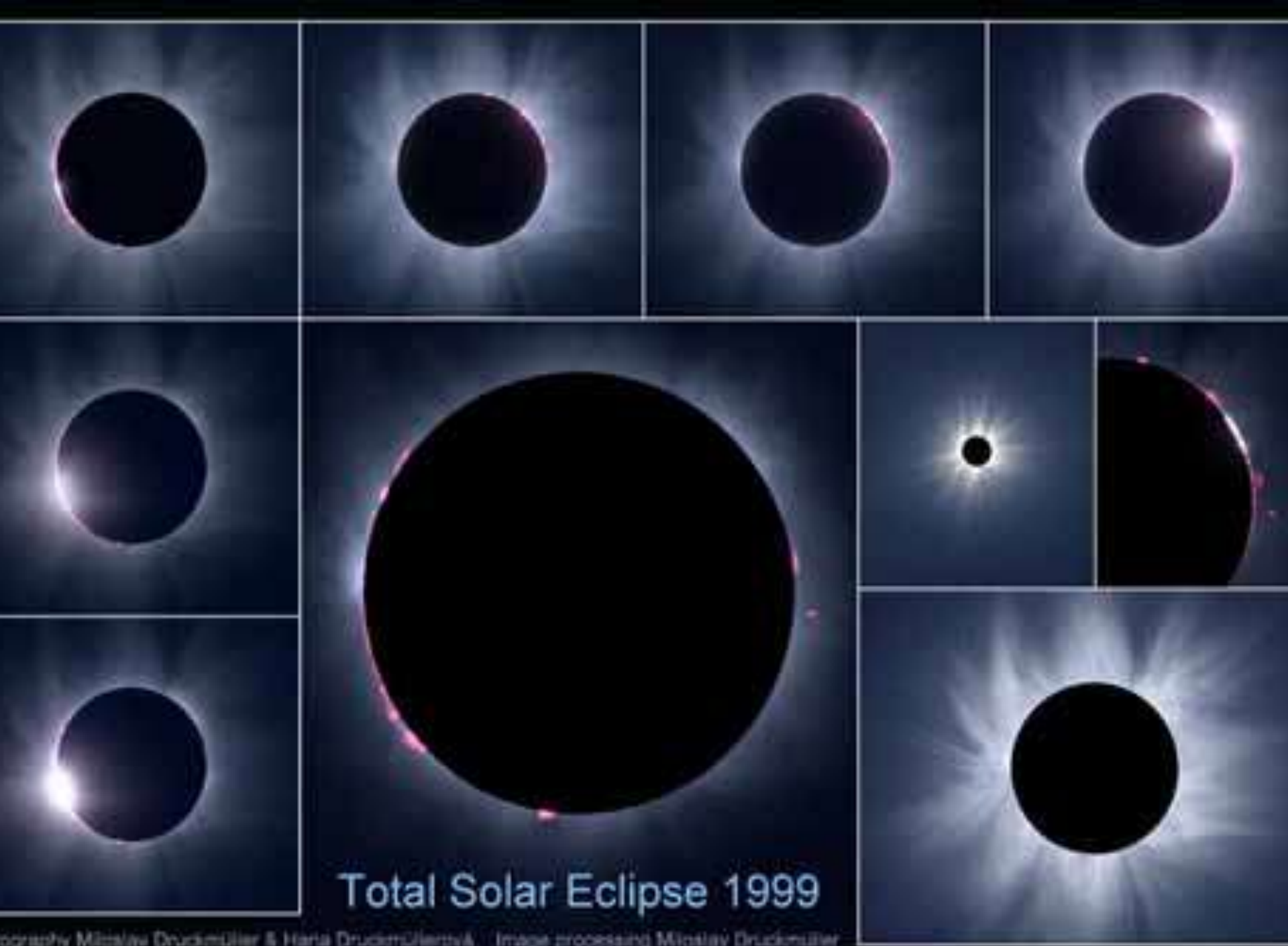
Solar Eclipse –

- **when the earth moves into the moons shadow**
- **Solar eclipse is longest at the equator 7.5 minutes**
- **When the sun shines through Deep valleys on the moon, during a solar eclipse, beads or string of bright light form and are called “Bailey’s Beads”**
- **Partial eclipses are more common than total eclipses**



Solar Eclipse





Total Solar Eclipse 1999



Photo: Oddleiv Skilbrei

Eclipses

- How can an object the size of the moon cover an object the size of the sun?
 - The sun is 400 times larger than the moon
 - Sun diameter 1 392 000 km
 - Moon's diameter 3 476 km
 - The sun is also 400 times farther away
 - Sun's distance from earth 149,000,000 km
 - Moon's distance from earth 384,400 km

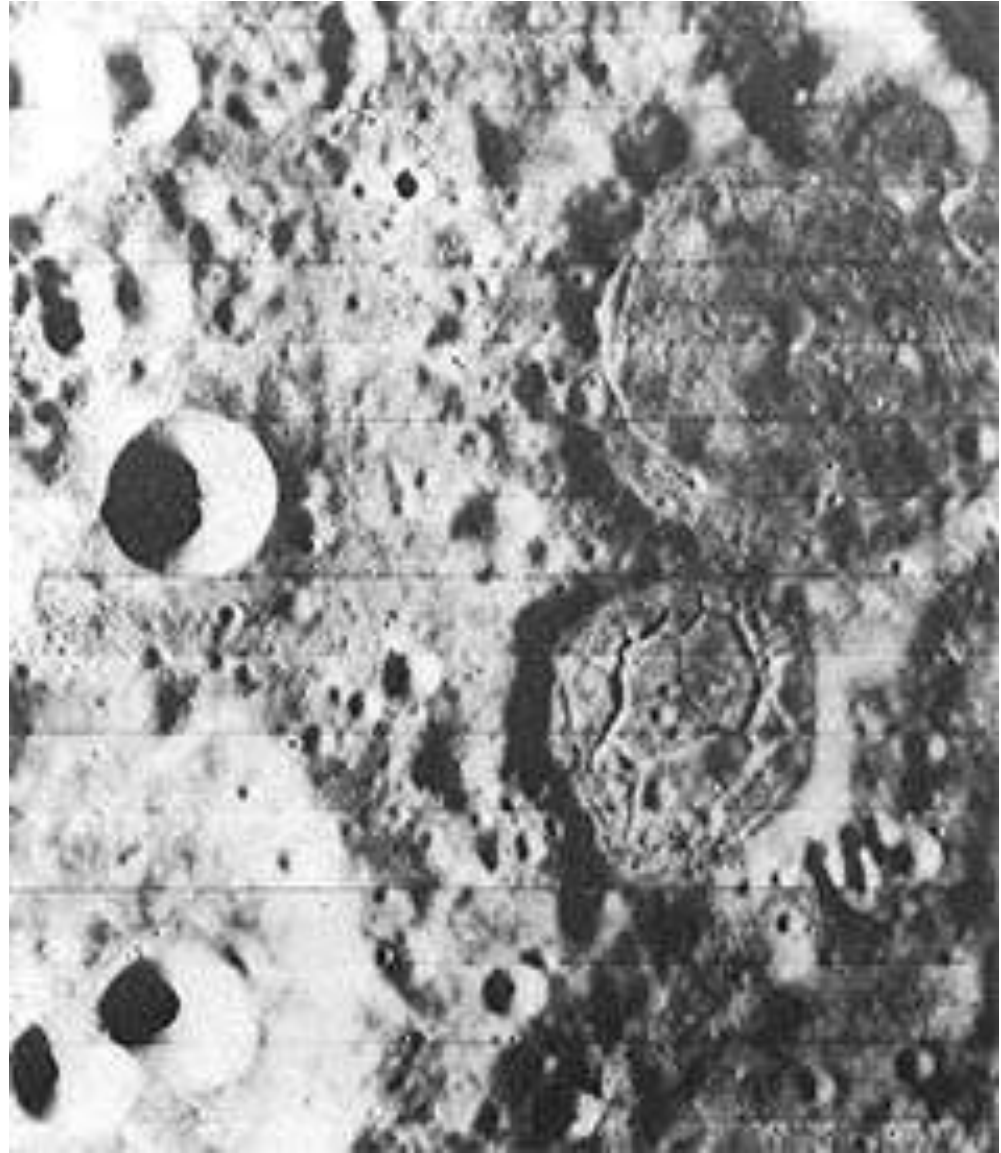


Lunar Surface and composition

- Surface solid rock covered with dust
- The moon has no atmosphere
- Because of no atmosphere temperatures vary from 130o C to -170oC in the shadows
- Moon's crust is 1 to 300 km thick
- Pieces of rock from space bombard the surface since there is no atmosphere to burn up those things falling toward its surface.

Craters

- **The results of the meteorites hitting the surface of the moon**
- **30,000 named craters on the moon**
Copernicus is 91 km from rim to rim



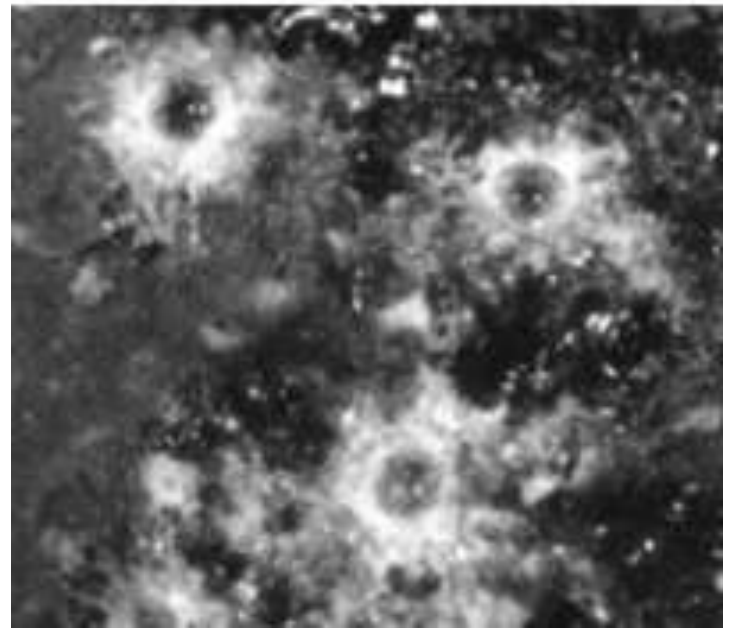
Lunar Surface

- **The moon plain is called Maria (the dark areas)**
 - Maria is Latin for sea
 - Maria is formed from hardened lava
- **Lunar Highlands (the light areas)**
 - mountains formed from huge chunks of rock hitting the moons surface
 - Mountains are as high as 5 km above the moons surface



Moons composition

- **Rocks brought from the moon by**
- **Apollo astronauts show composition much like earth**
- **Moon's crust oxygen, silicon aluminum, Iron, calcium**
- **Moon dust is much like our sand**



Origin of the moon

- **Appears to be the same age as earth**
- **No signs of past life**
- **One theory is moon another planet pulled in by earth's gravity**
- **Another theory is that the moon and earth formed from the same dust within gravitational pull.**
- **Another theory is that during earth's formation a piece was flung free from the earth**
- **Impact theory- collision of mars sized object with earth**

