

## The Sky from Different Locations

How does our view of the sky vary with location?

Where is the NCP if one is at the north pole?

The equator?

In the southern hemisphere?

In the southern hemisphere the altitude of the SCP is equal to one's southern latitude.

## Circumpolar Stars

All stars within one's latitude of the visible celestial pole will always be visible.

Conversely, all stars within one's latitude of the nonvisible celestial pole will never rise.

These stars are termed *circumpolar* stars:

## Motion of the sun, moon, and planets

I noted that stars do not move with respect to each other.

Well...almost.

Ancient peoples noted that seven objects appeared to move amongst the stars:

These were termed planets.

Note that the Greeks included the sun and moon as "planets."

## Annual motion of the Sun

Because of the Earth's orbit about the sun, the sun appears to move amongst the stars.

The path followed by the sun is called the *ecliptic*.

The *zodiac* is an  $18^\circ$  band around the ecliptic containing the zodiac constellations through which the sun and planets appear to move.

## Cause of the Seasons

The tilt of the Earth's rotation axis also causes the seasons.

When the sun is far to the north of the equator it is summer in the northern hemisphere.

Conversely, when the sun is far to the south of the equator it is winter in the northern hemisphere.

What are the seasons in the southern hemisphere?

Why?

## The Celestial Sphere — a model of the sky

The stars are attached to a large sphere which surrounds the Earth.

Sphere revolves around the Earth once a day.

Clearly the Celestial Sphere is not a true representation of the sky. In actuality, the stars are at various distances from the Earth.

Nevertheless, the Celestial Sphere provides a convenient way to visualize how the stars appear in the night sky.

## Motion of the Moon

Just like the sun, the Moon appears to drift eastwards on the sky amongst the stars.

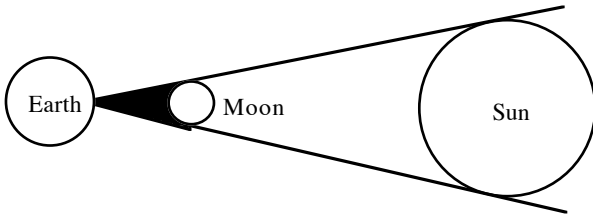
However, it moves much more quickly (about  $13^\circ/\text{day}$ ).

Not coincidentally, the Moon completes one orbit in just under one month.

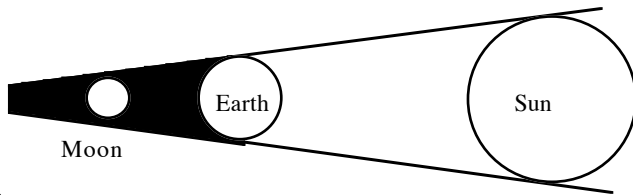
## Eclipses

Occur when the Sun, Earth and Moon precisely line up and the Earth or Moon blocks the sun as seen by the other.

Solar eclipse occurs when the Moon blocks the sun from the Earth:



Lunar eclipse occurs when the Earth blocks the sun from the Moon:



## Planetary Motions

The past couple of days we have examined the motion of the sun and moon.

Both appear to move eastwards ( $\sim 1^\circ/\text{day}$  for the sun;  $\sim 13^\circ/\text{day}$  for the moon).

Motion of the planets are more complicated.

First, different planets exhibit quite different behavior.

*Inferior Planets*—Planets which orbit closer to the sun than the Earth (Mercury and Venus):

*Superior Planets*—Planets which orbit outside the Earth's orbit:

Usually drift eastwards on the sky like the sun.

However, sometimes they reverse direction and drift westwards in *retrograde motion*.