Phases of the Moon

- The Moon goes through a set of phases about once every month
- "Month" comes from the word "moon"
- Time period of the phases (from Full Moon to Full Moon) is 29.5 days.

The different phases have different names:

- Getting larger = \textit{waxing}
- Getting smaller = \textit{waning}
- Less than 1/2 visible = \textit{crescent}
- More than 1/2 visible = \textit{gibbous}
- 1/2 visible, getting larger = \textit{1st quarter}
- 1/2 visible, getting smaller = \textit{3rd quarter}
- Entire Moon visible = \textit{Full Moon}
- None of the Moon visible = \textit{New Moon}

More Phases

- \textit{Full}
- \textit{1st Quarter}
- \textit{Waning Crescent}
- \textit{Waxing Crescent}
- \textit{New}
- \textit{Waning Gibbous}

Two perspectives: On Earth, or outside the Moon’s orbit

- At any time (except during lunar eclipses), 1/2 the moon is lit up
- Phases happen because the amount of lit up moon we can see \textit{from Earth} changes

Phases of the Moon Demo

- [Diagram showing different phases of the Moon]

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Lecture Tutorial: The Cause of Moon Phases (pg. 81-83)

- Work with a partner!
- Read the instructions and questions carefully.
- Discuss the concepts and your answers with one another.
- Come to a consensus answer you all agree on.
- If you get stuck or are not sure of your answer, ask another group.
- If you get really stuck or don’t understand what the Lecture Tutorial is asking, ask me for help.

Moon Rise & Set Times

- Moon’s orbit position determines its phase
- Also determines what time the Moon is up in the sky

Moon Rise & Set Times: Examples

- New Moon: Same side as the Sun
  - Rises at sunrise, sets at sunset

- Full Moon: Opposite the Sun
  - Rises at sunset, sets at sunrise

Eclipses

- “The cutting off of all or part of the light of one body by another”
- Rare events when light from the Sun or Moon is blocked for a short time
- Eclipses occur when the Sun, Moon, and Earth are lined up just right
- There is the potential for an eclipse twice a month!

Lunar Eclipses

- The Moon gets darker as it passes into Earth’s shadow
- Sometimes glows with a slightly reddish color at the middle of the eclipse
- The Moon is always in the Full phase during a lunar eclipse
- Next one is on April 4th! (Possible extra credit for observing)

A Lunar Eclipse

- Several pictures of a total lunar eclipse
- The moon gets “eaten up” by Earth’s shadow
- Sometimes glows with light bent through Earth’s atmosphere
What’s going on during a lunar eclipse

- The Sun disappears behind the Moon
- The Moon is always in the New phase during a solar eclipse
- Can only be seen from certain places on Earth
- These events are even more rare than lunar eclipses
  - Next one is in March but it’s only visible from Western Europe and North Africa

What’s going on during a solar eclipse

- Partial: Takes out a bite
- Total: Covers the Sun
  - Moon slightly closer
- Annular: Leaves a ring
  - Moon slightly farther away

Partial, Total, and Annular

Total Solar Eclipse on March 29, 2006 (viewed from Turkey)

Diamond Ring Effect

This occurs when sunlight shines through a dip (usually a crater or valley) on the edge of the Moon’s disk