

# Our View of the Sky and Seasons

9-2-2005

# Opening Discussion

- Speed of the Earth around the Sun.
- Have you seen anything interesting in the news?
- What did we talk about last class?
- How many days are in a year? (This is a trick question.)
- What constellation is Mars in?
- Does Venus ever rise at sunset?

# Discussion Questions

- At this point, I want to gage how people feel about some different topics.
- Is there life beyond Earth? What is it like?
- Should humans be trying to get to other planets? When will we get there?
- Will humans ever get to planets around other stars? Should we try?
- Is the Earth special?

# Motions of the Heavens

- We talked about all the ways the Earth is in motion last class. Of course, we don't feel like we are in motion. We see this motion when we look into the sky as the motion of objects across the sky.
- Most of the motions that we notice during our lives are caused by either the rotation of the Earth on its axis or the revolution of the Earth about the Sun. The exceptions are the motions of the Moon and planets that we will discuss tomorrow.
- Other things change, but those changes are too slow for us to really notice.

# Talking about the sky

- What is the zenith? (For trivia buffs, what is the opposite of zenith?)
- What is the celestial equator?
- What is the ecliptic?
- What is the meridian?
- What is the celestial sphere?
- What does it mean for a star to be circumpolar?
- How can you quickly and easily determine your latitude on a clear night?

# Seasons

- Almost 2/3rds of the class knew what the cause of the seasons was. Those who gave the wrong explanation generally mention the Earth being further from or closer to the Sun in it's orbit. You can quickly discount this by remembering that northern summer is southern winter and vice versa.
- Seasons are actually caused by the tilt of the Earth's axis which points toward the same location in space as we orbit the Sun. This is also why days are longer in the summer and shorter in the winter.

# Significant Circles on the Earth

- 23.5 degrees above and below the equator are the tropics. These are the furthest north and furthest south the Sun ever reaches zenith. Between them the effects of the seasons are minimal.
- 23.5 degrees south of the north pole and north of the south pole are the arctic and antarctic circles. Beyond these latitudes some days the Sun will not rise close to the first day of winter.
- These lines are not arbitrary like the location of the prime meridian.

# Solstices and Equinoxes

- There are 4 special times of the year that we normally think of as the official changes of the seasons.
- The summer solstice is when the Earth's axis is pointing as directly towards the Sun as it can and we have the most sunlight of any day of the year.
- The winter solstice is the opposite.
- Directly between these, the axis is pointing neither toward, nor away from the Sun. Those times are the spring and fall equinoxes when we have equal parts day and night.



# Minute Essay

- What do you feel about the speed of the class? In particular, when we are doing math are we going too fast, too slow, or just right?
- Have a good weekend. Don't show up on Monday. Remember to read 2.4-2.6 for next Wednesday.