

Seasons

PSC 203

Overview

- Why do we have seasons?
- Misconceptions about the seasons

- Sun – Earth geometry during the seasons
- Seasons terminology

Pre-lecture questions

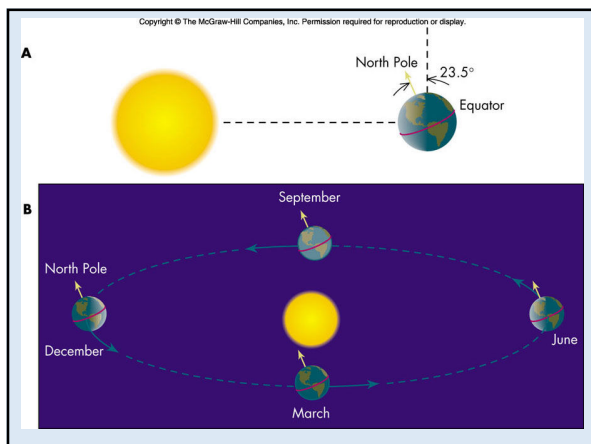
- Turn in now, if you haven't already
- Question 1, page 28
- Question 2, fig 1.7
- Question 3, page 30 and fig 1.13
- Question 4, page 25 and glossary

Cause of the seasons

- The tilt of the earth on its axis relative to the sun

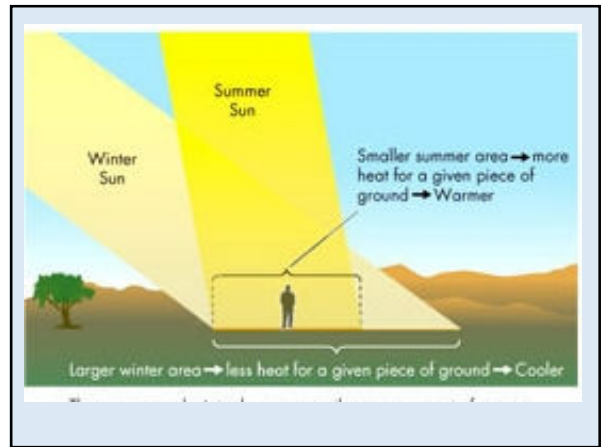
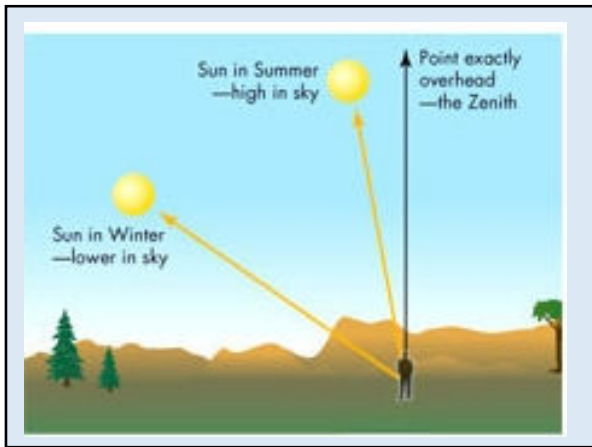
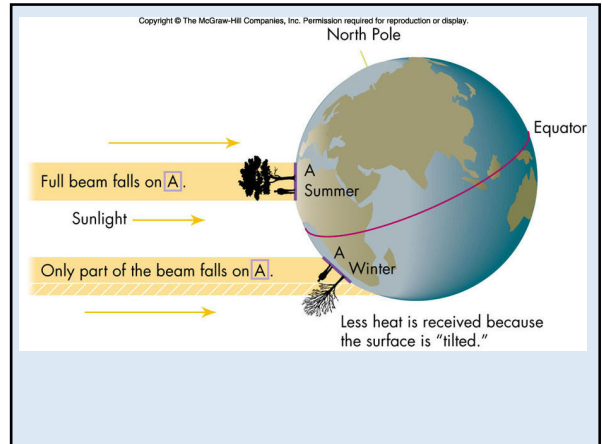
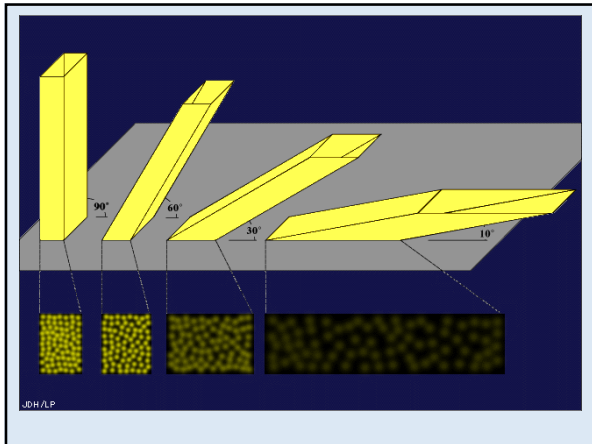
- 23.5 degrees

- Maintains direction over the year
- (Visual example)



Solar Heating

- The sun or any light, heats a surface most effectively when it is shining directly onto the surface



Seasons

- In summer, the sun is at a smaller angle, more effective heating
- In winter, the sun is at a larger angle, less effective heating

Seasons vs. hemispheres

- Northern and southern hemisphere have reversed seasons

Some common misconceptions

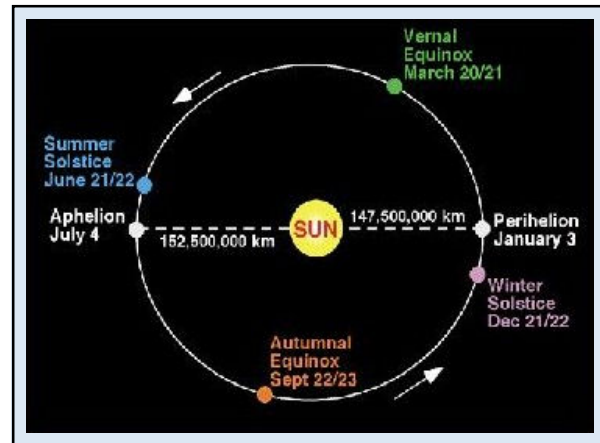
- What are some other things you have heard or been taught about the seasons?
- Caused by the weather
- Caused by the distance to the sun

Weather vs. Seasons

- The changing weather patterns don't cause the seasons
- The weather changes because of the seasons
- We want to know what it is that causes the difference over the year. Why is it warmer in summer and colder in winter?

Distance to the Sun

- The distance from the sun changes over the orbit
- If this causes the seasons then...
 - It should be summer when we are closer to the sun
- But we are closest to the Sun in January



variation

- As the planet tilts, the side toward the sun is closer to the sun
- This is true but it is a very small amount, less than the difference in the orbit
- If orbit change was not enough, then the change in distance due to tilt is not enough

Equinox

- Sun rises due east
- Sun sets due west
- Exactly 12 hours of day, 12 hours of night
- Once in spring
- Once in fall

Solstice

- Summer solstice:
 - Longest daylight of the year
 - Sun at noon is highest in sky
- Winter solstice:
 - Shortest daylight of the year
 - Sun at noon is lowest in sky

Prep for planetarium lecture

- Next week we will be in the planetarium
- Topics:
 - Constellations
 - Sky coordinates
 - Motion of sun and stars
 - Differences due to location

Notes for planetarium

- Since it will be difficult to take notes in the planetarium (it is dark)
- I will provide handouts on the concepts
- You will fill out worksheet at the end of each lecture