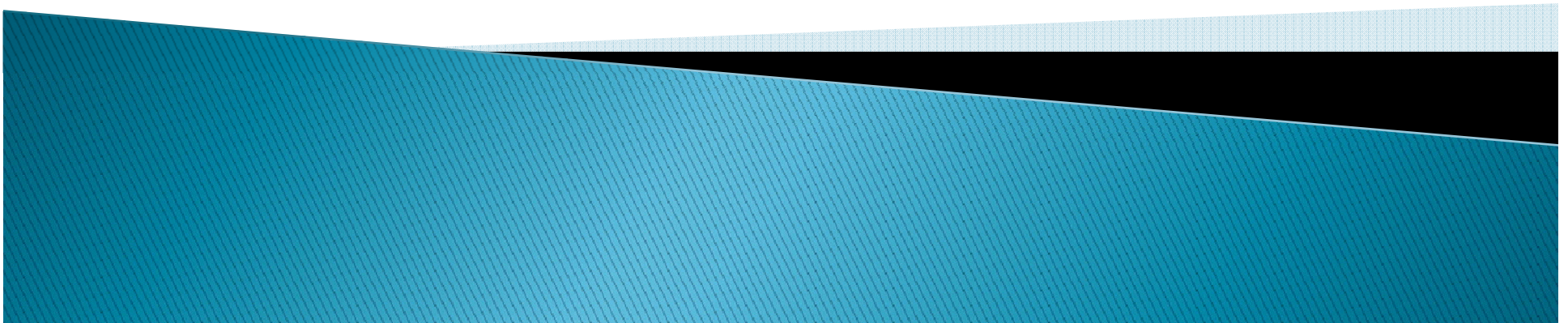




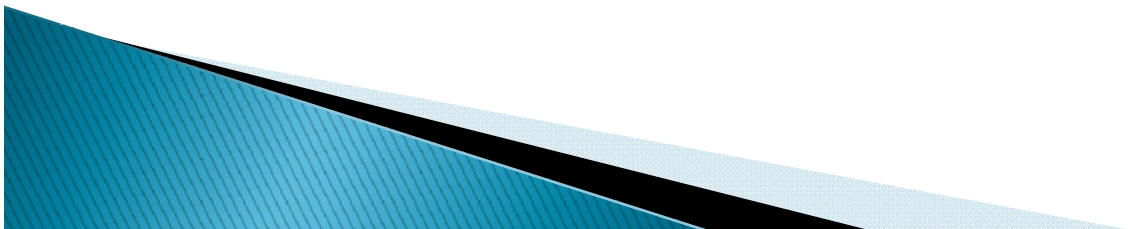
Sun, Shadows, Seasons The Relationship

What can we learn from direct observations?



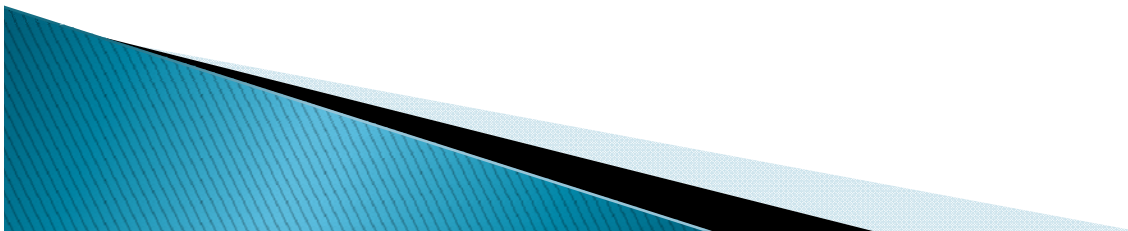
What causes weather changes?

- ▶ _____ of Earth's axis
- ▶ In winter, the Northern Hemisphere is tilted _____ from the Sun.
- ▶ In summer, it is tilted _____ the Sun.
- ▶ When Earth's North Pole is tilted toward the Sun, the Sun appears - to those in the Northern Hemisphere - to rise _____ in the sky.



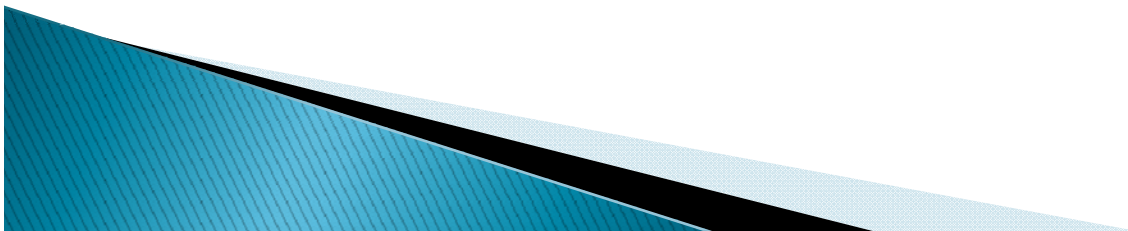
What does the higher path mean?

- ▶ The Sun stays above our horizon longer on summer days.
- ▶ When Earth's Northern Hemisphere tilts away from the Sun, the Sun appears – to those in the North Hemisphere – lower.



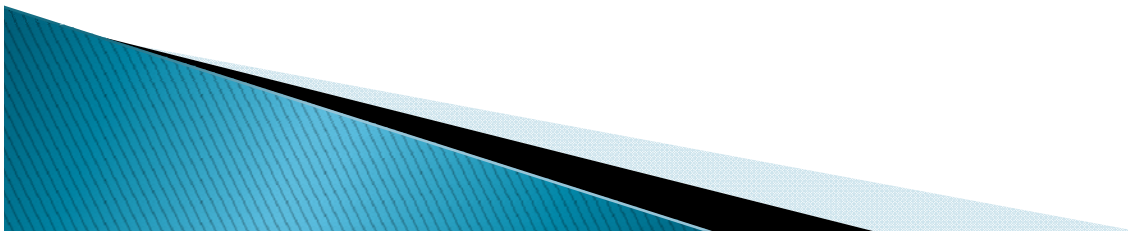
What do longer/days mean?

- ▶ More heat is absorbed by Earth on longer days.
- ▶ Shorter days mean less heat is absorbed.



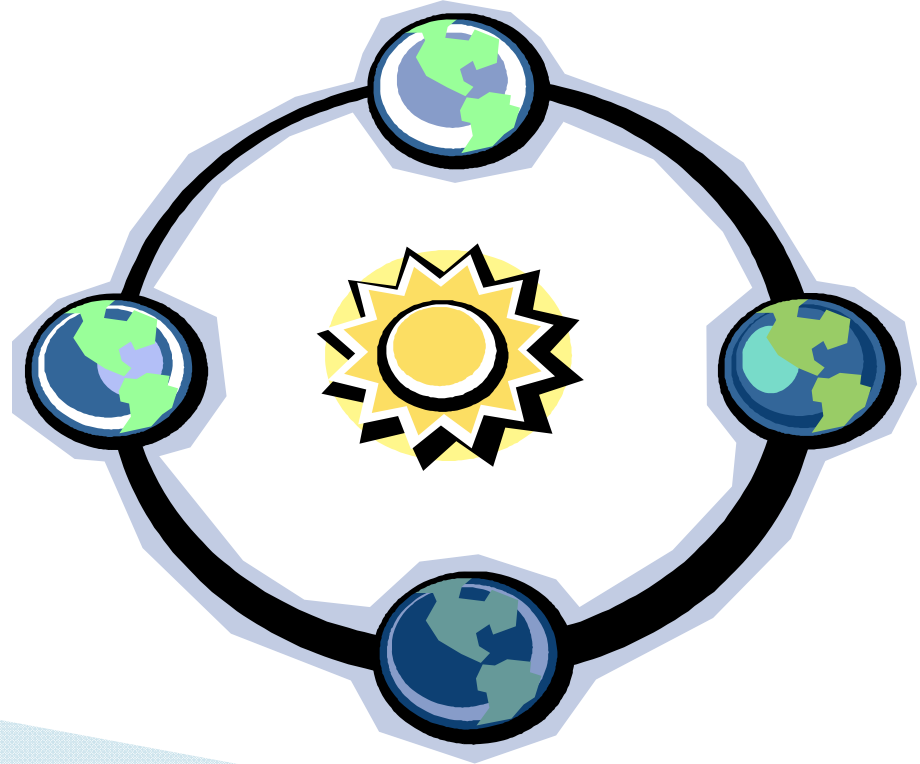
Goal of this project:

- ▶ To have students explain their observations
- ▶ To prove a longer day by length of shadow at the same time each day
- ▶ To connect past lessons to what we are learning now



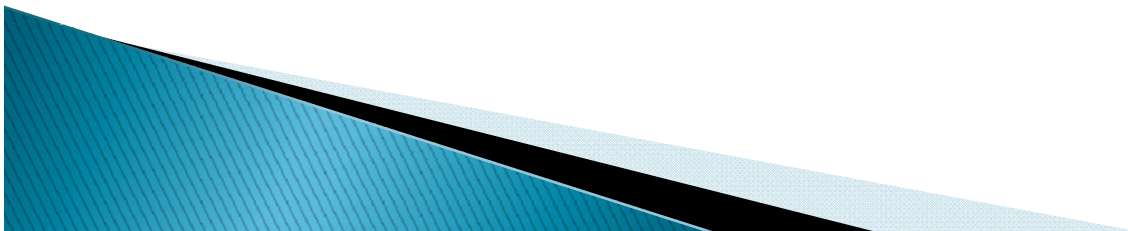
Misconceptions

- ▶ The Sun and Earth are the same size
- ▶ Earth is closest to the Sun in the summertime or, it is warmer in summer because Earth is closer to the Sun.



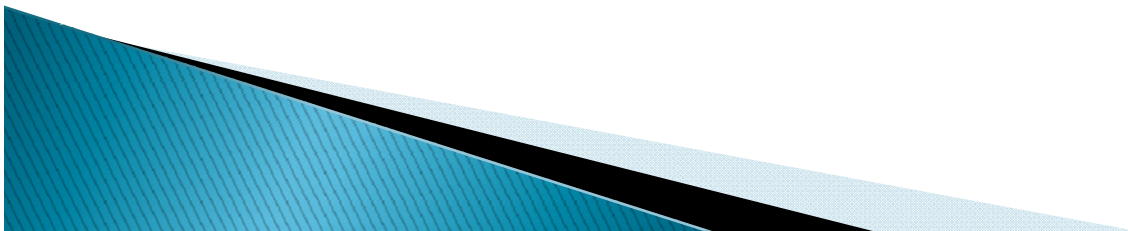
What is going on?

- ▶ While it may be summer in the northern hemisphere, it is wintertime in the southern hemisphere.
- ▶ What will it be six months from now?



Take a look at this...

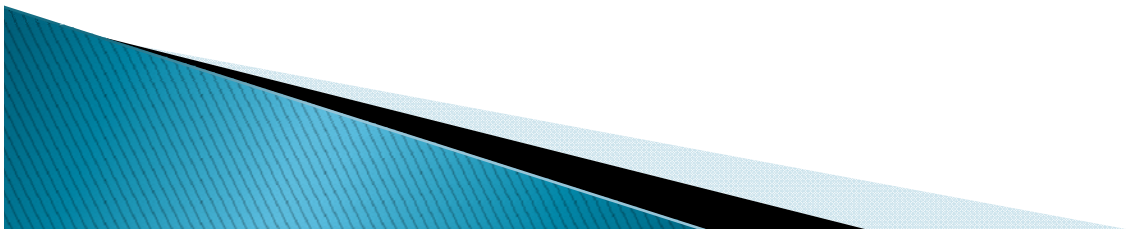
- ▶ http://esminfo.prenhall.com/science/geoanimations/animations/01_EarthSun_E2.html



Solstice and Equinox

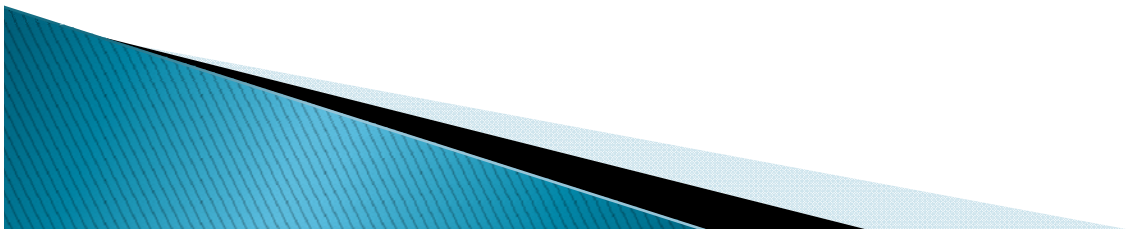
- ▶ What is a Solstice?
- ▶ How many do we have?
- ▶ When do they occur?

- ▶ What is an Equinox?
- ▶ How many do we have?
- ▶ When do they occur?



Let's get a better understanding.

- ▶ Watch and discuss the following animation:
- ▶ <http://www.astro.uiuc.edu/projects/data/Seasons/seasons.html>



What students need to think about from the survey:

- ▶ Nighttime happens when the part of the Earth where you live spins away from the light from the Sun. (Let's discuss this.)
- ▶ At noon, my shadow is longer outside in the wintertime than the summertime. (Let's discuss this.)
- ▶ Why does the Sun look like it moves across the sky? (Let's discuss)

