Name: _____ Laboratory Section: _____

Date: _____ Score/Grade: _____

Video
Exercise 5
Pre-Lab Video
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LAB EXERCISE 5

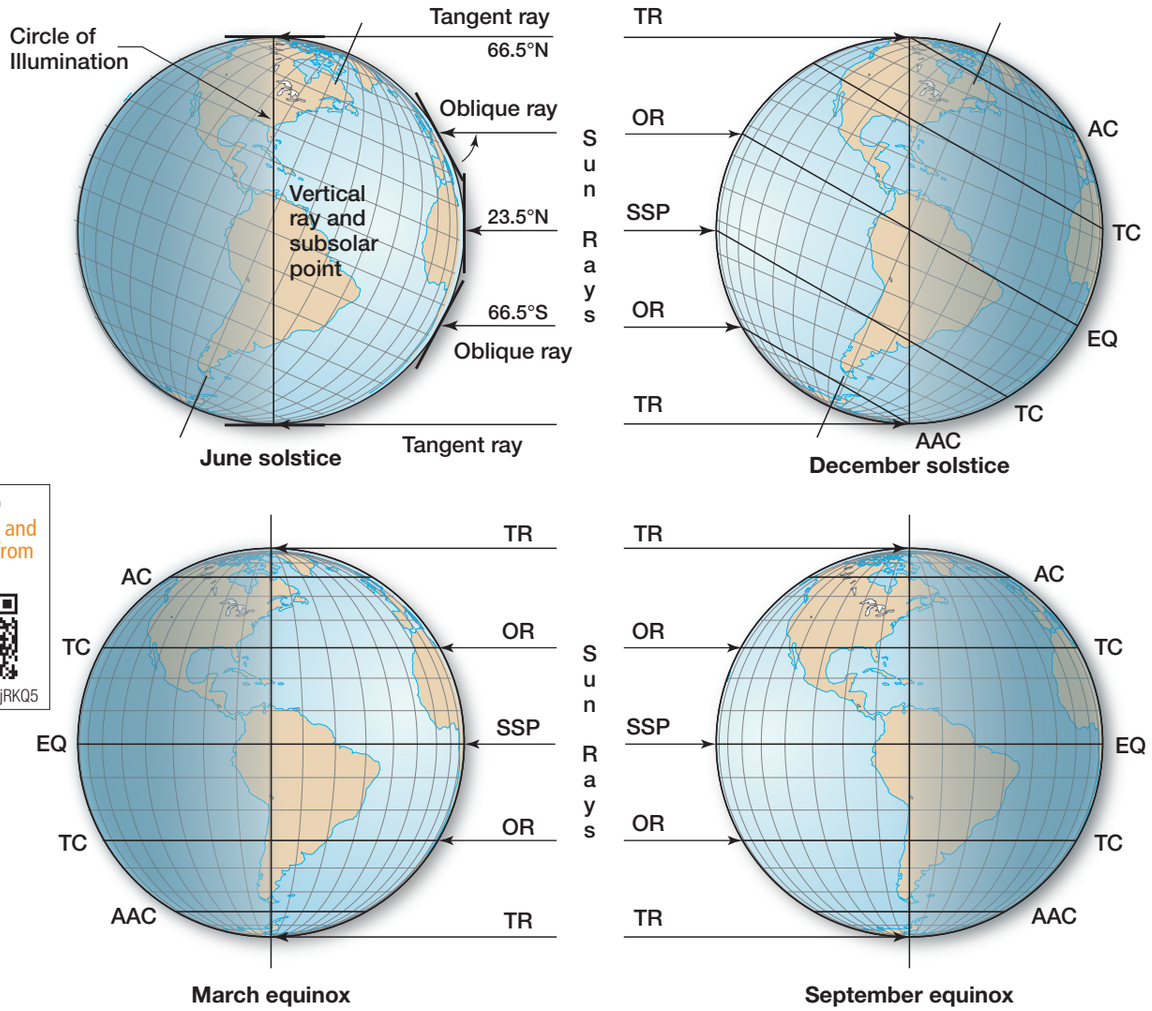
Earth–Sun Relationships and Daylength

Lab Exercise and Activities

SECTION 1

Earth–Sun Relations—Seasonality

2. On the equinoxes, the subsolar point is at the equator, and the circle of illumination runs through ___90___ °N and ___90___ °S. Therefore, the far north and south latitudes of the circle of illumination are ___90___° away from the subsolar point. On the June solstice, the subsolar point is at the Tropic of Cancer at ___23.5___° ___N___, and the circle of illumination passes through ___66.5___ °N and ___66.5___ °S. Which latitudes does the circle of illumination pass through on the June solstice? On February 26 the subsolar point is at 9°S, and the circle of illumination passes through ___81___ °N and ___81___ °S.



Video
Equinoxes and Solstices from Space
http://goo.gl/gjRKQ5

▲ **Figure 5.1** Earth–Sun relationships

SECTION 2

Daylength

1. Complete **Table 5.1** (below), filling in the daylength at selected latitudes.

TABLE 5.1 Daylength—the time between sunrise and sunset—at selected latitudes for the Northern Hemisphere

	Winter Solstice (December Solstice) December 21–22			Vernal Equinox (March Equinox) March 20–21			Summer Solstice (June Solstice) June 20–21			Autumnal Equinox (September Equinox) September 22–23		
	A.M.	P.M.	Daylength	A.M.	P.M.	Daylength	A.M.	P.M.	Daylength	A.M.	P.M.	Daylength
0°	6:00	6:00	*12:00*	6:00	6:00	*12:00*	6:00	6:00	*12:00*	6:00	6:00	*12:00*
30°	6:58	5:02	*10:04*	6:00	6:00	*12:00*	5:02	6:58	*13:56*	6:00	6:00	*12:00*
40°	7:26	4:34	*9:00*	6:00	6:00	*12:00*	4:34	7:26	*15:00*	6:00	6:00	*12:00*
50°	8:05	3:55	*7:50*	6:00	6:00	*12:00*	3:55	8:05	*16:10*	6:00	6:00	*12:00*
60°	9:15	2:45	*5:30*	6:00	6:00	*12:00*	2:45	9:15	*18:30*	6:00	6:00	*12:00*
90°	No sunlight			Rising Sun			Continuous sunlight			Setting Sun		

2. Estimate the approximate length of daylight for the following locations:

a) Dawson, Yukon Territory, Canada (64° N), on December 21 *0 hours*

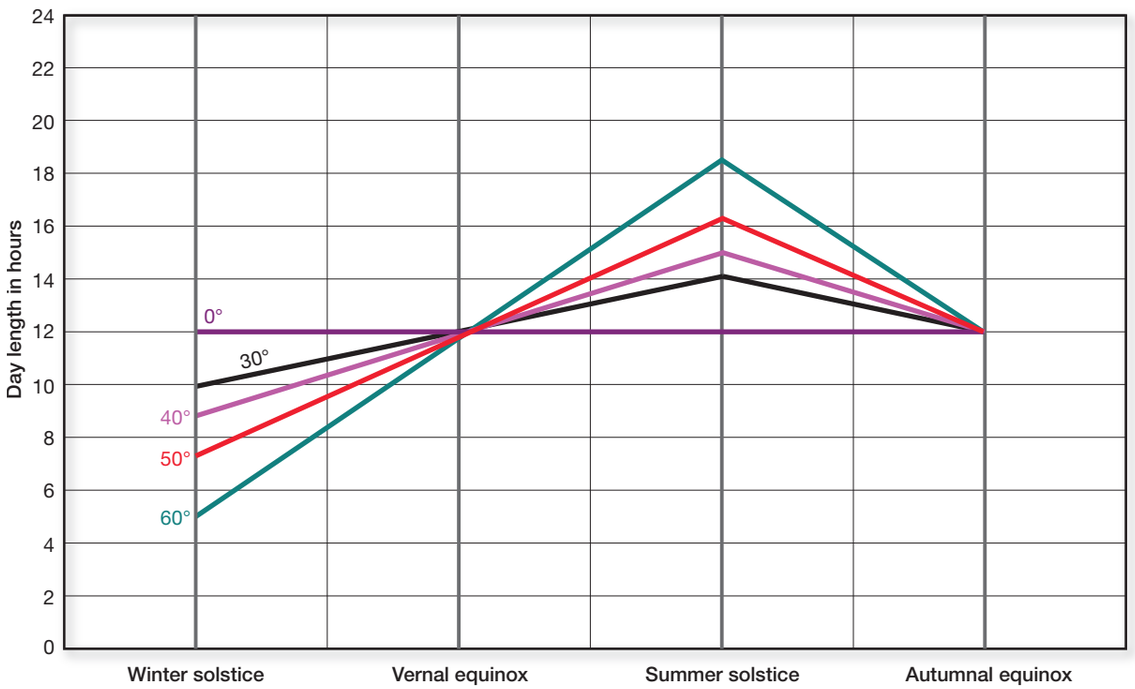
b) Adelaide, South Australia (35° S), on June 21 *14:30 hours*

c) Bangkok, Thailand (14° N), on March 20 *12:00 hours*

d) Your location on June 21 *personal answer*

e) Your location on December 21 *personal answer*

3. Complete the following graph, using the values for daylength calculated in Question 1 for the following latitudes: 0°, 30°, 40°, 50°, 60°, and 90°. Use a different color for each latitude. The line for 30° has already been done for you.



▲ **Figure 5.2** Daylength and latitude

4. Explain how changes in the Sun's angle above the horizon and daylength vary with the seasons at the equator, 30°, 60°, and 90°. What is the general relationship between latitude and the amount of seasonal change?

Seasonal changes in daylength increases with increasing latitude. The equator has 12 hour days throughout the year, and the poles have 24 hours variation in day length from summer to winter.