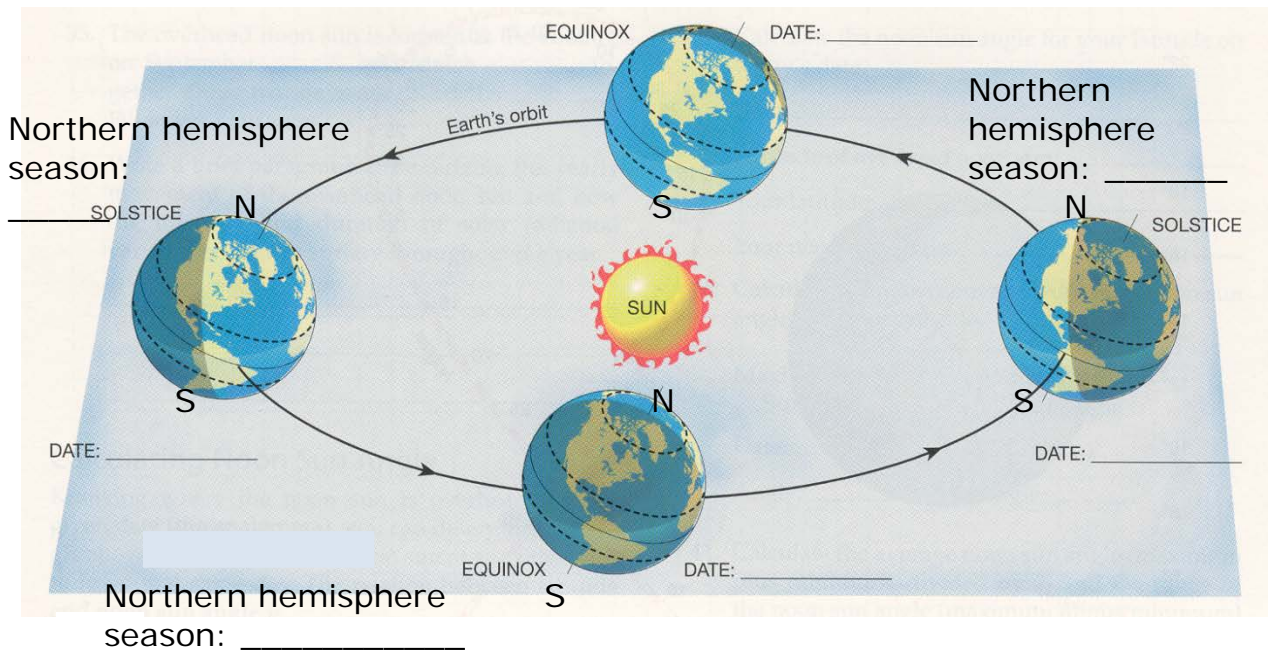


ES106 Lab NAME: \_\_\_\_\_

PART A Activity 2. Refer to Ch. 16 text reading, p. 497 and complete task below.

**Figure 3**  
Earth-Sun  
relations

Fill in the proper names and dates on Figure 3  
Northern hemisphere season: \_\_\_\_\_ N



**Activity 2:** Yearly Variation in Solar Energy

The amount of solar radiation received at a particular place would remain constant throughout the year if it were not for these facts:

- ◆ Earth rotates on its axis and revolves around (orbits) Sun.
- ◆ Earth's axis is inclined  $23\frac{1}{2}^{\circ}$  from perpendicular to its plane of orbit.
- ◆ Throughout the year, Earth's axis points to the same place in the sky.

This causes the noon Sun to appear directly overhead at the equator twice a year, as it migrates from directly over the Tropic of Cancer ( $23\frac{1}{2}^{\circ}$  N latitude), to directly over the Tropic of Capricorn ( $23\frac{1}{2}^{\circ}$  S latitude), and back, from one June solstice to the next.

As a consequence, there are variations in the intensity of solar radiation and changes in the length of daylight and darkness at every place on Earth. The seasons are the result of this changing intensity and duration of solar energy, and subsequent heating of the atmosphere.

Table 1, below, lists the hours of daylight on the solstices and equinoxes at each  $10^{\circ}$  of latitude on Earth's surface. Use this table and Figure 3 to answer the questions on the following page.

Latitude (degrees)	Summer Solstice	Winter Solstice	Equinoxes
0	12 h	12 h	12 h
10	12 h 35 min	11 h 25 min	12
20	13 12	10 48	12
30	13 56	10 04	12
40	14 52	9 08	12
50	16 18	7 42	12
60	18 27	5 33	12
70	24 h (for 2 mo)	0 00	12
80	24 h (for 4 mo)	0 00	12
90	24 h (for 6 mo)	0 00	12

**Table 1:** Hours of daylight.

**Use Table 1 and Figure 3 to answer the question on the next page.**

1. What term is used to describe June 20-21 in each hemisphere?	Northern Hemisphere:
	Southern Hemisphere:
2. What latitude is receiving the most intense solar energy on June 20-21?	Latitude:
3. What name is used to describe Dec. 21-22 in each hemisphere?	Northern Hemisphere:
	Southern Hemisphere:
4. For the Northern Hemisphere, what terms are used to describe these dates?	March 20-21:
	September 22-23:
5. For the Southern Hemisphere, what terms are used to describe these dates?	March 20-21:
	September 22-23:
6. (Circle responses) On June 20-21, latitudes north of the Arctic Circle are receiving ( <b>0 / 6 / 12 / 24</b> ) hours of daylight, while latitudes south of the Antarctic Circle are experiencing ( <b>0 / 6 / 12 / 24</b> ) hours of darkness.	
7. (Circle response) On December 21-22, the ( <b>Northern / Southern</b> ) Hemisphere is receiving the most intense solar energy.	
8. What latitude is receiving the most intense solar energy on:	March 21?
	September 22?

9. Describe the length of daylight everywhere on Earth on March 20-21 and September 22-23:

10. Use the Table 1 to find how many hours of daylight there would be at each of the following latitudes on December 21-22.

90 degrees N: \_\_\_\_\_ hrs \_\_\_\_\_ min

40 degrees N: \_\_\_\_\_ hrs \_\_\_\_\_ min

0 degrees: \_\_\_\_\_ hrs \_\_\_\_\_ min

40 degrees S: \_\_\_\_\_ hrs \_\_\_\_\_ min

90 degrees S: \_\_\_\_\_ hrs \_\_\_\_\_ min