

Chapter 25 Lab Activity A

Moon, Sun, and Seasons

You have probably noticed that as the seasons change, the sun's height in the sky changes. During the long days of summer, the sun's altitude is high for most locations in the United States. As winter approaches, however, the days get shorter and the sun's maximum altitude becomes lower. You may not have noticed the monthly and yearly variations that the moon experiences in its maximum altitude.

Procedure

- 1 The data table on next page gives the maximum altitudes of the moon and sun on selected dates for an observer at 40° N latitude for a certain year. Use a colored pencil to plot the sun's maximum altitude using an asterisk (*) for each of the dates given. Connect the asterisks to form a smooth curve.
- 2 Use a different colored pencil to plot the maximum altitude of the moon for each of the dates in the data table. Use a plus sign (+) for a new moon, a dot (•) for either quarter phase, and a circle (○) for each full moon. Connect all of the plotted moon data to form a smooth, wavelike curve.

Analysis and Conclusions

- 1 On your graph, compare the new moon's maximum altitudes throughout the year to the curve connecting the sun's maximum altitudes. Why do the new moon altitudes parallel the path of the sun?

- 2 During which months is the sun highest and lowest in the sky? During which months is the full moon highest and lowest in the sky?

- 3 What is the relationship between the sun's noon altitude and the maximum altitude of the full moon?

- 4 What effect does Earth's tilt have on the altitudes of the sun and the full moon? How is this shown on your graph?

LAB SKILLS AND OBJECTIVES

- **Construct** a graph of the altitudes of the sun and the moon over a one year period.
- **Interpret** the patterns on the graph.
- **Describe** the relationship between the sun's noon altitude and the moon's maximum altitude.

MATERIALS

- 2 colored pencils

Maximum Altitude				Maximum Altitude			
Date	Moon Phase	Moon	Sun	Date	Moon Phase	Moon	Sun
Jan 4	New Moon	25.9°		Jul 7	First Quarter	39.9°	
Jan 13	First Quarter	62.9°		Jul 14	Full Moon	28.3°	71.7°
Jan 19	Full Moon	72.0°	29.5°	Jul 22	Last Quarter	61.9°	
Jan 26	Last Quarter	34.8°		Jul 29	New Moon	69.1°	
Feb 3	New Moon	33.1°		Aug 5	First Quarter	32.2°	
Feb 11	First Quarter	69.9°		Aug 13	Full Moon	37.4°	64.7°
Feb 18	Full Moon	60.2°	38.0°	Aug 21	Last Quarter	71.4°	
Feb 25	Last Quarter	26.5°		Aug 28	New Moon	56.0°	
Mar 4	New Moon	45.3°		Sep 3	First Quarter	27.6°	
Mar 12	First Quarter	74.5°		Sep 12	Full Moon	50.0°	54.2°
Mar 18	Full Moon	50.7°	48.8°	Sep 19	Last Quarter	73.6°	
Mar 26	Last Quarter	26.6°		Sep 26	New Moon	46.6°	
Apr 3	New Moon	58.9°		Oct 3	First Quarter	27.4°	
Apr 10	First Quarter	71.6°		Oct 11	Full Moon	58.2°	43.0°
Apr 17	Full Moon	36.1°	60.5°	Oct 19	Last Quarter	68.8°	
Apr 24	Last Quarter	30.6°		Oct 25	New Moon	37.9°	
May 2	New Moon	66.5°		Nov 2	First Quarter	34.6°	
May 9	First Quarter	64.6°		Nov 10	Full Moon	68.9°	32.8°
May 16	Full Moon	29.6°	69.1°	Nov 17	Last Quarter	61.1°	
May 24	Last Quarter	41.1°		Nov 24	New Moon	28.4°	
Jun 1	New Moon	73.7°		Dec 2	First Quarter	45.9°	
Jun 7	First Quarter	55.2°		Dec 9	Full Moon	72.6°	27.2°
Jun 15	Full Moon	26.0°	73.3°	Dec 16	Last Quarter	51.6°	
Jun 23	Last Quarter	54.0°		Dec 22	New Moon	27.3°	
Jun 30	New Moon	73.4°					

MAXIMUM ALTITUDE OF THE MOON AND SUN

