

## **Lunar Phases**

### **Student Page**

#### Purpose

To study the relationships among lunar phases, lunar sky location, and observing time.

#### Before you Begin

If it were noon at your location, in approximately which direction would you look to find a first quarter Moon?

#### A.J.J.A.R. Programs Required

Simple Lunar Phases Application  
Another Lunar Phases Application

#### Questions

1. At the first quarter Moon, does the Moon appear to the left or to the right of the Sun?
2. During what lunar phase or phases does the Sun-Earth-Moon line form a right triangle?
3. What lunar phases can never be seen when the observer's time is midnight?
4. What lunar phases can be seen when the observer's time is noon?
5. If you looked at the eastern horizon and saw the full Moon just rising in the east, in what direction would you look to see the Sun?
6. You are planning to do some evening ocean sailing some time in the near future. Because of scheduling conflicts, the only time that you can sail is 9:00 p.m. Since you would like to have the Moon in the sky to help you navigate, what phases could the Moon be?
7. Configure the simulation for an observer's time of midnight and a full lunar phase. The current view is for someone in the Northern Hemisphere. Where would the Moon be found in the sky if the simulation were suddenly switched to the Southern

Hemisphere, but everything else (time and lunar phase) were kept the same? Explain your answer.

## **Lunar Phases**

### **Teacher Page**

#### Purpose

To study the relationships among lunar phases, lunar sky location, and observing time.

#### Answers to Before you Begin

During a first quarter phase, you would find the Moon on the eastern horizon at noon.

#### A.J.J.A.R. Programs Required

Simple Lunar Phases Application

Another Lunar Phases Application

#### Answers to Questions

1. During a first quarter Moon, the Moon appears to the left of the Sun if you live in the Northern Hemisphere, and to the right if you live in the Southern Hemisphere.
2. A right triangle is formed when the Moon is either at first or third quarter.
3. The phases that cannot be seen at midnight are waning crescent, new, and waxing crescent.
4. The phases that can be seen at noon are third quarter, waning crescent, new, waxing crescent, and first quarter.
5. You would look on the western horizon to see the setting Sun.
6. The phases visible at 9:00 p.m. are waxing crescent, first quarter, waxing gibbous, full, and waning gibbous.
7. The Moon would be visible on the horizon from both the Northern and Southern Hemispheres. How high in the sky it would be would depend on the observer's latitude. In general, the closer the observer is to the equator, the higher the Moon will be in the sky.

#### Additional Internet References

Complete Sun and Moon Data for One Day

[http://aa.usno.navy.mil/AA/data/docs/RS\\_OneDay.html](http://aa.usno.navy.mil/AA/data/docs/RS_OneDay.html)

You can obtain the times of sunrise, sunset, moonrise, moonset, transits of the Sun and Moon, and the beginning and end of civil twilight, along with information on the Moon's phase by specifying the date and your location.

Java Moon Phase Calculator

<http://www.can-do.com/lakehs/dlab/moonphase/moon.html>

Moon-Watch.com

<http://www.moon-watch.com/>