

## SUPPLEMENTAL RESOURCES FOR BOY SCOUTS

### 4c. Make two sketches of the Big Dipper.

In one sketch, show the Big Dipper's orientation in the early evening sky. In another sketch, show its position several hours later. In both sketches, show the North Star and the horizon. Record the date and time each sketch was made.

Early Evening Sky - Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

A Few Hours Later - Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

#### 4d. Explain what we see when we look at the Milky Way.

The Milky Way Galaxy is our home in the universe. At night, all the stars we see are part of the Milky Way. On a clear night we can see the band of the Milky Way, the fuzzy light that runs across the sky. This band is made up of gas, dust, and many stars so far away we cannot distinguish them from each other. Below is a picture of a different galaxy that has a similar structure to the Milky Way Galaxy. Imagine living inside that galaxy. What would you see? It would be very similar to the view from Earth of the Milky Way Galaxy.



Image Credit: NASA/Hubble Space Telescope

## 5a. List the names of the five most visible planets.

Explain which planets can appear in phases similar to lunar phases and which ones cannot and explain why. To get a better understand of this question, get online with your parents' permission and check out the following websites:

### **Astronomy Education**

<http://www.astronomy-education.com/index.php?page=154>

### **Waubonsie Valley High School Planetarium**

<http://planetarium.ipisd.org/Subpage.aspx?id=285>

## 5b. Using the Internet (with your parent's permission) and other resources, find out when each of the five most visible planets that you identified in requirement 5a will be observable in the evening sky during the next 12 months, then compile this information in the form of a chart or table.

Visit <http://www.nightskyinfo.com/> to look at a month by month explanation of visible objects, including planets. You may also download **Stellarium** for free from <http://www.stellarium.org/> to see the night sky at any location and time.

6a. Sketch the face of the Moon and indicate at least five seas and five craters. Label these landmarks.

Use the below image to help you identify craters and mare (seas) on the Moon.

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

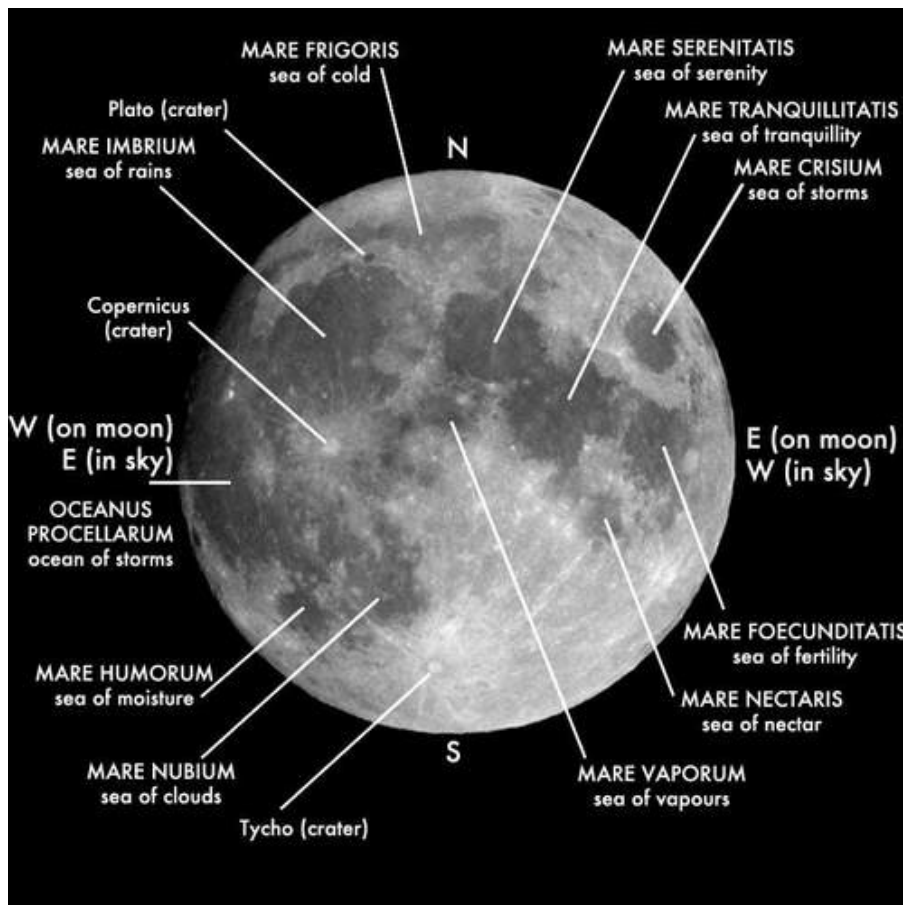


Image Credit: <http://astrobob.areavoices.com/2008/09/10/stars-and-pajamas/>

6b. Sketch the phase and the daily position of the Moon at the same hour and place, for four days in a row.

Include landmarks on the horizon such as hills, trees, and building. Explain the changes you observe.

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

Date: \_\_\_\_/\_\_\_\_/\_\_\_\_ Time: \_\_\_\_\_

Use the following picture to help you understand the Moon's motion around Earth and how this creates the phases of the Moon. How does this help you understand the sketches you made above?

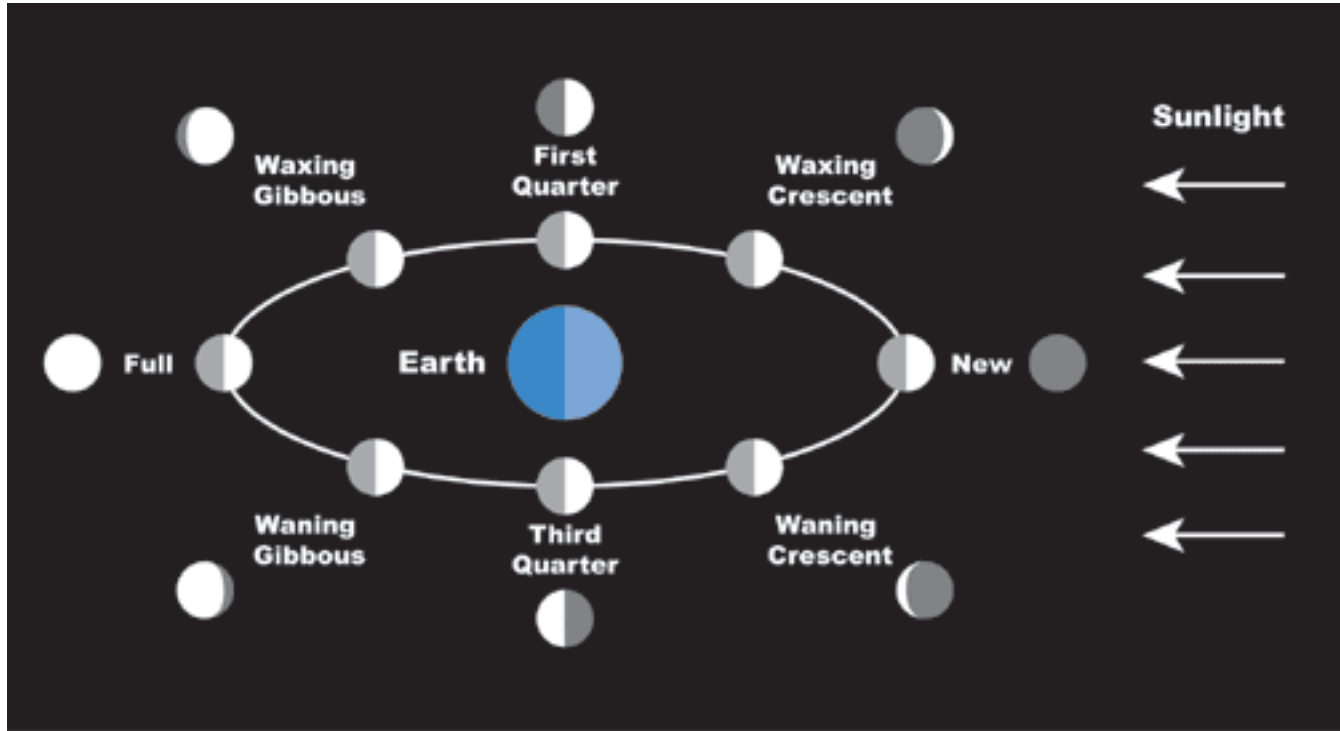


Image Credit: <http://spaceplace.nasa.gov/review/dr-marc-earth/moon-phases.html>

**6c. List the factors that keep the Moon in orbit around Earth.**

The Moon stays in orbit around Earth for the same reason Earth stays in orbit around the Sun - gravity.

7a. Describe the composition of the Sun, its relationship to other stars, and some effects of its radiation on Earth's weather and communications.

7b. Define sunspots and describe some of the effects they may have on solar radiation.

To get a better understand of these questions, get online with your parents permission and check out the following videos from NASA:

**The Composition of the Sun**

[http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/The\\_Composition\\_of\\_the\\_Sun.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/The_Composition_of_the_Sun.html)

**Understanding Sunspots and Solar Flares**

[http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Understanding\\_Sunspots\\_And\\_Solar\\_Flares.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Understanding_Sunspots_And_Solar_Flares.html)

**The Scientific Importance of Studying Solar Flares**

[http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/The\\_Scientific\\_Importance.html](http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/The_Scientific_Importance.html)

**7c. Identify at least one red star, one blue star, and one yellow star (other than the Sun). Explain the meaning of these colors.**

Look up into the sky and you'll see the stars twinkling in different colors. Some are dull and red, while others are white and others look bright blue. So how do you get so many different star colors?

The color of a star depends on its surface temperature. Our Sun's surface temperature is about 6,000 Kelvin. Although it looks yellow from here on Earth, the light of the Sun would actually look very white from space. This white light coming off of the Sun is because its temperature is 6,000 Kelvin. If the Sun were cooler, it would give off light more on the red end of the spectrum, and if the Sun were hotter, it would look more blue.

And that's just what we see with other stars. The coolest stars in the Universe are the red dwarf stars. These are stars with just a fraction of the mass of our Sun (as low as 7.5% the mass of the Sun). They don't burn as hot in their cores, and their surface temperature is about 3,500 Kelvin. The light released from their surface looks mostly red to our eyes (although there are different colors mixed up in there too, red is the majority).

This is also the color you see with red giant stars; solar-mass stars that ran out of hydrogen fuel and bloated up many times their original size. The luminosity of the star is spread out over the much larger surface area of the red giant and so they're cooler,

On the opposite side of the spectrum are blue stars. These are stars with many times the mass of the Sun and so their surface temperatures are much hotter. Blue stars start out above 10,000 Kelvin but they can reach 40,000 Kelvin with the largest hypergiant stars. *Credit: [www.UniverseToday.com](http://www.UniverseToday.com)*



**9. List at least three different career opportunities in astronomy.**

Pick the one in which you are the most interested and explain how to prepare for such a career. Discuss with your counselor what courses might be useful for such a career.

Some careers opportunities you might investigate include telescope operator, astronomer at a university, educator at a planetarium, teacher, science policy specialist, or research astronomer at an observatory.