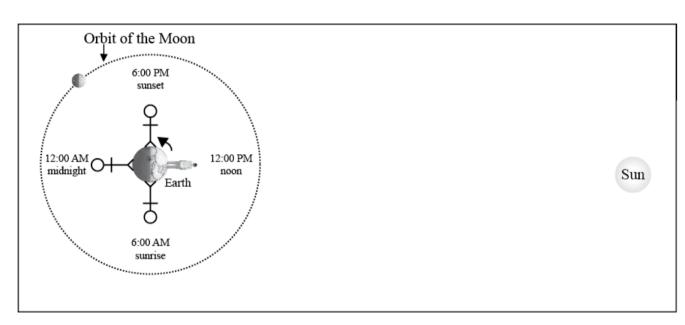
## Answer keys to Discussion #2 activities "Predicting Moon Phases"

- [Waning; Left] After full phase, the Moon's phase wanes for about 2 weeks. With the Moon high in the southern sky, the Sun would be in the East (sunrise) producing a thirdquarter moon with the lit side facing east (left).
- 2. [Eastern horizon; 6:00 PM (Sunset)] Look for any rising celestial object on the eastern horizon. When the Moon is full, the Moon is on the opposite side of Earth from the Sun (Location H in Figure 2 of the Cause of Moon Phases Lecture–Tutorial, for example). So, as the full Moon is rising, the Sun must be setting.
- 3. [Western horizon] The Sun must be in the opposite direction as the Moon for it to be full.
- 4. [Eastern horizon; 6:00 AM (sunrise)] Look for any rising celestial object on the eastern horizon. When the Moon is new, the Moon is on the same side of Earth as the Sun. (Location F in Figure 2 of the Causes of Moon Phases Lecture-Tutorial, for example.) So, as the new Moon is rising, the Sun must also be rising.
- 5. [H] The phase of the Moon does not change during a day.
- 6. [ 12 PM (noon) ]
- 7.



8. a) [ waxing gibbous ]

b) [ 9:00PM (a few hours after sunset) ]

c) [ 3:00 PM (9:00 PM minus 6 hours; a few hours past noon) ]

d) [ 3:00 AM (9:00 PM plus 6 hours; a few hours before sunrise) ]

- 9. [ 6 PM (sunset) ] A first quarter Moon would be located at the top of the orbit shown in Figure 1. It is highest in the sky when the observer is directly beneath it in the drawing. The time for that location is 6 PM.
- 10. [waning gibbous] At full Moon, the Moon rises as the Sun sets. Each successive night, the Moon rises about 50 minutes later and its phase wanes. At approximately 8:00 pm if an observer were able to see the Moon near the eastern horizon it would be in the waning gibbous phase.
- 11. [waning crescent; eastern horizon] The Moon is described as a thin sliver indicating that it is in the crescent phase. Because it is visible just before sunset it must be above the horizon before the Sun rises and that can only occur if it is in the waning phase. Following is an example of one student's picture:

