

## Worksheet – Motion of the Sun and Moon

### The time of day, position of the Sun, and the phase of the Moon.

1. The Sun is on the western horizon (all parts rely on this)
  - a) What time is it? **The Sun is setting and so 6 pm**
  - b) Where in the sky would you see a first quarter Moon at this time? **On the Meridian**
  - c) Where in the sky would you see a third quarter Moon at this time? **Below the horizon, underneath you**
  - d) Where in the sky would you see a new Moon at this time? **On the western horizon, next to the Sun.**
  - e) Where in the sky would you see a full Moon at this time? **On the eastern horizon, directly opposite to the Sun.**
  - f) If you are looking to the south at this time and see the Moon in the sky to the left of you, what phase would you see? **Waxing gibbous**
  - g) If the Moon had already set about 1.5 hours ago, what phase would it have shown when it was still in the sky? **Waning crescent**
2. It is 3 pm in the afternoon, and the Moon is just crossing your Meridian. What phase do you see? **Waxing gibbous**
3. It is noon, and the Moon is just crossing your Meridian. What phase do you see? **New**
4. It is midnight, and the Moon is just crossing your Meridian. What phase do you see? **Full**
5. Can you see a full Moon at noon? If so where will you see it? **No, it will be below the horizon**
6. Can you see a new Moon at noon? If so where will you see it? **Yes, right next to the Sun, on the Meridian.**
7. Can you see a full Moon at midnight? If so where will you see it? **Yes, on the Meridian**
8. Can you see a new Moon at midnight? If so where will you see it? **No, it will be below the horizon**

9. Can you see a 1st quarter Moon at midnight? If so where will you see it? **Yes, on the western horizon.**
10. Can you see a 1st quarter at noon? If so where will you see it? **Yes, on the eastern horizon.**
11. Suppose tonight there is a 1st quarter Moon
- a) What is elongation of the Moon tonight?  **$90^\circ \text{ E}$**
  - b) What will it be tomorrow?  **$90^\circ \text{ E} + 12^\circ \text{ E} = 102^\circ \text{ E}$**
  - c) What phase will you see tomorrow? **Waxing gibbous**