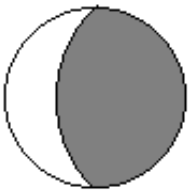
Earth Science Regents
Orbit and Phases of the Moon Lab

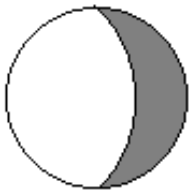
The Moon revolves around the earth once every "moonth" - that's where the word "month' comes from. During the 29.5 day moonth, the Moon, as viewed from earth, goes through a cycle of ***phases*** or shapes. Sometimes we see only a little of the right side of the Moon lit up. Other times, it's the left side. Sometimes we see the Moon during the morning or afternoon, sometimes at night, and sometimes not at all. Careful observation reveals that these motions and phases of the Moon are predictable and quite easily understood. In this lab, you'll discover for yourself the pattern of the phases of the Moon.

THE NAMES OF THE SHAPES OF THE MOON

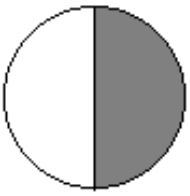
When less than half of the Moon is illuminated, we call that shape ***crescent***. Sometimes the right side is illuminated, sometimes the left.



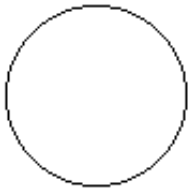
When more than half of the Moon is illuminated, we call that shape ***gibbous***. Sometimes the right side is illuminated, sometimes the left.



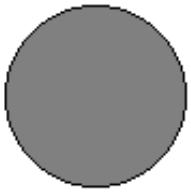
When exactly half of the Moon is illuminated, we call it a ***quarter moon*** (even though we see half of the side that faces us. You'll see why we call it a quarter moon soon.) Sometimes the right side is illuminated, sometimes the left.



Of course you know the ***full moon***!



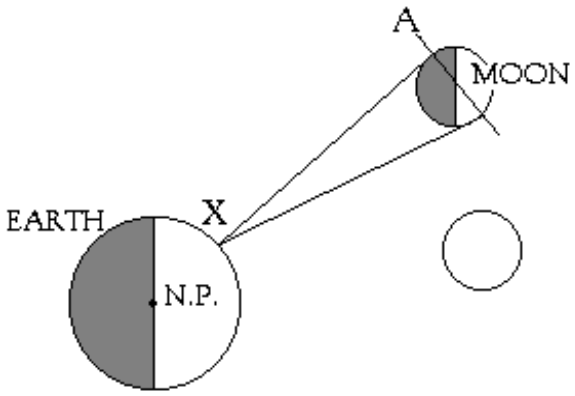
And finally, when the Moon is nearly between us and the Sun, and its dark side is facing us and the illuminated side is facing away from us., we can't see the moon, but we call it a ***new moon***



THE PHASES OF THE MOON DIAGRAM

The diagram on the next page is a polar view of the earth/Moon system - it is a view from above the north pole of the Earth. The Moon is drawn in eight positions on its orbit around the earth. The "Moons" drawn next to each of the eight Moons will be used to diagram what the Moon looks in that position when viewed from earth.

Follow your instructor's discussion and use the diagram below to learn how to determine the appearance of the Moon at various times in its orbit around earth.



Imagine that you are an earthbound observer at position X, looking at the Moon.

The line A divides the Moon into 2 parts - the part you can see (below and to the left of line A) and the part you can't see (the part above and to the right of line A).

From earth, it would appear that less than half of the right side of the part you see is lit up.

Draw the moon as it would appear to you in the small circle next to the Moon in the diagram.

For each of the 8 positions of the Moon on the diagram on the following page, determine what the Moon would look like to an observer on earth and draw it in the circle next to the moon.

THE PHASES OF THE MOON

When the Moon is nearly between the earth and the Sun, and its illuminated side is facing away from earth, we can't see it. This Moon is called the ***New Moon***. Label the New Moon on the diagram on page 3 and in the PHASE column on page 4.

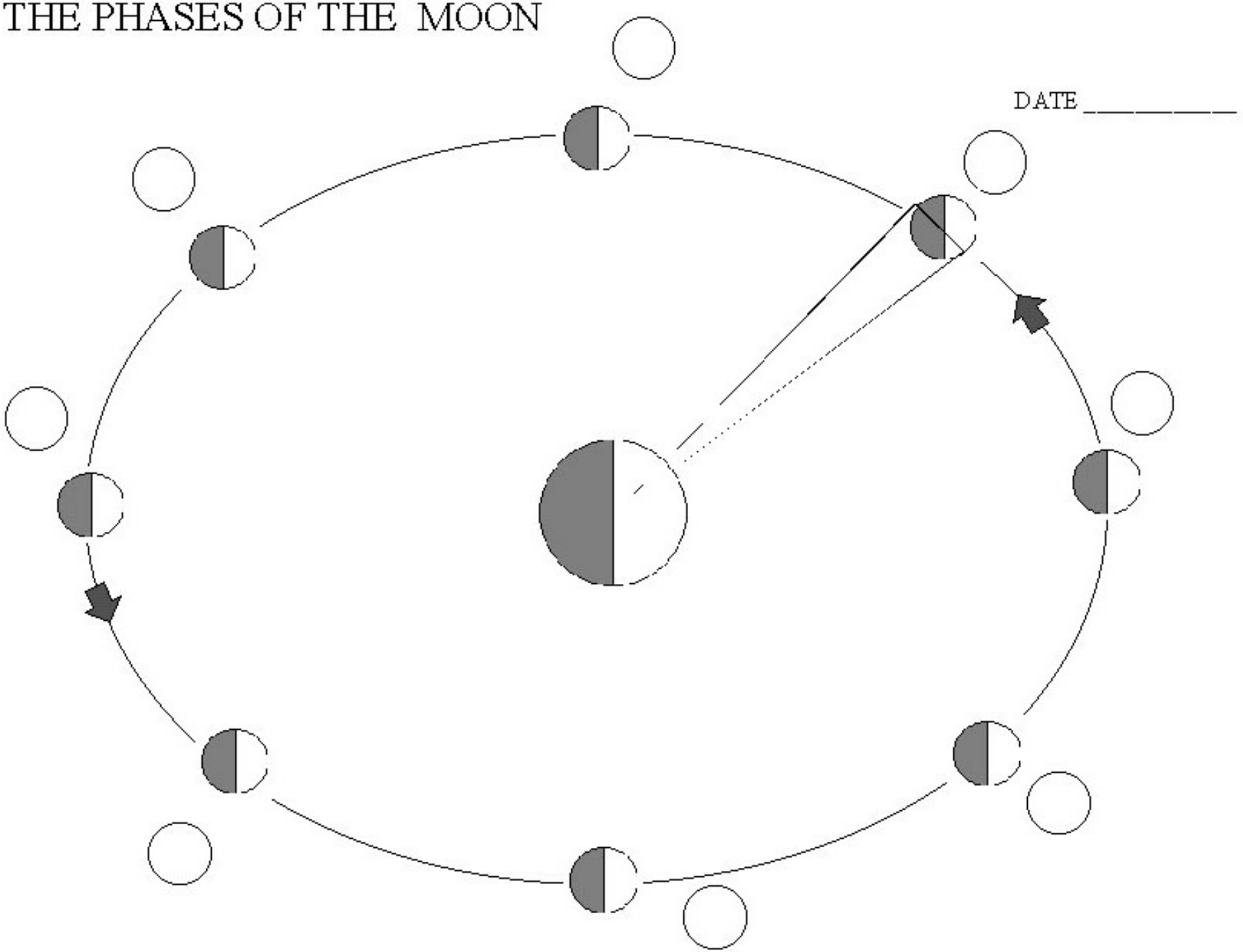
When the illuminated portion of the Moon that we see is growing larger each day, we say that the moon is *waxing*. Label the ***Waxing Crescent Moon*** on the diagram on page 3 and in the PHASE column on page 4.

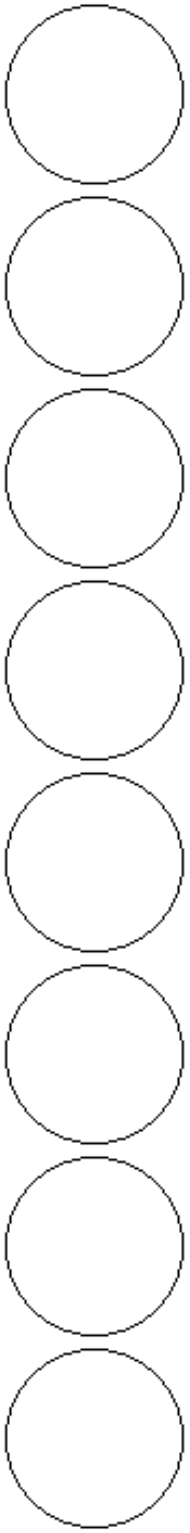
When the Moon has completed 90 degrees, or one quarter, of its revolution around the earth, half of the illuminated portion of the Moon faces the earth (and the right hand half of the disk of the Moon that we see is lit up). This phase is called the ***First Quarter Moon***. Label it on the diagram on page 3 and in the PHASE column on page 4.

As the Moon continues to grow past the 1st Quarter, we see more than half of the right hand side of the Moon's disk illuminated. This phase is called the ***Waxing Gibbous Moon***. Label it on the diagram on page 3 and in the PHASE column on page 4.

THE PHASES OF THE MOON

DATE _____



DATE	SHAPE	PHASE	APPEARANCE
			

When the Moon is opposite the Sun, the entire illuminated portion of the Moon faces the earth, and we see the Full Moon. Label the Full Moon on the diagram on page 3 and in the PHASE column on page 4.

When the illuminated portion of the Moon the we can see is growing smaller and smaller, we say that the Moon is *waning*. Label the ***Waning Crescent*** and ***Waning Gibbous Moons*** on the diagram on page 3 and in the PHASE column on page 4.

When the Moon has completed 270 degrees of revolution from the New Moon, and the left hand side of the disk that we see is illuminated, the Moon is entering the last quarter of its monthly cycle. Label the Last Quarter Moon on the diagram on page 3 and in the PHASE column on page 4.

ANSWER THE FOLLOWING QUESTIONS neatly and completely in the spaces provided

1. What is the Full Moon doing as the Sun sets? _____

   Explain: _____

   _____

2. What is the Sun doing as the Full Moon sets? _____

   Explain: _____

   _____

3. What Moon crosses your meridian (is halfway between rising and setting, as high as it gets in the sky) at 9 PM?

   _____

4. You head outside one night at 3 AM and observe a gibbous Moon high in the southern sky as shown in the diagram to the right. Is what you're seeing possible, or is the bad burrito you had for dinner causing hallucinations?

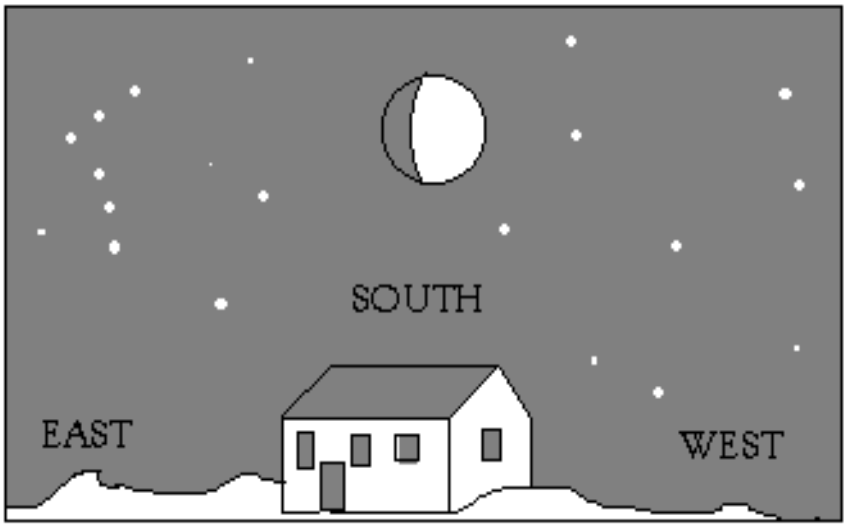
   _____

Explain:

   _____

   _____

   _____



5. If you answered "bad burrito" to # 4 above, what Moon *would* you see high in the southern sky at 3 AM?

   _____

   _____

   _____

6. What Moon(s) might you see as you wait for the bus in the morning ? _____

Explain: _____

_____

7. Which side of the Moon is illuminated as it waxes from New to Full? _____
8. Between which two phases is the Moon waning? _____
9. What is the shape of the Moon just before and just after the New Moon?_____
10. What is the shape of the Moon just before and just after the Full Moon? _____
11. Is the Crescent Moon ever visible at midnight? _____

    EXPLAIN!_____

    _____

12. What time is it in the diagram below?_____

    EXPLAIN:_____

    _____

    _____