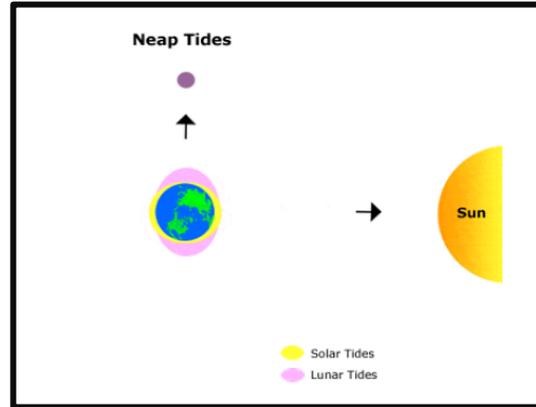
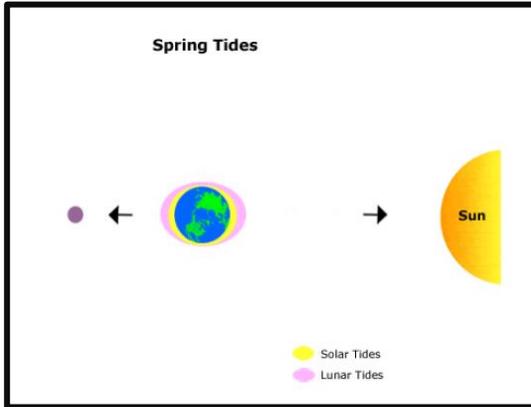


# Charting the Tides Worksheet KEY

Name: \_\_\_\_\_

## Section 1: Sketching Spring and Neap Tides

Draw the correct position of the Moon and Sun for a spring tide and a neap tide:



## Section 3: Analyzing Tidal Data

1. Pick one day on the tidal graph and write down both high tides and both low tides that that day as well as the time they are to occur.

For the following answers, the December 2017 tidal data from the Beaufort station were used.

Date: December 5, 2017

High Tide

Low Tide

Time: 8:48 Height (ft): 4.895

Time: 2:24 Height (ft): -0.135

Time: 21:12 Height (ft): 3.678

Time: 15:30 Height (ft): 0.039

*Answers for this question will vary depending on what day the student chooses.*

2. What is the highest tide on the graph and what day does it occur?

*4.931 feet on December 9, 2017*

3. What is the lowest tide on the graph and what day does it occur?

*-0.833 feet on December 30, 2017*

4. What is the tidal range for the time period on the graph?

*$4.931 - (-0.833) = 5.764$  feet*

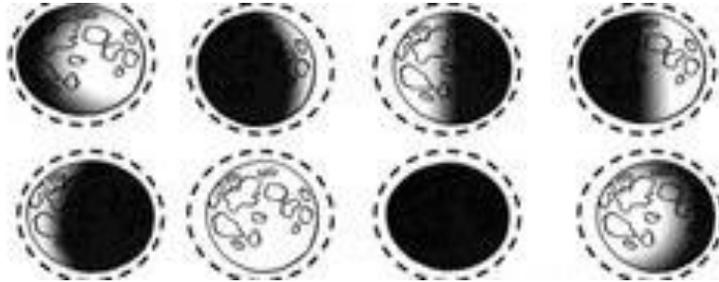
5. What was the average tidal height on the day you selected for question #1?

*$4.895 + 3.678 + (-0.135) + 0.039 = 8.477 \rightarrow 8.477/4 = 2.119$  ft*

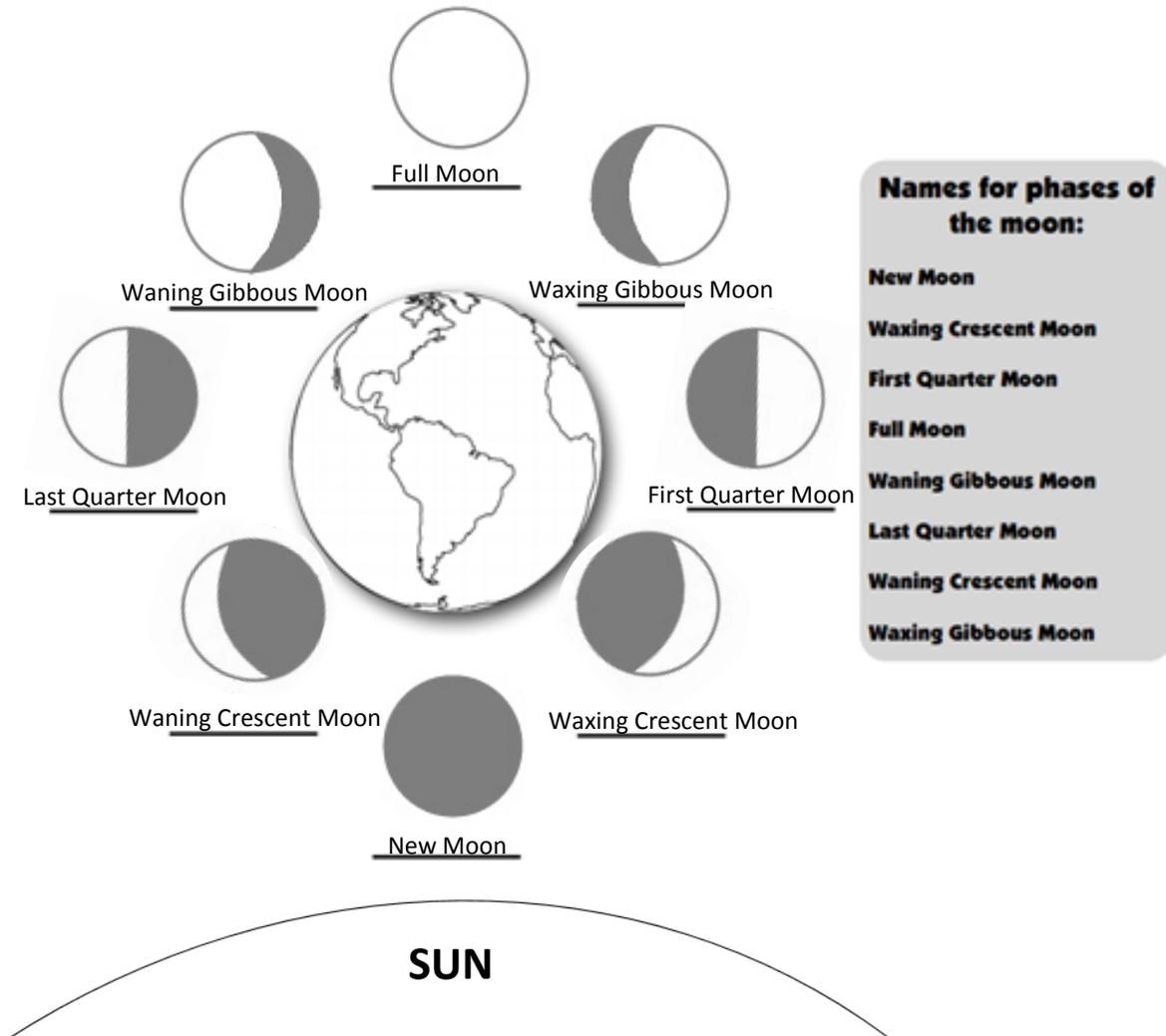
*Answers for this question will vary depending on what day the student chooses.*

**Section 2: Phases of the Moon**

While conducting the activity with the moon (ball) and sun (flashlight), look for the following phases being created during the moon's orbit.



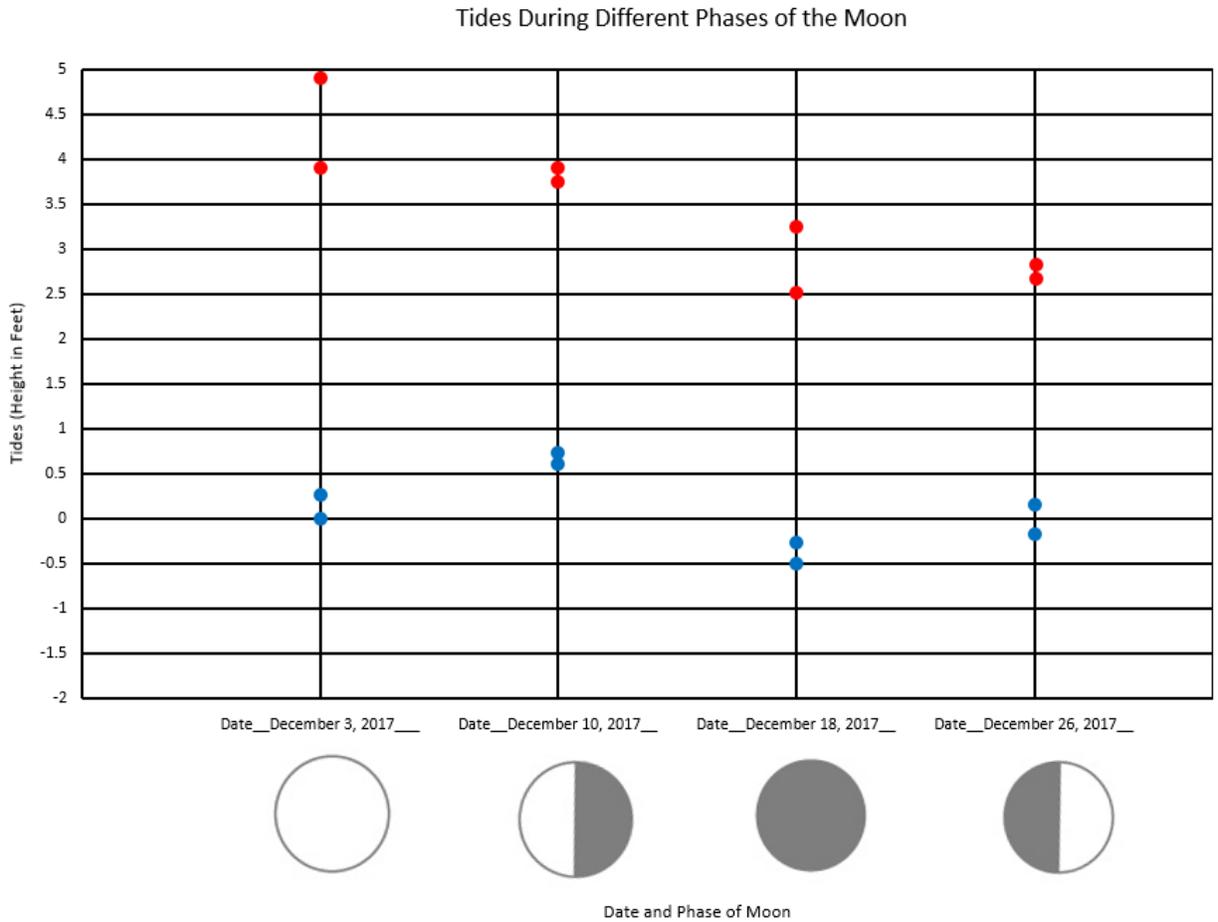
In the diagram below, color in the empty circles with the phases of the moon and label each phase of the moon in the blanks provided.



**Section 4: Charting Tidal Data**

Find out what dates the moon was Full, New, First Quarter and Last Quarter during the month that your tidal data are from. In the graph below, plot both low tides and both high tides on each of the four days. Color in the blank moons with the correct phases for the dates that month. You may want to color low tide dots in blue and high tide dots in red.

*For the following answers, the December 2017 tidal data from the Beaufort, NC station were used. Answers for this activity will vary depending on what month and station the student chooses to graph.*



- 1) What day did the highest tide occur?  
*December 3, 2017*
- 2) What day did the lowest tide occur?  
*December 18, 2017*
- 3) Which phase of the moon produced the largest tidal range?  
*Full Moon*
- 4) Explain why you are seeing differences in tidal ranges during different phases of the moon. Hint: Think about Spring Tides and Neap Tides!

*During spring tides (New and Full Moons), there are larger tidal ranges because the Sun, Moon and Earth are all in alignment and the solar tide has an additive effect on the lunar tide. This creates higher high tides, and lower low tides. During neap tides (First and Last Quarter Moons), the Sun and Moon are at right angles to each other and the solar tide has an opposing effect on the lunar tide. This creates more moderate high and low tides.*