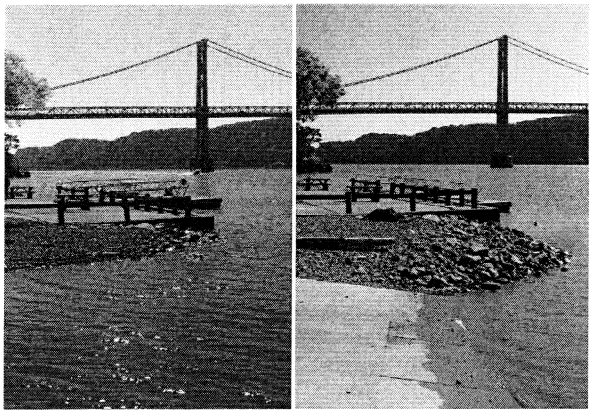
Regents Earth Science: The Tides Lab # _____

Name:_____ Lab Partners: _____



View of the Hudson from the Mid-Hudson Bridge about 1 hour north of Peekskill, NY. The left depicts high tide/the right depicts low tide.

Introduction: Each day the water level in the oceans changes in a periodic way. This change in sea level is called the tides. The tides are caused by the gravitational attraction of the moon and the sun. Ocean tides often extend into stream that empty into the ocean. The level of the Hudson River is affected as far north as Albany. This data show the changing water level of the Hudson River at Peekskill, NY, over a period of 40 hours. **Use this data to construct a graph to show the changing water level over this period of nearly two days**. Since your graph will show data both above and below mean sea level, data must be shown above and below a "0" line of mean sea level that runs across the middle of our graph. A (-) value indicates the level below sea level.

Date	Time	Height (m)	Date	Time	Height (m)
October 20 am	12:00	0.8	**October 21 am**	12:00	0.45
October 20 am	1:00	0.7	October 21 am	1:00	0.5
October 20 am	2:00	0.5	October 21 am	2:00	0.45
October 20 am	3:00	0.2	October 21 am	3:00	0.3
October 20 am	4:00	-0.2	October 21 am	4:00	0
October 20 am	5:00	-0.6	October 21 am	5:00	-0.3
October 20 am	6:00	-0.7	October 21 am	6:00	-0.45
October 20 am	7:00	-.65	October 21 am	7:00	-0.5
October 20 am	8:00	-0.4	October 21 am	8:00	-0.45
October 20 am	9:00	0	October 21 am	9:00	-0.3
October 20 am	10:00	0.3	October 21 am	10:00	-0.1
October 20 am	11:00	0.5	October 21 am	11:00	0.1
October 20 pm	12:00	0.6	**October 21 pm**	12:00	0.3
October 20 pm	1:00	0.6	October 21 pm	1:00	0.4
October 20 pm	2:00	0.5	October 21 pm	2:00	0.4
October 20 pm	3:00	0.2	October 21 pm	3:00	0.3
October 20 pm	4:00	-0.1	October 21 pm	4:00	0.1
October 20 pm	5:00	-0.4			
October 20 pm	6:00	-0.5			
October 20 pm	7:00	-0.5			
October 20 pm	8:00	-0.4			
October 20 pm	9:00	-0.1			
October 20 pm	10:00	0.1			
October 20 pm	11:00	0.3			

Vocabulary:

1.) Tide:

2.) Tidal **Range**:

3.) Neap Tide:

4.) Spring Tide:

Tidal Analysis and Discussion Questions (based on your graph)

1.) According to your graph, what was **the time** of the **first** high tide (to the nearest half-hour): _____

In order to answer this question, circle the points in your graph where there are peaks in the water level (high tide). Find the time difference between the second and third high tide. Does this time interval match the time difference between the first and second high tide on your graph? If so, the first point is in fact the first high tide. Do not ask me a question until you physically do the work above.

2.) What was **the time** of the **second** high tide? _____

3.) What is the **time *difference*** *between* one high tide and the next successive **high tide?** *(you already did this in question*

_____

4.) What was the time difference between successive **low tides**? _____

5.) How many complete tidal cycles are shown on your graph? (From one high tide to the next)

_____

6.) Using the graph, **predict the time** of the next high tide: _____ a.m. or p.m (circle)

7.) a. Is the *tidal range* increasing or decreasing in your graph? Recall that a range is the *difference* between max and min. measurements for each tidal period. _____.

b. Which moon phase(s) could we be approaching based upon this data? _____

8.) What evidence suggests that the change of tides is a cyclic relationship? (use the graph as well as information about the moons revolution).

9.) Explain the difference between **tidal ranges (max-min)** during a spring and neap tide. Your explanation must include information on highs AND lows.

Spring:

Neap:

10.) a. Which two positions is the moon relative to the Earth and Sun during a **spring tide**? **Draw a picture below**

b. Which **two** moon phases occur during spring tides?

11.) a. Which two positions is the moon relative to the Earth and Sun during a neap tide**? Draw a picture below**

b. Which **two** moon phases can occur during neap tides?

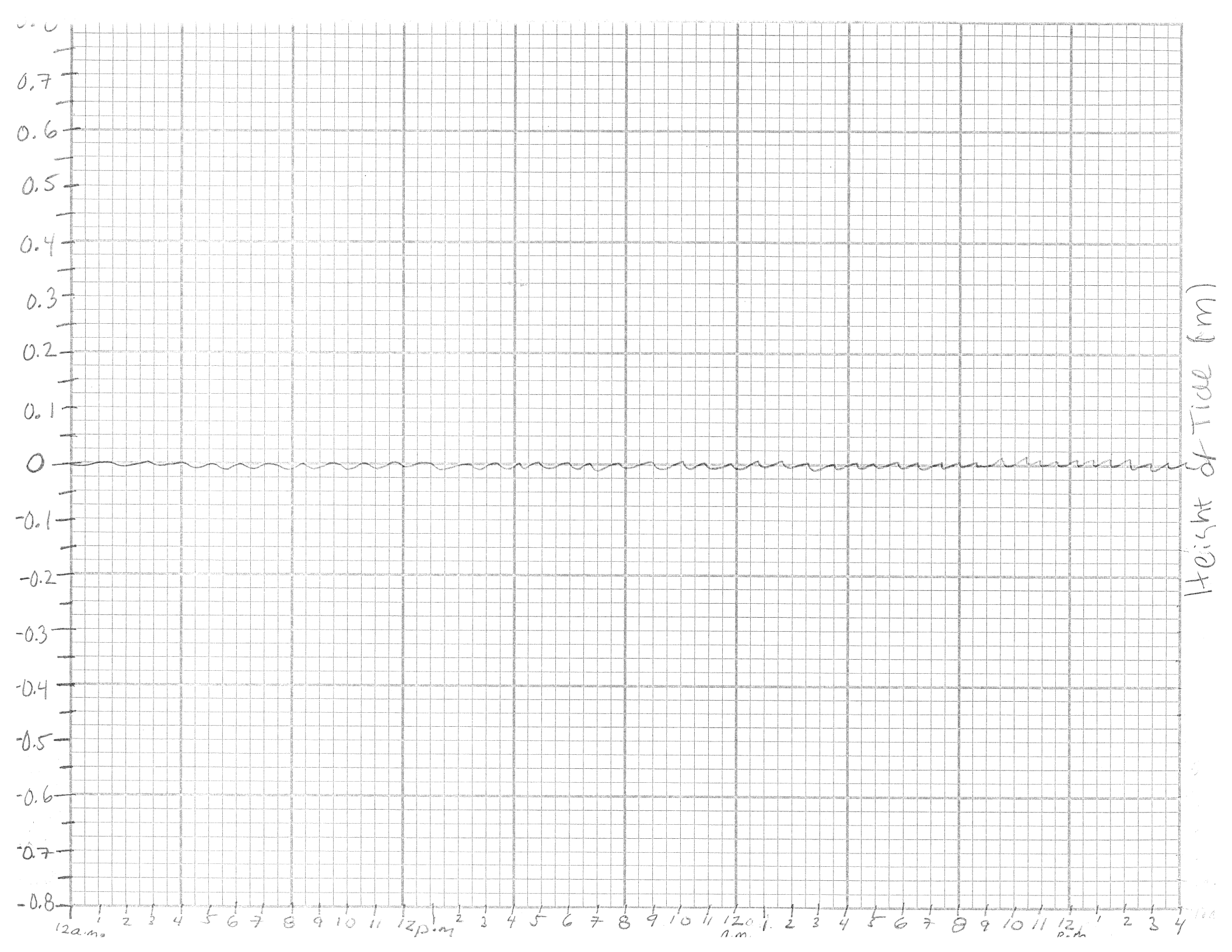
12.) Which type of tide occurs during solar and lunar eclipses? _____

13.) Which type of eclipse can only occur during a **full moon**? _____

14.) If the tidal **range is increasing**, and the moon is currently in its **waxing gibbous** phase, what phase of the moon would be viewed from earth in ~3 days' time?

_____

Conclusion: If the earth takes 24 hours to spin, why aren't high and low tides spaced exactly 12 hours apart? What do we need to account for?


0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
Height of Tide (m)
12a.m.
1 2 3 4 5 6 7 8 9 10 11
12p.m.
1 2 3 4 5 6 7 8 9 10 11
12a.m.
1 2 3 4 5 6 7 8 9 10 11
12p.m.
1 2 3 4