

Name: _____ Period: _____ Date: _____

Worksheet: Tides, Tides and Tides !

Tides are caused by the pull of gravity by both the moon and the sun. The moon is more important because it is closer to the earth. The moon causes the water on the side of the Earth nearest to the moon to rise up in a high tide. The water on the opposite side of the Earth also rises up in an high tide as the solid Earth under it is pulled toward the moon. Low tides occur in between these places as water flows toward the high tides.

The Earth rotates on its axis once every 24 hours, so the moon causes high tides at any one location twice every day. High tides would occur every 12 hours, except for one thing. The moon revolves around the Earth at the same time as the Earth is rotating. When Earth completes one revolution, the moon has moved 13 degrees in the same direction. Therefore, the Earth has to rotate a little more before the moon is over the same place that it was 24 hours earlier.

Part A: What tide is it ?

For this reason, high tides are slightly more than 12 hours apart. The afternoon high tide on one day is about 12 hours and 50 minutes later than the afternoon high tide on the previous day, and the same holds true for low tides.

Tides for Cape May, New Jersey				
Day of Week	Low tides		High Tides	
	A.M.	P.M.	A. M.	P.M.
Tuesday	9:16	9:28	2:43	3:30
Wednesday	10:09	10:25	3:52	4:33
Thursday	11:00	11:20	4:54	5:28
Friday	11:50	12:07	5:48	6:17
Saturday	12:14	12:39	6:37	7:04
Sunday	1:06	1:28	7:25	7:51
Monday	1:57	2:15	8:12	8:38

- Use the information in the table above to determine the time between the low tides and high tides for the day. The first set is done for you.

Day of the Week	Time between low tides	Time between high tides
Tuesday	12 hours 12 minutes	12 hours 47 minutes
Wednesday		
Thursday		
Friday		
Saturday		
Sunday		
Monday		

Part B: Average Tidal Range:

The difference between the average high tide and the average low tide is called the average **tidal range**. Because of the varying shapes of the coastlines, different places have different average tidal ranges.

1. Create an appropriate graph in the space provided to compare the average tidal ranges for various cities in the U.S.

Average Tidal Ranges in meters for Cities in the United States	
Cities	Average Tidal Range
Portland, Maine	2.7
Boston, Massachusetts	2.9
New York, New York	1.4
Savannah, Georgia	2.2
Key West, Florida	.4
Galveston, Texas	.4
San Diego, California	1.2
San Francisco, California	1.2
Seattle, Washington	2.3
Cordova, Alaska	3.0
Honolulu, Hawaii	.4

Conclusions: answer in the space provided.

1. How many tides occur each day ?
2. About how much time elapses between high tides on the same day ?
3. Which city above had the highest average tidal range ?
4. Which city had the higher average tidal range - Portland, Maine or Seattle, Washington ?
5. Explain why it might be important to know the average tidal range for an area ?
6. What causes tides on the Earth ?
7. How is the moon positioned when there is a high tide ?
8. What causes the water on the opposite of the Earth to rise up during a high tide ?
9. Where do low tides occur ?
10. Why do low tides occur ?

