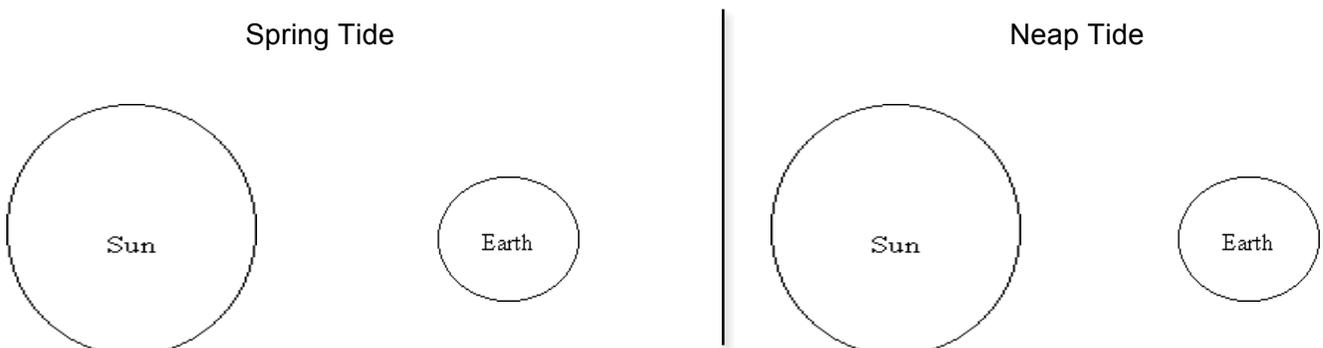


Tides Worksheet

The world's oceans are in constant flux. Winds and currents move the surface water causing waves. Ocean levels fluctuate daily as the sun, moon and earth interact. As the moon travels around the earth and as they, together, travel around the sun, the combined gravitational forces cause the world's oceans to rise and fall. Imagine the earth covered completely by water. As the earth spins, this water is balanced evenly on all sides by centrifugal force. The moon has a gravitational pull on this layer of water as it orbits the earth. This pull causes the water to bulge toward the moon. Because the earth is spinning there will be a bulge on the opposite side of the earth as well. As the earth rotates on its axis, each location on the earth will experience both tidal bulges. The areas of high water levels are high tides and the areas of low levels are low tides. The Sun also affects tides, but since it is so much further away from Earth than the moon, the affect the moon has is much greater.

Since the earth and the moon rotate around the sun, there is an added modifying factor. When the sun and moon are aligned, there are exceptionally strong gravitational forces, causing very high and very low tides, which are called spring tides, though they have nothing to do with the season. When the sun and moon are not aligned, the gravitational forces cancel each other out, causing moderate tides. These are called neap tides. Tides vary from day to day, but most places on Earth experience two high tides and two low tides every day (about 6 hours in between each tide).

1. What are tides caused by?
2. Which exerts stronger gravitational pull on earth, the sun or the moon? Why?
3. What is a spring tide? What position do the sun and moon have to be in to create a spring tide?
4. What is a neap tide? What position do the sun and moon have to be in to create a neap tide?
5. In most places on earth, how often do high and low tides occur?
6. Draw the position of the moon during a spring tide and a neap tide.



Graphing High Tides

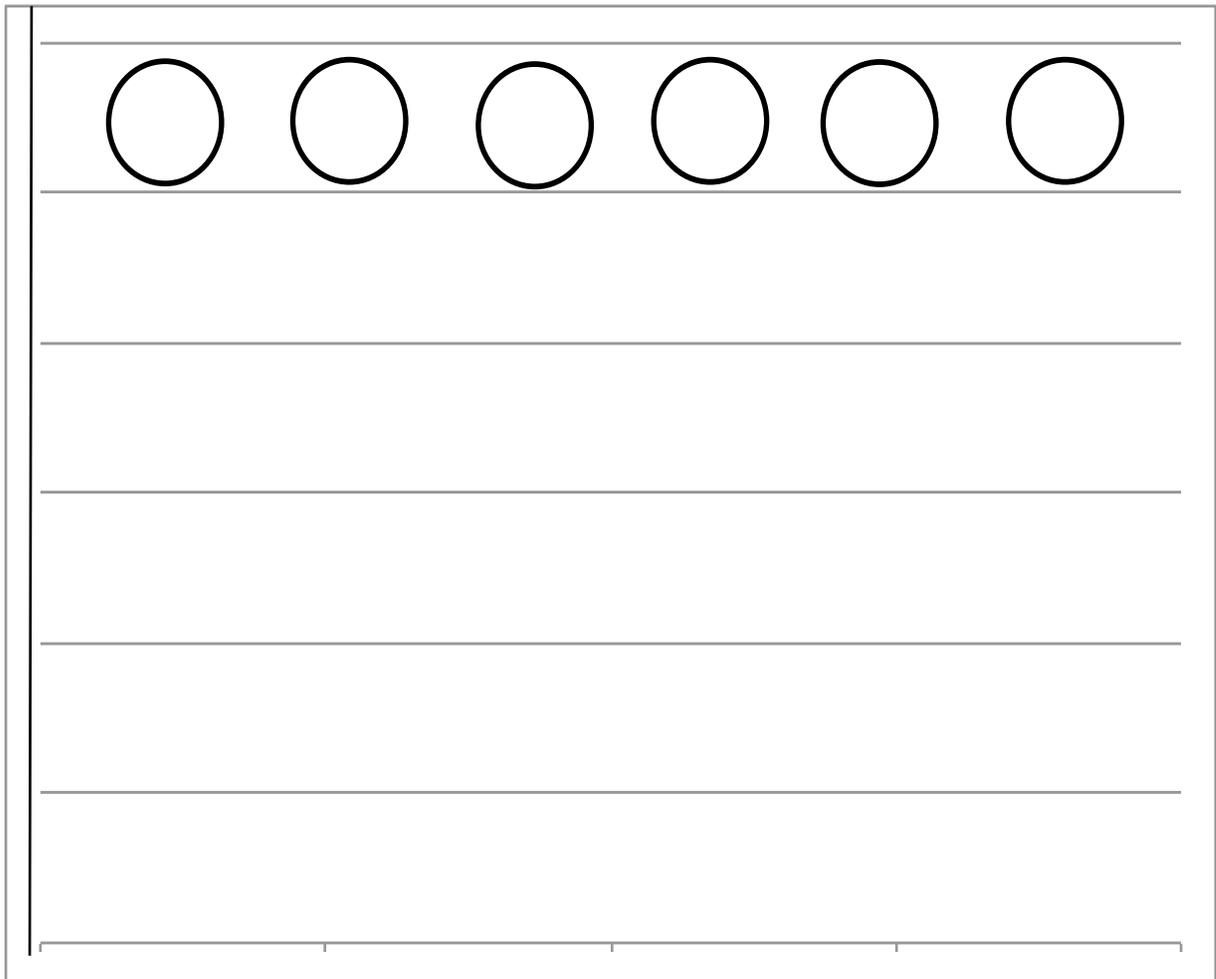
Directions: The chart below shows the height of high tide at Kitty Hawk, North Carolina over the course of a month. It also shows the phase of the Moon on each date.

1. Fill out your scales with the dates on the x-axis (side-to-side) and feet on the y-axis (up and down).
2. Make a line graph of the high tides.
3. Fill in the circles at the top of your graph with the phase of the Moon for each date.

Date	Height of High Tide in Feet	Phase of the Moon
02/11/2013	3.9 feet	New Moon
02/14/2013	3.6 feet	Waxing Crescent
02/17/2013	2.4 feet	First Quarter
02/20/2013	2.9 feet	Waxing Gibbous
02/24/2013	3.5 feet	Full Moon
02/24/2013	3.2 feet	Waning Gibbous

High Tides and Lunar Phases at Kitty Hawk, NC

Height of High Tide in Feet



Date