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

***TIDES***

**Why is understanding the tides important?**

For centuries, people who live and work near seacoasts have understood the importance of being able to predict tides and tidal currents. Low tides may prevent ships from entering harbors, while high tides may make it impossible for ships to pass beneath bridges. Tidal currents may significantly increase the speed of a vessel, or may carry it into dangerous waters. Recreational boaters who anchor near shore may find them­selves stranded by a falling tide. Fishermen throughout the world have learned that catches are likely to be much larger during certain portions of the tidal cycle than others.

Many people who live thousands of miles from any ocean also pay close attention to the same lunar cycles that produce tides. Traditional agricultural practices often prescribe planting and harvesting during times when the moon is at a specific loca­tion relative to the Earth. Some traditional forestry practices link lunar cycles with specific properties of wood including strength, resistance to decay, and resonance for musical instru­ments. Lunar cycles have also been linked with many aspects of human biology, behavior, and folklore including crime, sui­cide, mental illness, birthrates and fertility.

1. **What does the passage above indicate is the cause of the tides?**
2. **What are three examples from the passage that illustrate the importance of the tides?**
3. What is a ***Lunar Cycle***?

***What causes tides?***

Tides are the periodic rising and falling of ocean waters caused by the gravitational forces of the sun and moon. The vertical motion of tides is accompanied by a horizontal movement of ocean waters called tidal currents. Oceanographers say that tides rise and fall, while tidal currents ebb (during a falling tide) and flood (during a rising tide).

For a simple explanation of tides, it is sufficient to consider only the effects of the moon (the magnitude of the moon’s effect is about twice that of the sun, since the moon is closer to the Earth). At any point in a day, one side of the Earth will be closer to the moon than the opposite side. Ocean waters on the closer side of the Earth will experience a greater gravitational pull from the moon than waters on the opposite side of the earth. This causes a “bulge” in the waters closest to the moon, and creates a high tide. At the same time, **inertial forces** on the opposite side of the Earth causes a similar “bulge” creating another high tide. Low tides occur at longitudes that are 90° from the longitudes of loca­tions that are experiencing high tides.

The sun also exerts a gravitational force on ocean waters. Depending upon the positions of the sun and moon relative to the Earth, the sun’s gravity may enhance or diminish the tidal effect caused by the moon. When the sun and moon are aligned (at the time of full moon or new moon), their gravita­tional forces act in the same direction and produce more pro­nounced high and low tides that are called spring tides. When the sun and moon are at right angles relative to the Earth, the gravitational force of the sun partially cancels out the gravi­tational force of the moon. The result is less pronounced high and low tides that are called neap tides. The magnitude of tides is also affected by the actual distances between the sun, moon, and Earth: Gravitational attraction is increased when the Earth is closest to the sun or moon.

1. According to the information above, what causes tides?
2. How can you predict the tides?
3. List three things that determine how “high” or “low” the tides will be at any time.