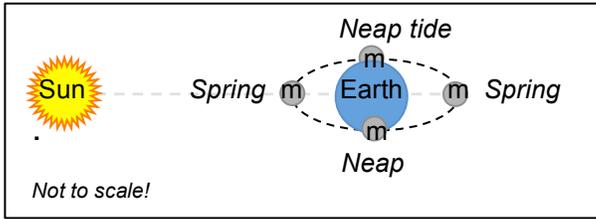


Predicted “**astronomical tides**” are computed mostly from the relative position of the sun, moon, and earth. Actual tides can be very different because of local wind, surf, atm. pressure, recent weather.

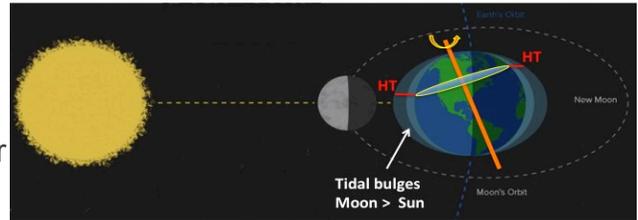
Normal Tides



Moon orbits the spinning earth once a lunar month (28 d). **Neap** tides – Predicted High & Low tides are relatively small when the moon is offset ~90° from the sun.

Spring tides – Predicted High & Low tides are relatively high when the sun-moon-earth are in a straight line (full and new moon phase). (It's unrelated to the season “Spring”!)

The tilt of the earth’s north-south axis means that the 2 high tides and 2 low tides during one day can be different. Here, the water depth is shown as pale blue-gray bulges. Note that the tide height (short red lines) for the 2 high tides are unequal as the earth spins. Our tides in Pacifica are this “*mixed semidiurnal*” type.



Modified from www.higher-tides.com/king-tides/

“King Tides” (so called; it’s not a precise scientific term.)

The orbits of the moon around the earth and the earth around the sun are nearly circular, but not quite! The slight elliptical shape makes a small but significant difference. The higher-high tides when the moon is closest to earth (**perigean**, or King tides) are a few inches higher.

The Moon's distance is only 7% less than average when the Moon is closest to the Earth, at “**perigee**”. The Sun can be ~2% closer.

Surf and other unpredictable factors easily dominate this effect, but Kings are the biggest predicted tides of the year, and thus grab our attention. Whether a 7 ft. tide is due to high surf or a King tide, it can show us what may become the new “normal” as future sea level rises.

