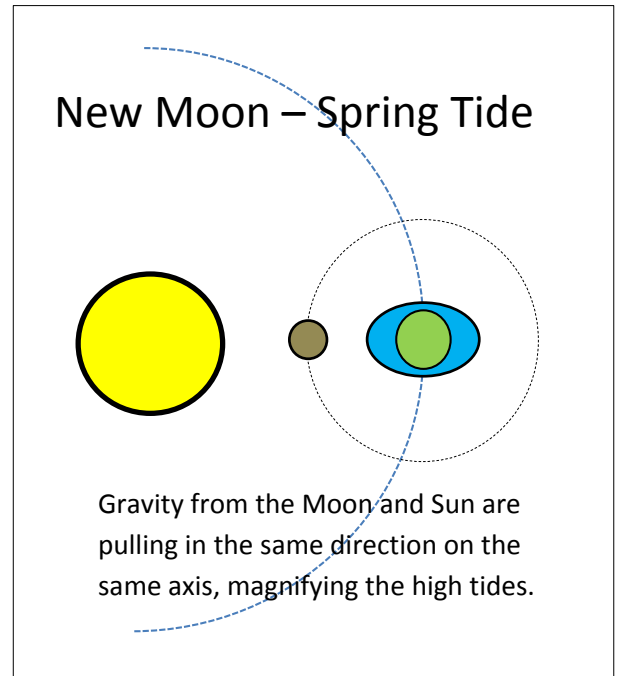
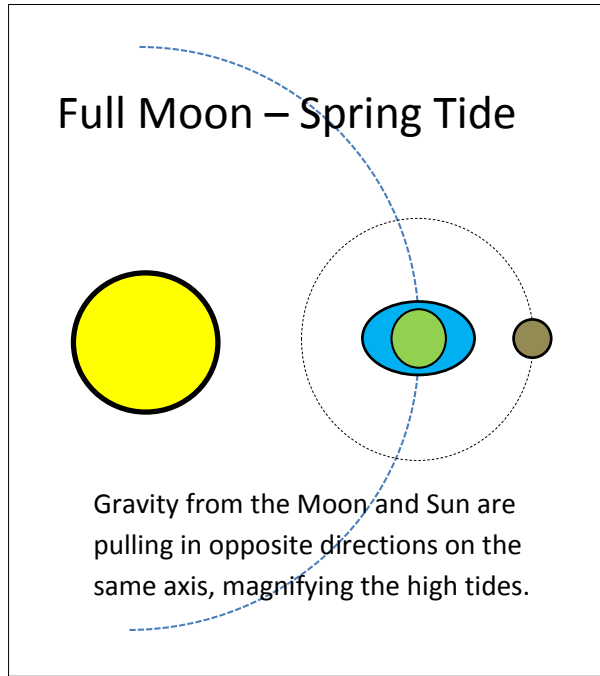
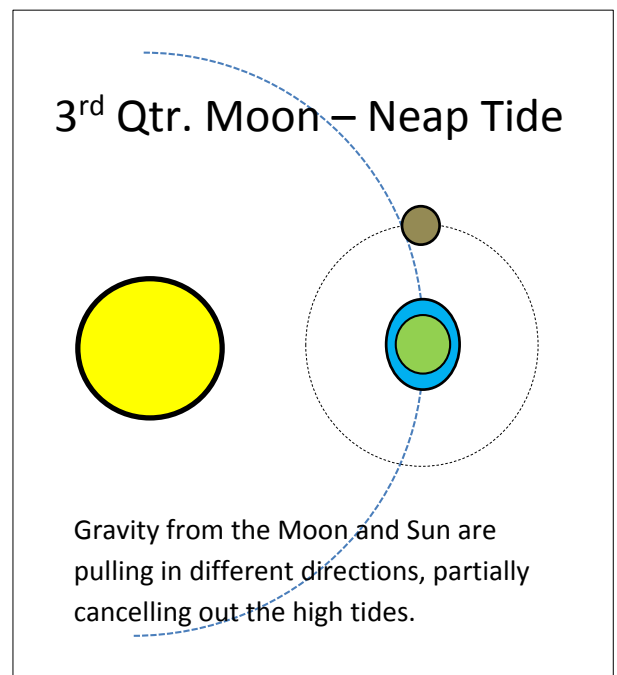
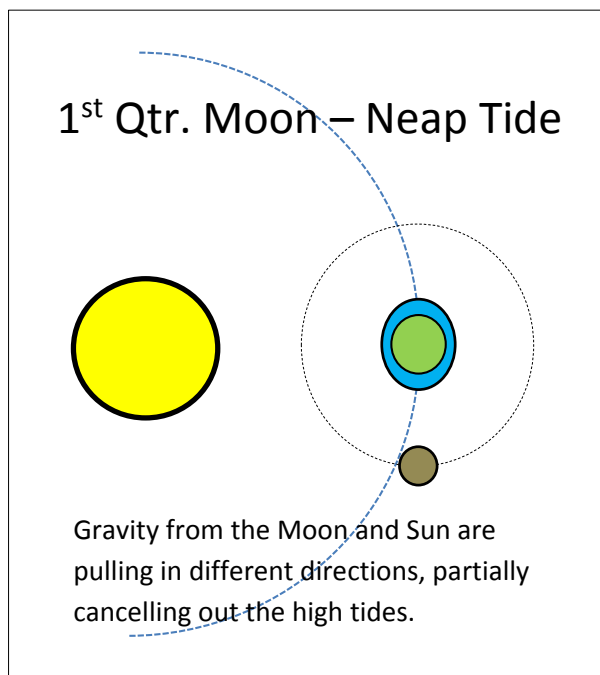




The relative position of the Earth, Moon and Sun control the height and timing of tides. When the Sun and Moon are in line with one another, such as during a full moon or new moon, the tidal range is magnified, because the gravity from both the Moon and Sun are pulling in the same direction or axis. These are called “spring tides”, though they happen twice per the 29.5 day long lunar cycle, not just in the spring season. Spring tides have a very high tidal range—the high tides are very high, and the low tides are very low. The diagrams below show the two Moon positions for spring tides.



When the Moon and Sun are at right angles (90 degrees or ‘perpendicular’) to one another, relative to Earth, during a 1<sup>st</sup> quarter or 3<sup>rd</sup> quarter moon, the tidal range is reduced because the gravity from the Moon and Earth partially cancel one another. These are called “neap tides”. Again, they occur twice in each 29.5 day long lunar cycle. Neap tides have a low tidal range—there is less difference between high tides and low tides, compared with spring tides. The diagrams below show the two Moon positions for neap tides.



# Practice Questions

1. Tides are mainly caused by the force of \_\_\_\_\_ from the \_\_\_\_\_.
2. At any point on Earth's oceans, there are \_\_\_\_\_ high tides and \_\_\_\_\_ low tides each 24 hour day.
3. High tides face either directly towards or directly away from the \_\_\_\_\_.
4. Low tides face at \_\_\_\_\_ (90 degrees) to the Moon.
5. The tides that have the greatest tidal range are called \_\_\_\_\_ tides.
6. The tides that have the lowest tidal range are called \_\_\_\_\_ tides.
7. Spring tides occur during the \_\_\_\_\_ and \_\_\_\_\_ moon phases.
8. Neap tides occur during the \_\_\_\_\_ and \_\_\_\_\_ moon phases.

For questions 9-12, label each of the following diagrams with both the moon phase name and type of tide, draw a picture of the moon phase in the blank circle, and draw the two high-tide bulges in proper size and direction in relation to the Moon.

