

### Moon/Earth/Sun System

- Examine the illustration below showing Earth in relation to our sun in its orbit. Identify the seasons **SUMMER**, **FALL**, **WINTER**, and **SPRING** (example: A = choose season, B = choose season, etc.). Next to each, identify **WHY** you chose that season.
- Examine the same illustration showing Earth in relation to our sun in its orbit. Identify which letter corresponds to the **SUMMER SOLSTICE** and which letter corresponds to the **WINTER SOLSTICE**. Next to each choice, **EXPLAIN WHY**.

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Nov 30-6:56 AM

### Moon Phases, Eclipses and Tides

- Examine the illustration of Earth's moon in relation to our sun and Earth. Identify which letter corresponds to the **WAXING CRESCENT** and which letter corresponds to the **WANING CRESCENT**. Next to **EACH** choice, **EXPLAIN** how you know (Look at relationships between the Earth, sun and moon).

**B - A waxing crescent occurs after a new (no) moon when the Earth's shadow covers all but a small part of the moon. The concave part of the crescent faces left. The surface of the moon illuminated by the sun increases towards a full moon.**

**D - A waning crescent occurs after the third quarter moon as the Earth's shadow prevents more of the moon's surface from illumination by blocking sunlight until the lunar cycle ends with the next new moon. The concave part of the crescent faces right.**

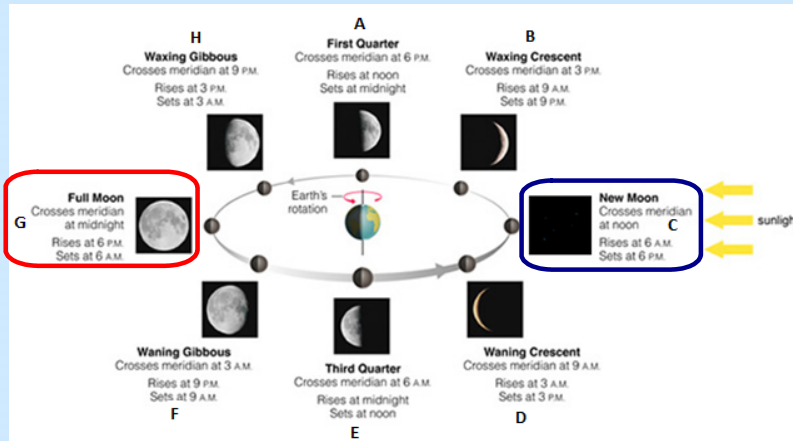
← ← ← sunlight

Nov 30-8:04 AM

**Moon Phases, Eclipses and Tides**

4. Examine the illustration of Earth's moon in relation to our sun and Earth. Identify which letter corresponds to the NEW MOON and which letter corresponds to the FULL MOON.

Next to EACH choice, EXPLAIN how you know (Look at relationships between the Earth, sun and moon).



**C - A new moon occurs when the moon between the Earth and sun such that the illuminated side of the moon is facing the sun.**

**G - A full moon occurs when the Earth is between the moon and the sun such that the illuminated side of the moon faces the Earth.**

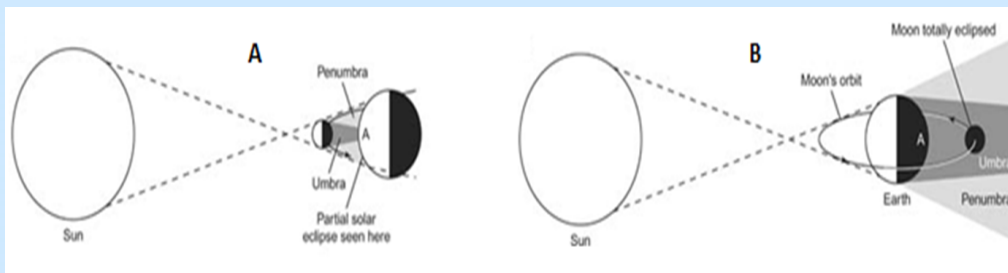
Nov 30-8:04 AM

**Moon Phases, Eclipses and Tides**

5. Examine the illustration of Earth, its moon and sun. Identify which letter corresponds to a SOLAR ECLIPSE.

Identify which letter corresponds to a LUNAR ECLIPSE.

Next to EACH choice, EXPLAIN how you know (Look at relationships between the Earth, sun and moon).



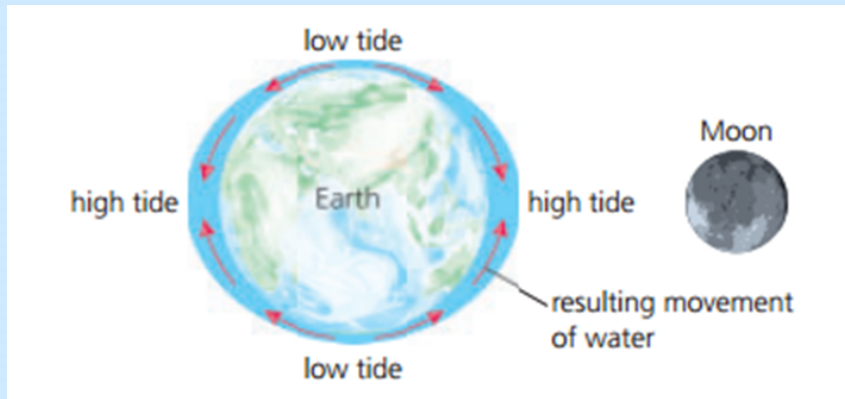
**A** shows a solar eclipse. When the moon is between the sun and Earth, a solar eclipse occurs because the moon's shadow, the umbra, blocks light from reaching the area on Earth covered by the moon's shadow. A partial eclipse occurs within the moon's penumbra, the broader, less dark shadow cast by the moon's blockage of the sun's light.

**B** shows a lunar eclipse. When the Earth is positioned between the sun and moon, the Earth's umbra (shadow) blocks light from the sun from reflecting back (illuminating) the moon's surface.

Nov 30-8:06 AM

Moon Phases, Eclipses and Tides

6. Describe the forces that determine ocean tides.



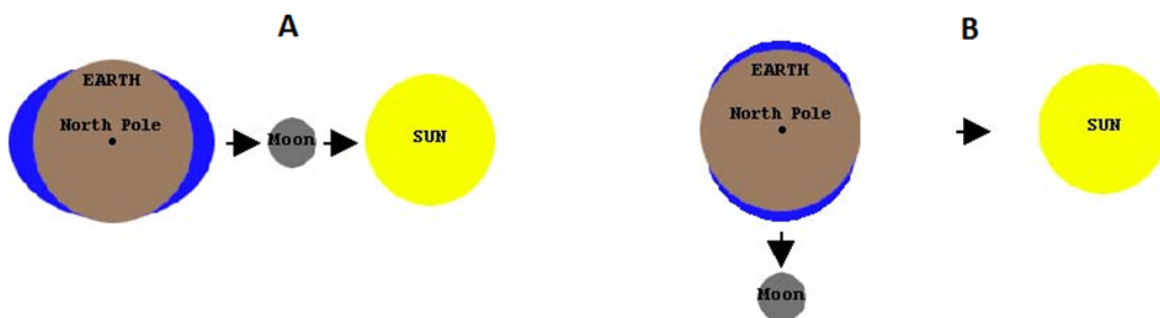
Tides are the rise and fall of the ocean's water every 12.5 hours or so. The force of gravity pulls the moon and Earth toward each other. Tides occur mainly because of differences in how much the moon pulls on different parts of Earth. As Earth rotates, the moon's gravity pulls water toward the point on Earth's surface closest to the moon. The moon pulls least on the side of Earth farthest away. Two tides occur each day because of this difference in the pull of the moon's gravity.

Nov 30-8:18 AM

Moon Phases, Eclipses and Tides

7. Examine the illustration of Earth, its moon and sun. Identify which letter corresponds to a NEAP TIDE. Identify which letter corresponds to a SPRING TIDE.

Next to EACH choice, EXPLAIN how you know (Look at relationships between the Earth, sun and moon).



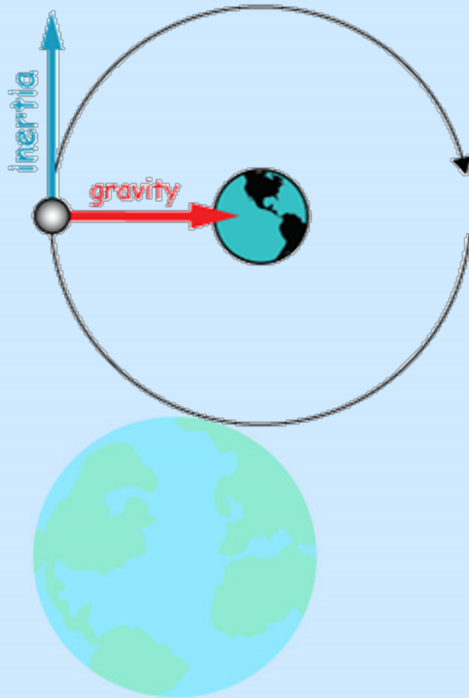
**A:** Twice a month, the moon, Earth, and the sun are in a straight line. The combined forces of the gravity of the sun and moon produce an especially high tide—called a **spring tide**—and an especially low tide.

**B:** Also twice a month, the pull of gravity of the sun and moon are at right angles to each other. At those times the high tide is lower than usual, and is called a **neap tide**. The low tides then are higher than usual.

Nov 30-8:22 AM

## Gravity and Inertia

8. Describe the relationship between GRAVITY and INERTIA.



Two factors—inertia and gravity—combine to keep the planets in orbit.

A moving object will continue to move until a force acts to stop its motion. This tendency of a moving object to continue in a straight line or of a stationary object to remain in place is the object's *inertia*. The tendency of an object to resist changes in its state of motion varies with mass. Mass is that quantity that is solely dependent upon the inertia of an object.

***Gravity*** is the force that attracts all objects toward each other.

Gravity and inertia act to keep celestial objects in elliptical orbits around more massive celestial objects as pictured to the right.

Nov 30-8:22 AM



Nov 30-9:04 AM