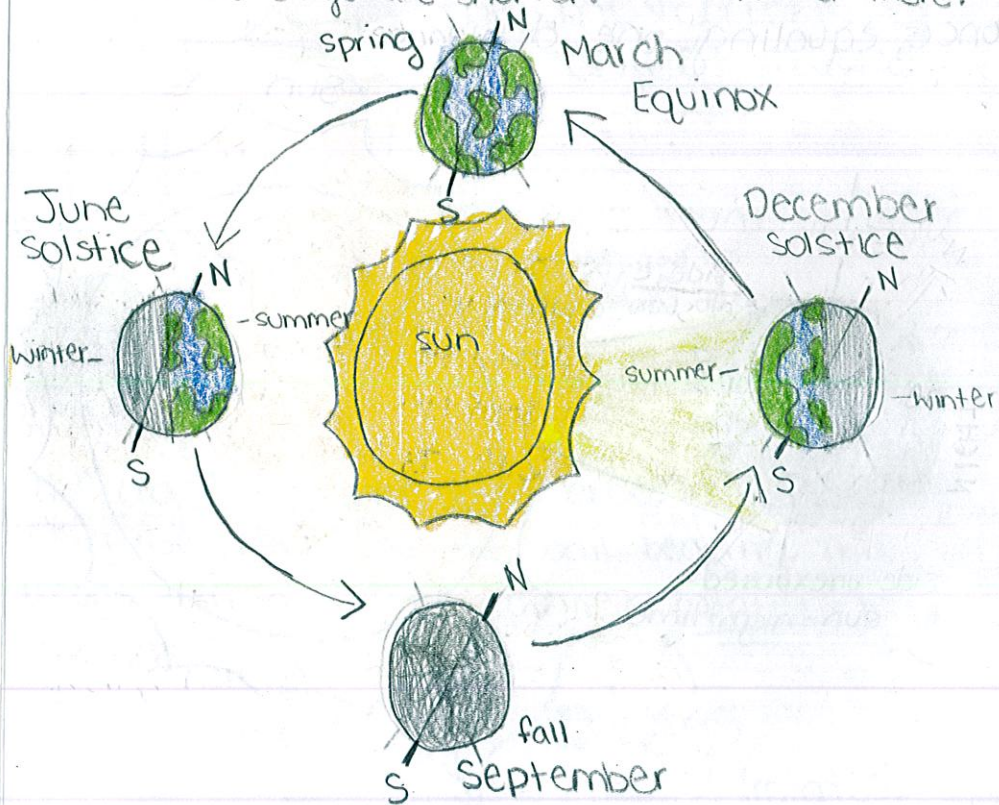


WHAT CAUSES THE

Seasons?

The Earth's tilt causes the seasons - without it, the temperature would be the same year-round. The part of the Earth directly facing the sun is warm, and the days are longer, meaning it is summer. The other half of the Earth is facing away from the sun, and is colder and the days are shorter. It is winter there.



Solstice - when the sun is farthest north or south of the equator

SUMMER

Solstice

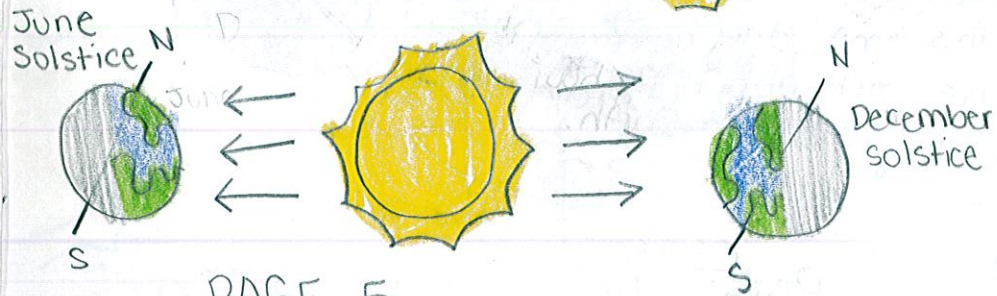
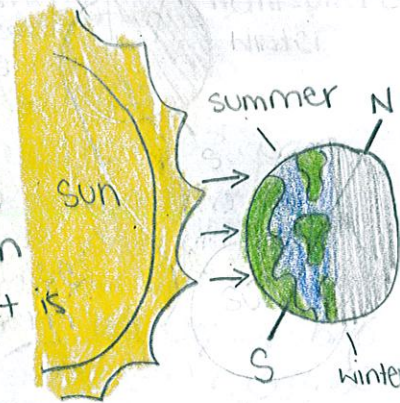
Around June 21, the Northern Hemisphere is directly facing the sun, giving us longer, warmer days, otherwise known as summer. In the southern Hemisphere it is the opposite. It is winter there.



WINTER

Solstice

Around December 21, the Northern Hemisphere is pointed away from the sun, giving us shorter, colder days, otherwise known as winter. In the southern Hemisphere it is the opposite. It is summer there.



Equinox - "equal day, equal night"

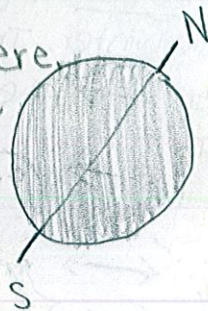
SPRING Equinox

Around March 21, the spring or vernal equinox begins, turning winter to spring for the Northern Hemisphere, and summer to fall for the Southern Hemisphere. During this time, day and night are each about 12 hours long everywhere on Earth.



FALL Equinox

Around September 22, the fall or autumnal equinox begins, turning summer to fall in the Northern Hemisphere, and winter to spring in the Southern Hemisphere. During this time, day and night are each about 12 hours long everywhere on Earth.



SOLAR ECLIPSE

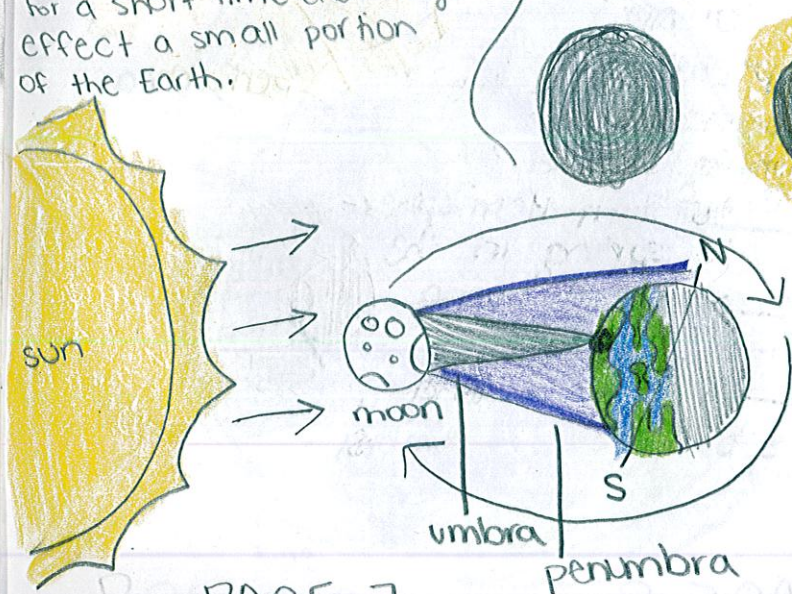
A solar eclipse occurs when the moon passes directly between Earth and the sun, blocking sunlight from part of Earth's surface. This is the opposite of a lunar eclipse.

TOTAL solar eclipses VS.

The very darkest part of the moon's shadow, the umbra, is cone-shaped. From any point in the umbra, light from the sun is completely blocked by the moon. These usually only happen for a short time and only affect a small portion of the Earth.

PARTIAL solar eclipses

The larger part of the moon's shadow that is less dark than the umbra is called the penumbra. In the penumbra, part of the sun is visible from the Earth. An extremely bright part of the sun still remains visible.



LUNAR ECLIPSE

Lunar eclipses occur at a full moon when Earth is directly between the moon and sun, blocking sunlight from reaching the moon. This is the opposite of a solar eclipse.

TOTAL lunar eclipse VS.

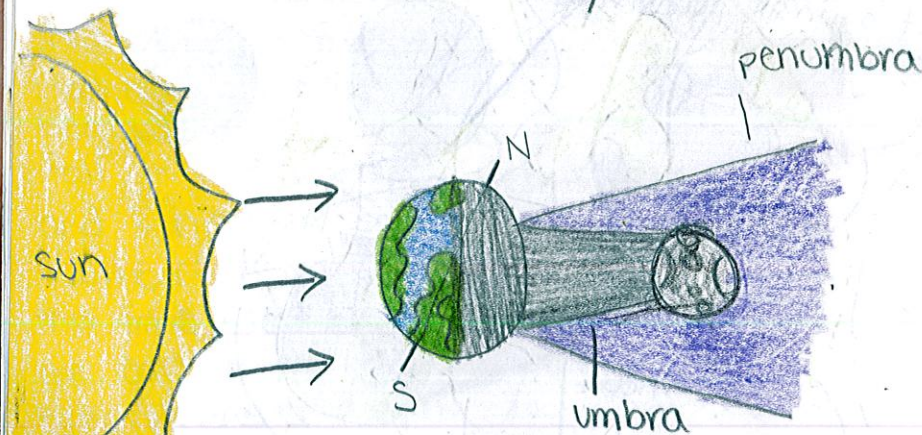
A total lunar eclipse occurs when the moon is in Earth's umbra, meaning you can see the edge of Earth's shadow on the moon before and after it happens.

Unlike a total solar eclipse, a total lunar eclipse can be seen anywhere on Earth that the moon is visible.

PARTIAL lunar eclipse

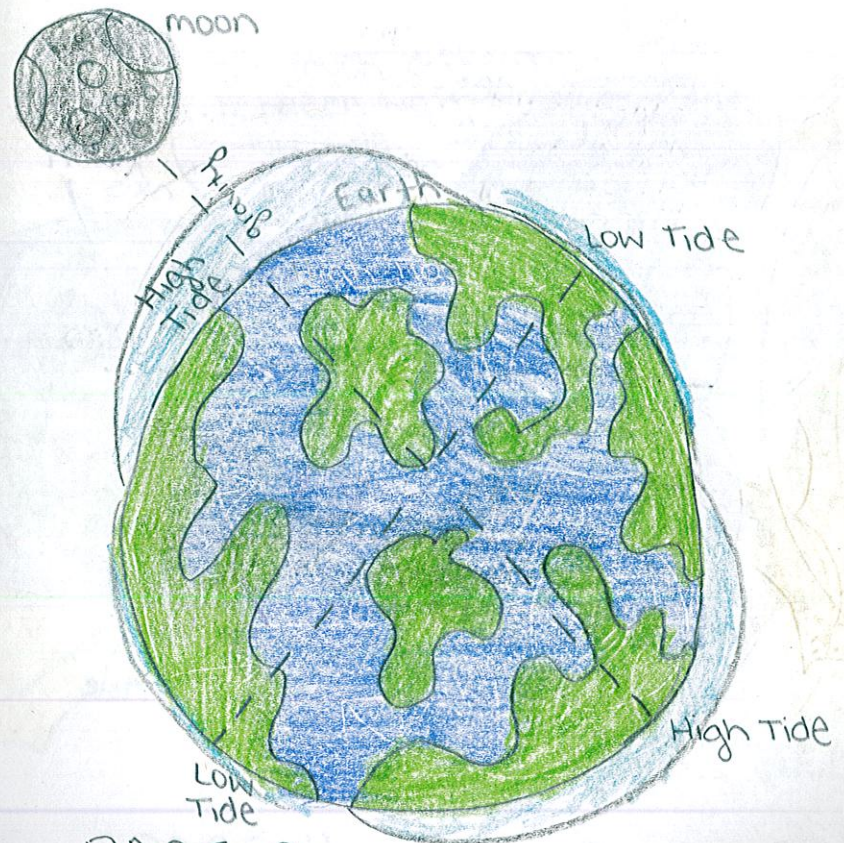
A partial lunar eclipse occurs when the moon passes partly into the umbra of Earth's shadow making the edge of the umbra appear blurry.

During these, the Earth, moon, and sun are not quite in line, which is the case for most lunar eclipses.



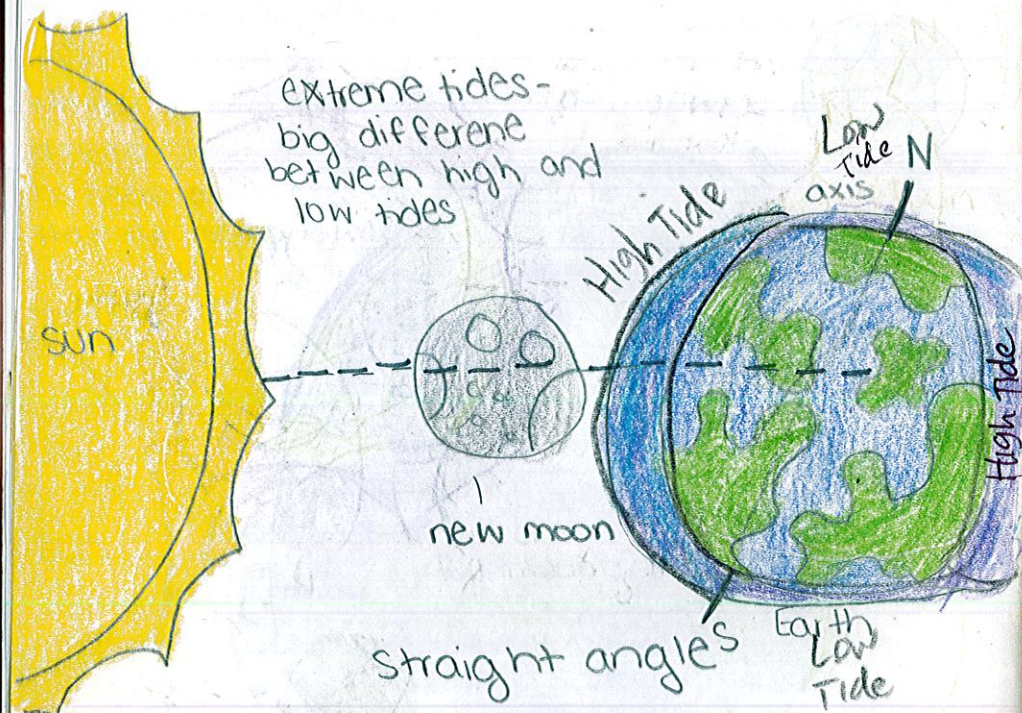
TIDES

The force of gravity pulls the moon and Earth (including the water on Earth's surface) toward each other. Tides are caused mainly by differences in how much the moon's gravity pulls on different parts of Earth. Tides occur every 12.5 hours when the ocean waters rise and fall. The water rises for 6 hours, then falls for 6 hours, in a regular cycle. Water closer to the moon, therefore receiving a stronger force of the moon's gravity than its force on the Earth as a whole, will have a high tide. The opposite happens for water farther away - low tide.



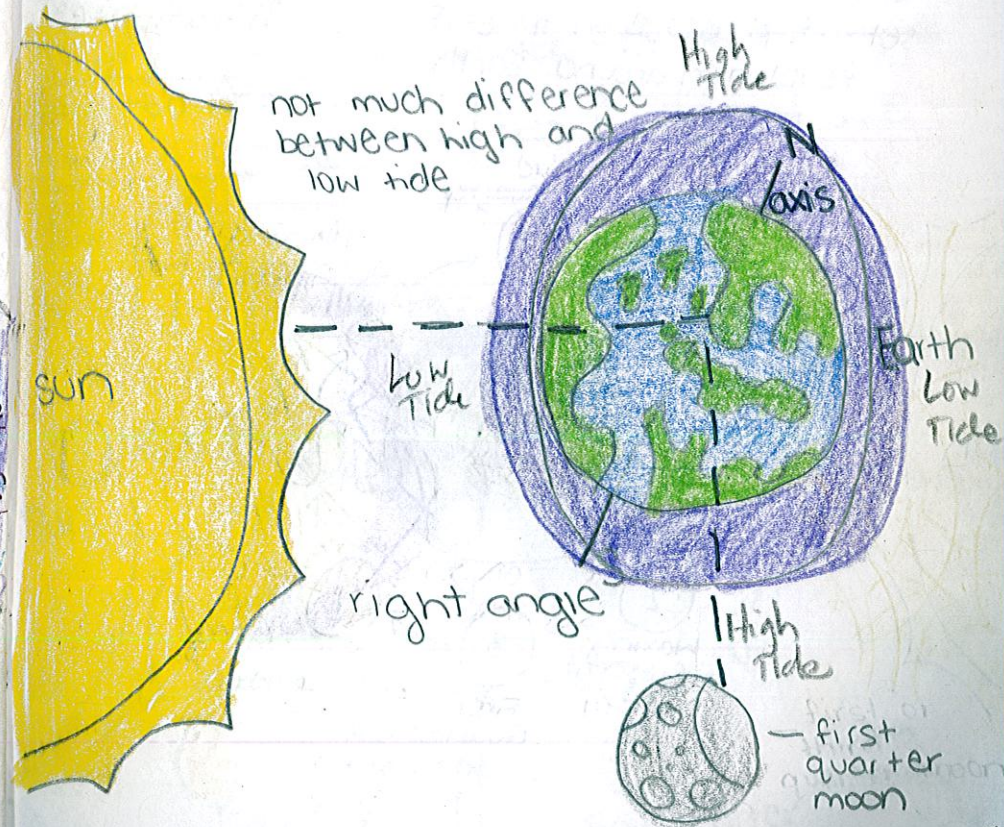
SPRING tides

During a new moon, the sun, moon, and Earth are nearly in line, meaning the gravity of the sun and moon are pulling in the same direction. Their combined forces produce a tide with the greatest difference between consecutive low and high tides, called a spring tide. Spring tides occur twice a month, at new moon and full moon.



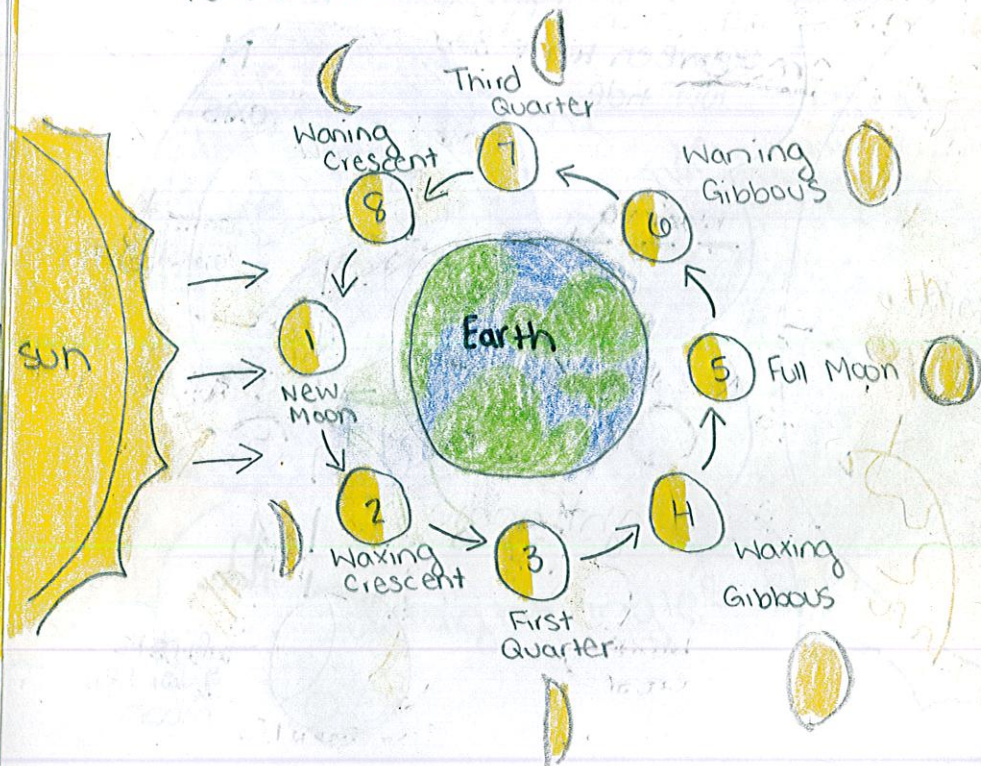
NEAP tides

During the moon's first and third quarter phases, the line between Earth and the sun is at a right angle to the line between Earth and the moon, meaning the sun's pull is at a right angle to the moon's pull. This arrangement produces a neap tide, a tide with the least difference between consecutive low and high tides. Neap tides occur twice a month.



WHAT CAUSES THE PHASES OF THE MOON?

The different shapes of the moon we see from Earth are called phases. Phases are caused by changes in the relative positions of the moon, Earth, and the sun. Since the moon revolves around the Earth, you see the moon from different angles. The moon does not produce its own light-- it reflects the sun's light, therefore the phase of the moon you see depends on how much of the sunlit side of the moon faces Earth. The moon goes through its whole set of phases each time it makes a complete revolution around Earth.



PHASES OF THE MOON

New Moon - the sunlit side faces away from Earth.

Waxing Crescent - the portion of the moon you can see is waxing, or growing, into a crescent shape.

First Quarter - you can see half of the sunlit side of the moon.

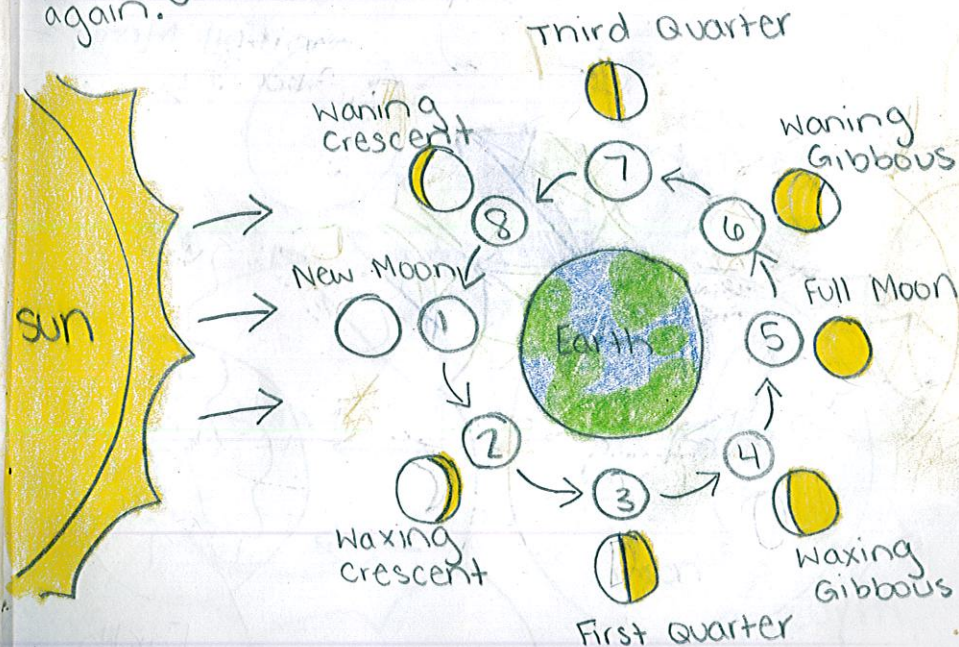
Waxing Gibbous - the moon continues to wax. The visible shape of the moon is called gibbous.

Full Moon - the entire sunlit side faces Earth.

Waning Gibbous - the portion of the moon you can see wanes, or shrinks.

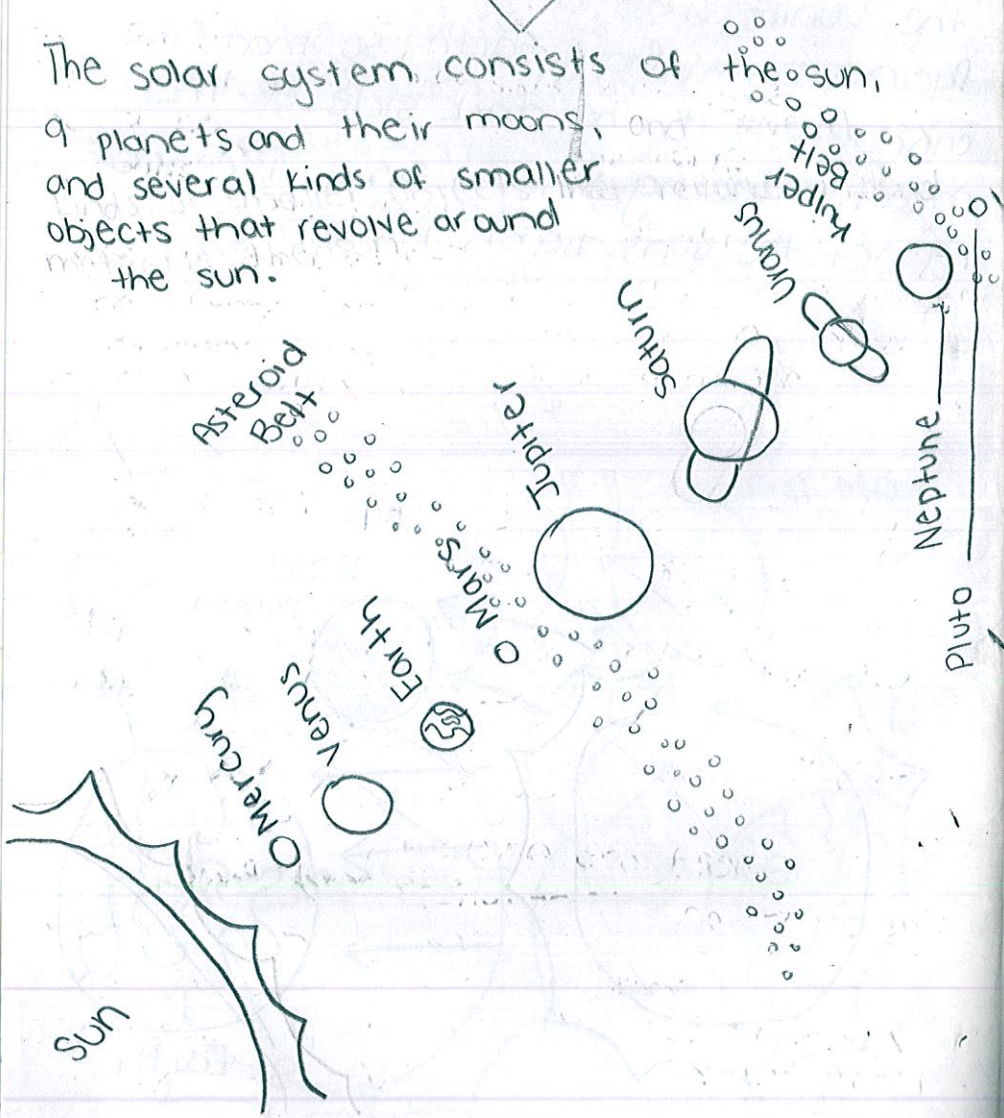
Third Quarter - you can see half of the moon's lighted side.

Waning crescent - you see a crescent once again.



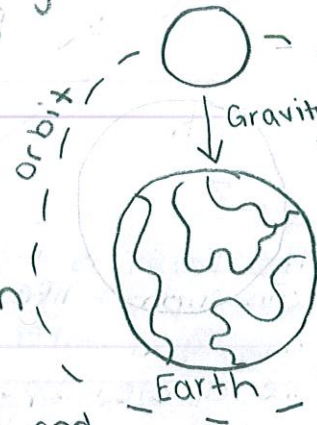
MAJOR PARTS OF OUR SOLAR SYSTEM

The solar system consists of the sun, 9 planets and their moons, and several kinds of smaller objects that revolve around the sun.



Why don't the planets fly off into Outer space?

For the same reason we do not fly into space—gravity. Gravity is the magnetic force that pulls us and other objects toward the Earth so they don't float around, or fly off into space. This also exists between other objects in space.

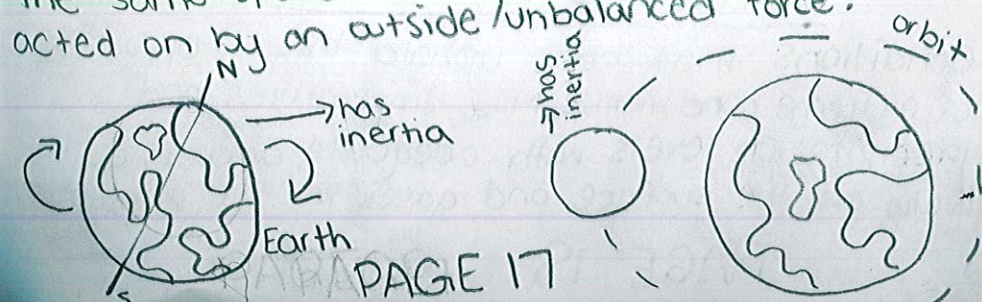


What keeps the planets in their orbits?

A combination of inertia, gravity and forward velocity work together to keep planets and moons in orbit. Gravity pulls planets to the sun while they are in a forward motion. This causes them to orbit in a circular motion.

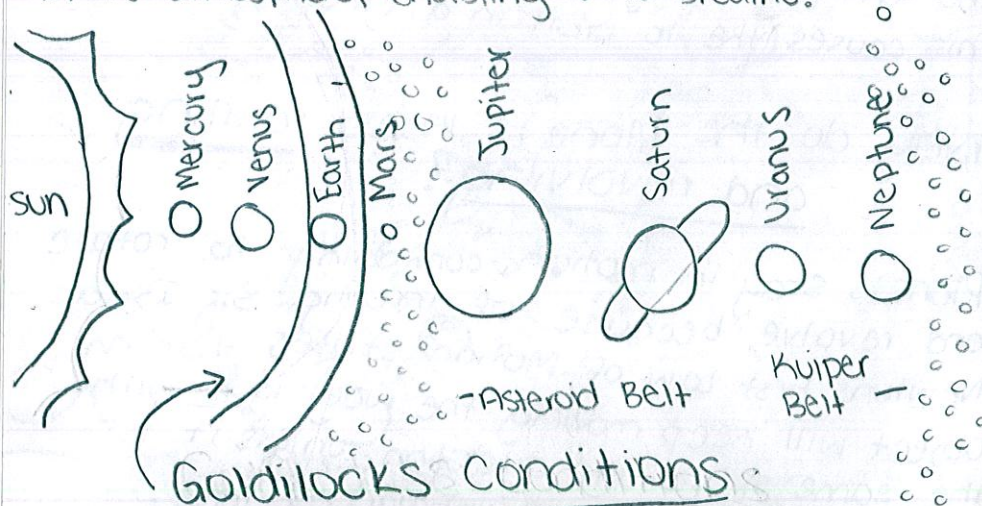
Why do the planets keep rotating and revolving?

Planets stay in motion, continuing to rotate and revolve, because of inertia. Sir Isaac Newton's First Law of Motion states that an object will keep moving the way it is with the same speed and direction, unless it is acted on by an outside/unbalanced force.



WHY IS EARTH THE ONLY PLANET WITH LIFE ON IT?

The Earth is the only planet we know of that can support life. Unlike some other planets, Earth has liquid water that we need at its surface. Also, the climate, especially the temperature and precipitation levels, are not extreme on Earth. Yet another reason Earth can support life is because it has enough gravity to hold gases such as oxygen, carbon dioxide, argon, nitrogen, and water vapor in its atmosphere, enabling us to breathe.



Conditions that can uphold life → opposite of extreme conditions. Mild temperatures and precipitation levels with adequate amounts of water on the surface and gases in the atmosphere.