
THE
UNIVERSE

Essential Standard 1.1

Explain Earth's role as a body in space.

Learning Objective 1.1.1

Explain Earth's motion through space, including precession, nutation, the barycenter, and its path about the galaxy.

I Can Statements

At the end of this lesson, you should be able to say, with confidence:

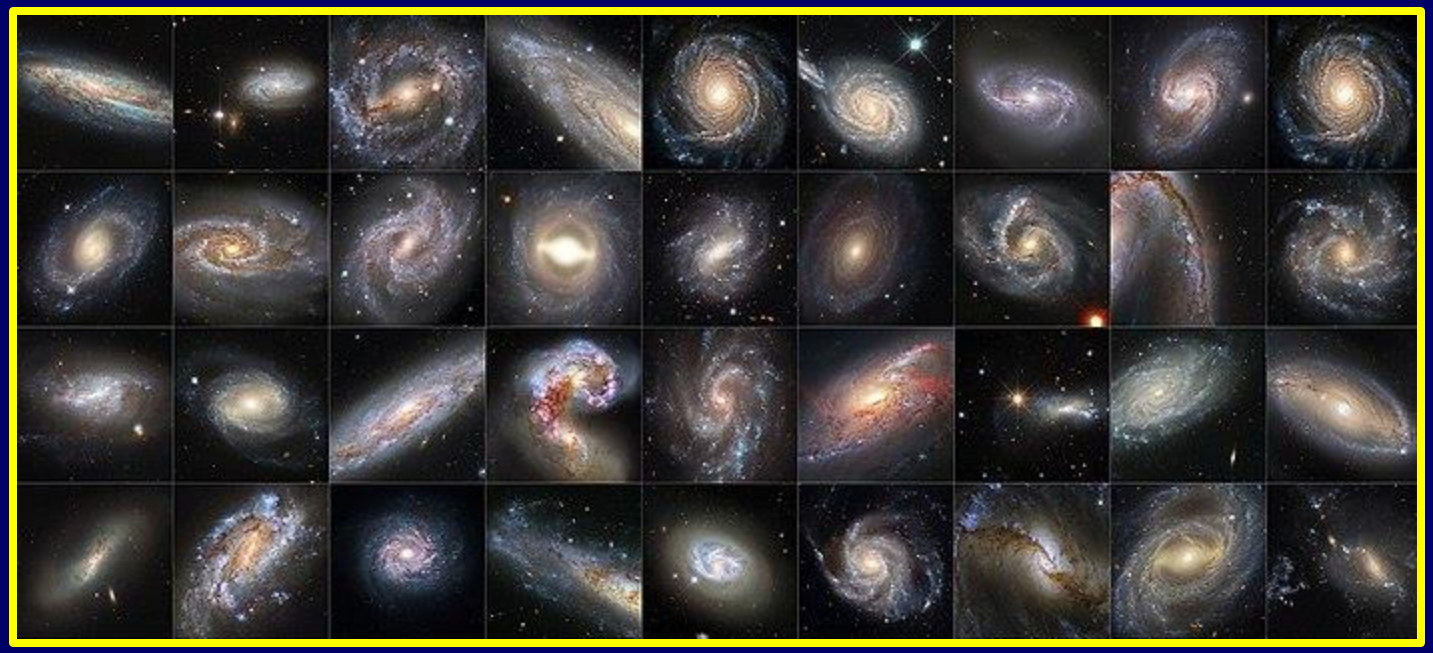
- I can describe the hierarchy of the Universe, according to relative size.
- I can identify and describe various structures and phenomena found in space.
- I can describe the conditions on Earth that make life possible.

Universe

The universe is everything. It includes all of space, and all the matter and energy that space contains. It even includes time itself and, of course, it includes you.

Galaxies

Over 100 billion galaxies have been discovered, so far, but as technology improves, that number is expected to increase dramatically.

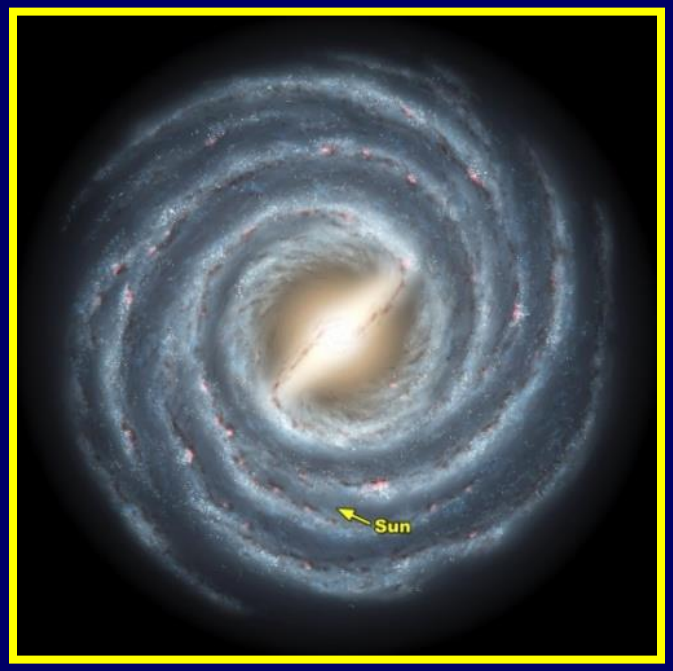


Galaxies

A galaxy consists of collection of stars, along with the surrounding gas, dust, ice, planets, moons, and asteroids.

The Milky Way

Our own galaxy, called The Milky Way, consists of spiral arms and a massive black hole in its center.



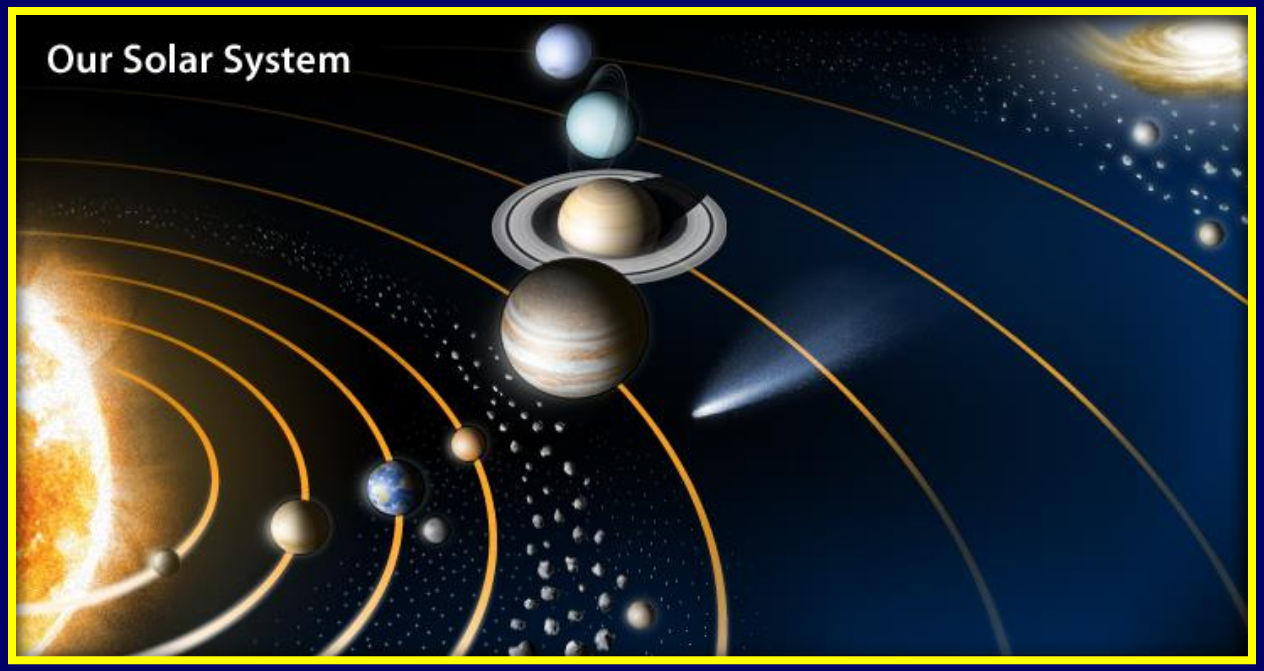
The Milky Way Galaxy is 100,000 light years wide and our Sun is just one of at least a billion stars within the Milky Way.

Black Holes

A black hole is a place in space with a gravitational pull so strong that nothing can escape its force, not even light, making it appear as a black hole.

Solar System

Our solar system is just one of hundreds of solar systems within our galaxy and formed 4.6 billion years ago.



Solar System

In the center of our solar system is the Sun. Planets, asteroids, and comets orbit around the Sun.

Moons orbit around planets.

Planets

Planet are large bodies that orbit a star, have a spherical shape, and are large enough that gravity cleared away any objects of similar size near its orbit.

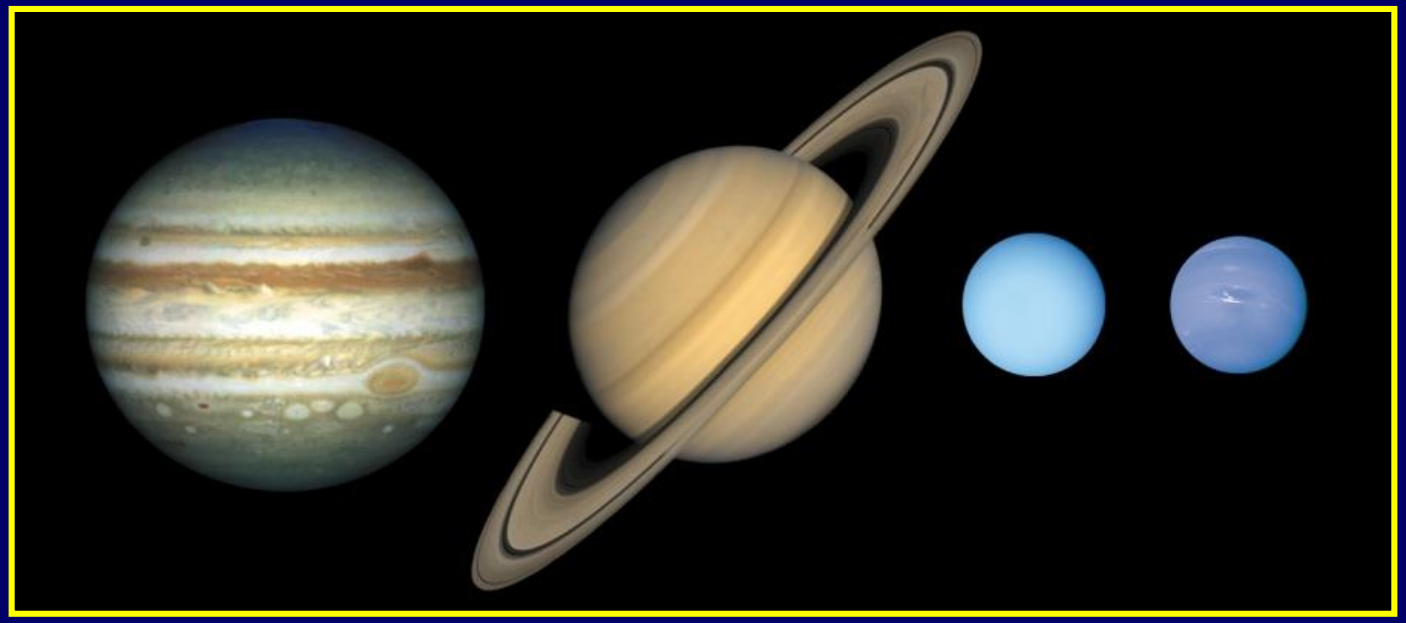
My Very Educated Mother Just Served Us Nachos

Solar System

The four heavier inner planets, closer to Sun, are called the rocky planets and consist of Mercury, Venus, Earth, and Mars.

Solar System

The four lighter outer planets are called the gas giants and consist of: Jupiter, Saturn, Uranus, and Neptune.

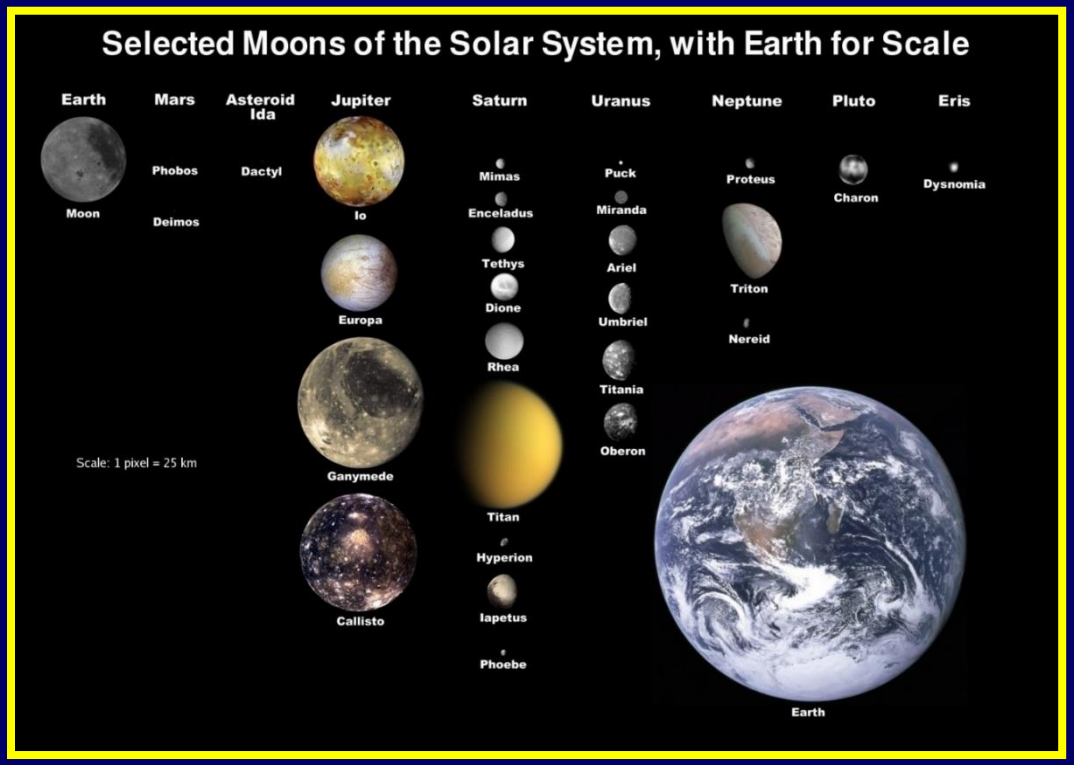


Planets

Pluto was declassified as a planet because scientists found other things in our solar system just as large as Pluto. It is now called a dwarf planet.

Moons

Moons are large bodies or rock or ice that orbit a planet.



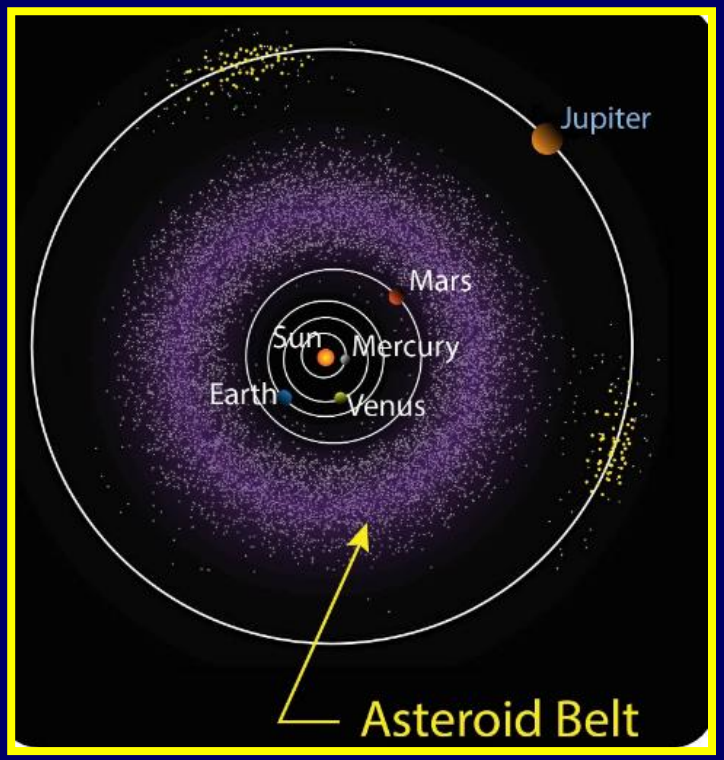
There are 178 moons in our solar system.

Asteroids

Asteroids are large rocks that never got large enough to form a planet but still orbit the Sun.

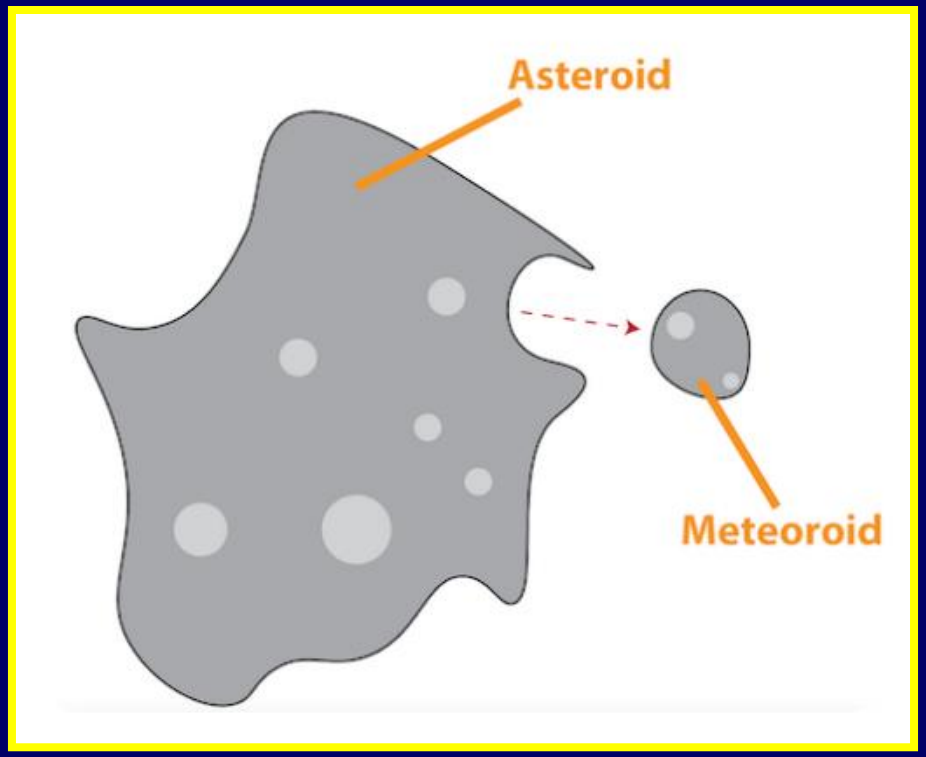
Asteroids

Most asteroids, in our solar system, are found in the asteroid belt, located between Mars and Jupiter.



Meteoroids

Sometimes asteroids collide and pieces of rock break off into what are called meteoroids.



Meteors

When meteoroids enter Earth's atmosphere, they vaporize into what we call meteors.

Meteors look like streaks of light in the sky. Some call them shooting stars.

Meteorites

Not all meteors vaporize. Those that reach the Earths surface are called meteorites.

Hoba – Largest Meteorite

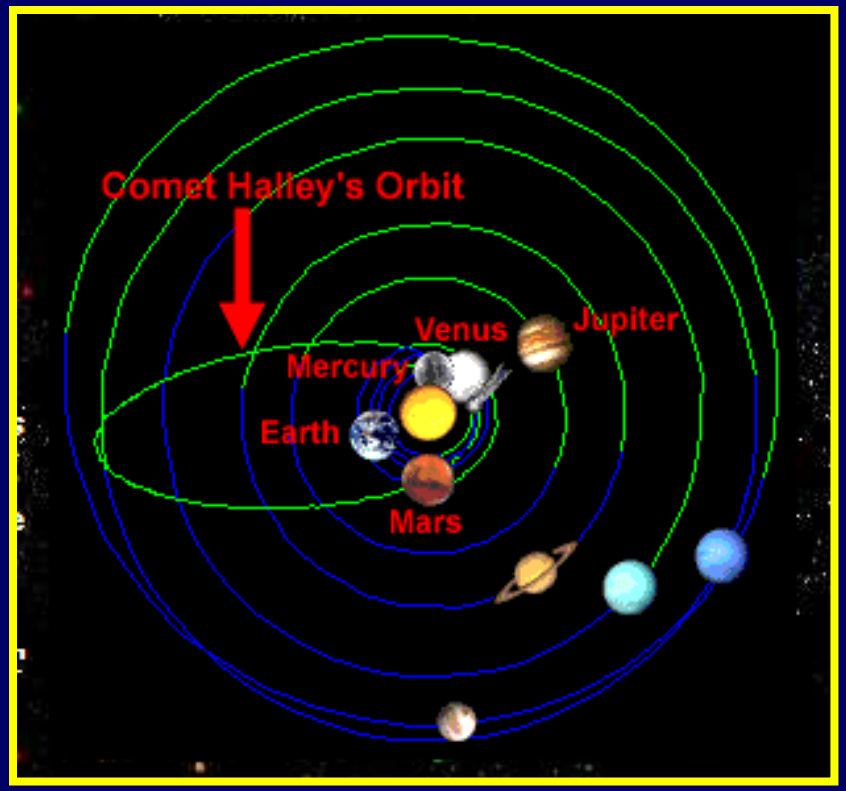
Scientists collect and study meteorites to learn more about our solar system.

Comets

Comets are large bodies of ice, dust, and a carbon-based black goo, like the charcoal residue on a barbeque grill.

Comets

Comets orbit the Sun, but their orbits are elongated compared to planetary orbits.



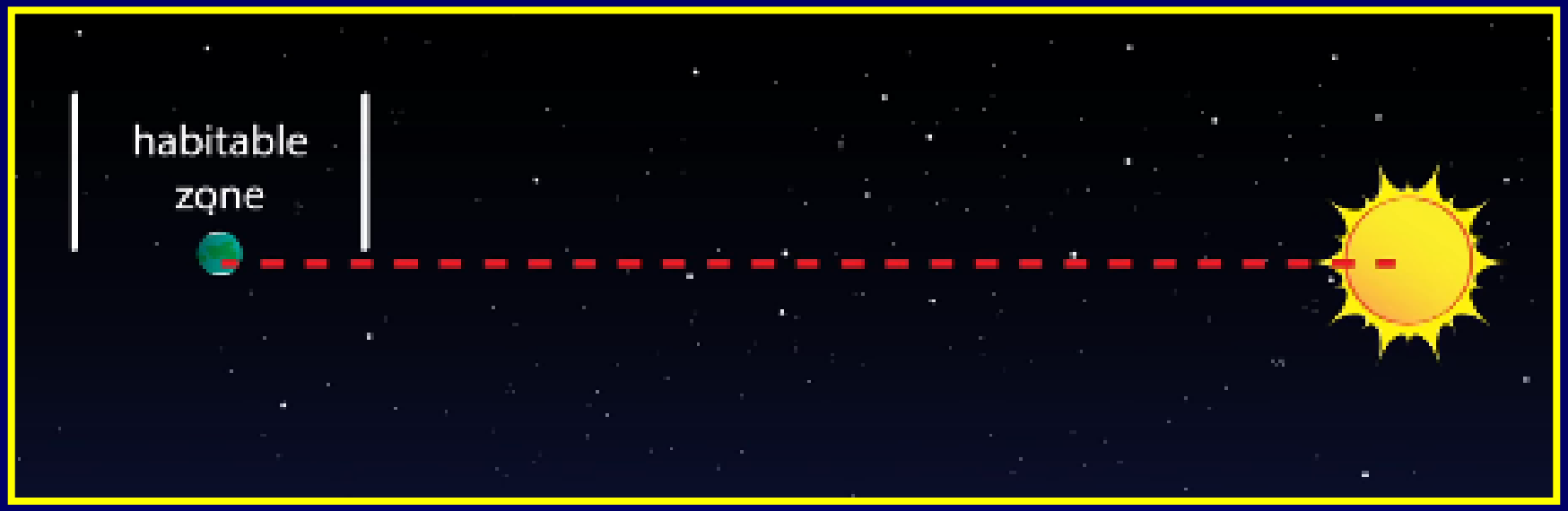
Life on Earth

Earth is the only place where we know life exists. When scientists search for life, they look for planets or moons that have similar conditions to Earth.

They must be the right size so they can maintain an atmosphere.

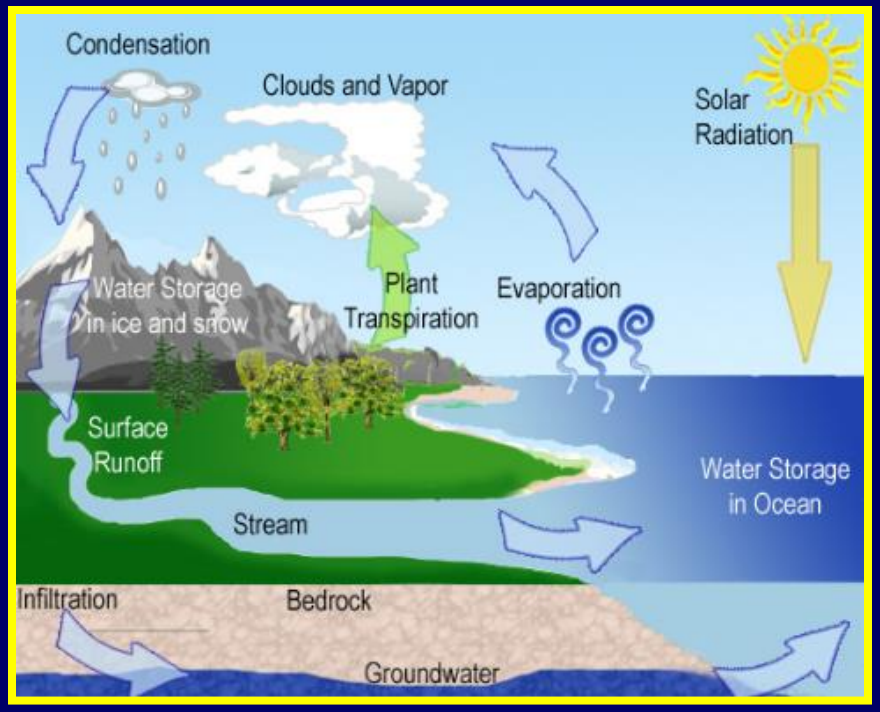
Life on Earth

They also need to be at just the right distance from a star, called the habitable zone.



Water Cycle

The habitable zone has just the right range of temperatures so that water can exist in all three states: solid, liquid, and gas.



Water is an essential ingredient for life and is constantly being recycled through the water cycle.

The End