Out of This World

Discovering what is in space has become very popular with people today.

Space is cold, dark, and very empty. There are stars, planets, moons, asteroids, comets, meteoroids and dust.

People began looking at and studying the sky many years ago. At first they only looked with their eyes, then with telescopes. Today, people can travel to space on space shuttles, and they can send spacecraft to other planets and moons

Astronomy - is the oldest science

- is the study that deals with all materials such as sun, moon, stars, planets, comets, gas, galaxies, dust that are beyond the Earth's atmosphere

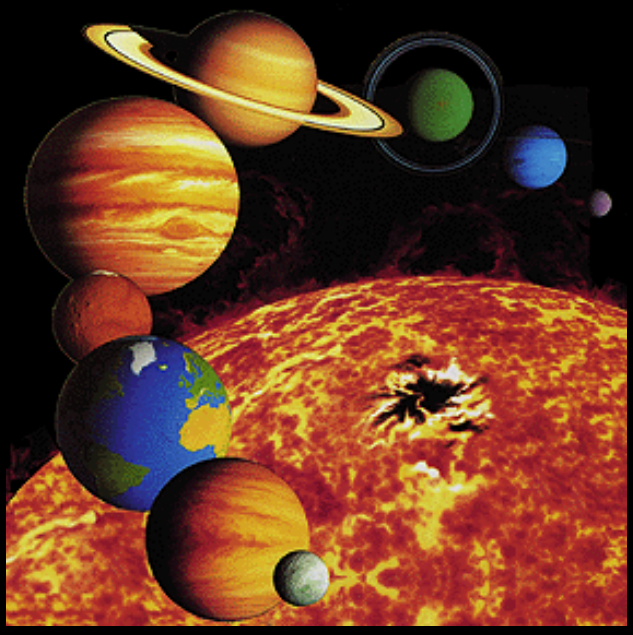
Astronomer: is a person that studies objects in the universe beyond earth.

People have been sky gazing for centuries, noting the regular movements of the sun, moon, planets, and stars.

Early cultures estimated the time of day by the position of the sun in the sky. People from Babylon used a Sundial, which is the oldest known instrument for telling time. The shadow of the sundial correlates with the suns's position in the sky and tells the time of day.

sundials

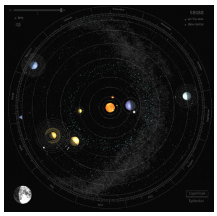
Our solar system consists of the sun and everything that travels around it.



Luminous - means give off its own light. Starts are luminous.

Planets and moons do not emit their own light. They are nonluminous.
We can see them because light from the sun reflects off them.

FUN NOTE:
Everything in the solar system is much closer to earth than the stars.



How Big is the Solar System?

Earth is part of the solar system, which is the family of planets and other, smaller space objects that move around the sun.

The order of the planets starting with the closest to the sun is as follows:

	A way to remember the order
Mercury Smallest in size (4880 km in diameter)	My
Venus - hottest	Very
Earth - has life	Excited
Mars Red planet & 2nd smallest in size (6800 km in diameter)	Mother
Jupiter Largest in size (142 000 km in diameter)	Just
Saturn has rings & 2nd Largest in size (120 000 km in diameter)	Served
Uranus Coldest	Us
Neptune Known as an Ice Giant	Nachos

Exploring Our Solar System: Planets and Space for Kids - FreeSchool - YouTube

Planets differ in their size motion and temperatures.

The furthest away from the sun means that it receives the least amount of sunlight and heat

The Solar System had dozens of moons, including the Earth's moon and thousands of asteroids and meteoroids.

Every year or so new moons are discovered for the outer planets.

- 0 Moons for Mercury.
- 0 Moons for Venus.
- 1 Moon of Earth. Luna.
- 2 Moons of Mars. Deimos. Phobos
- 0 Moons for Dwarf Ceres.
- 67 Moons of Jupiter
- 62 Moons of Saturn
- 27 Moons of Uranus

14 Moons of Neptune

This has changed over the years due to new discoveries.

The sun is the largest object in our solar system (1 392 000 km in diameter)

The moon is the closest object to the earth. It is 348 500km away from Earth.

The Earth is actually 150 000 000 km away from the sun. Knowing this tells us how big the solar system really is.

Fun fact: It takes 8 min 20 seconds for the light of the sun to reach earth.

Fun note: The average travel time to the moon (providing the moon is your intended destination), using current rocket propulsion is approximately three days. The fastest flight to the moon without stopping was achieved by NASA's New Horizons probe when it passed the moon in just 8 hours 35 minutes while en route to Pluto.

According to NASA, a one-way trip to the Red Planet would take about nine months

Planets are made of either rock or gases.

Inner planets (Mercury, Venus, Earth, Mars) made of rock

Outer Planets (Jupiter, Saturn, Uranus, Neptune) made of gas

What We Know About Mercury, Venus & Mars - YouTube

The Fascinating Facts About Jupiter, Saturn & Their Moons | The New Frontier | Spark (youtube.com)

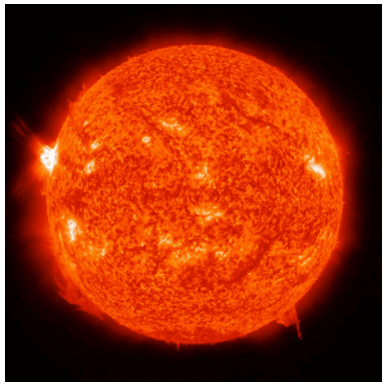
- ALL planets except Mercury have atmosphere

Atmosphere is the thin layer of gases around a planet. The gases are not the same for each planet. For Protection

Earth has an atmosphere that is about **3/4 nitrogen, 1/4 oxygen,** and trace amounts of carbon dioxide and other gases

The Moon has no atmosphere

What is in the Solar System?



Sun - is the center of the solar system

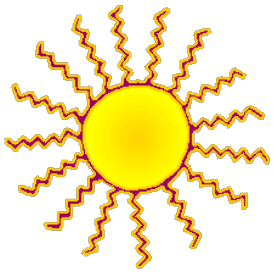
- Earth's main source of heat and energy

-All other things reflect the sun's light

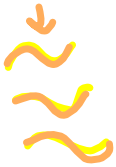
- Closes star to Earth

Comets: One of the most spectacular things to see in the night sky. The center is a chunk of ice, gas and dusk. Usually a few kilometers in diameter. Comets are small compared to stars and planets. They travel far beyond the planets, at the edge of the solar system (Very long orbit around the sun).

When a comet comes close to the sun, the sun's heat causes the gas to start to evaporate from its surface, As the huge cloud of dust and gas starts to grow around it, and a tail of dust starts to spread away from it, Sunlight reflects off the dust and gas particles, making the comet shine. Bright comets visible the naked eye appear about once every 10 - 20 years



solar winds



melting of gas, dust blown away from sun and comet by solar winds forming a tail

*Orbit the sun but takes a very long time to do so

What are comets? (youtube.com)

Meteoroids:

*Are irregular shaped pieces of rock zipping around space. Broken off pieces of a comet. (Smaller orbit than a comet)

* Meteoroids that glow are called Meteors. This happens when a meteoroid falls into the earth's atmosphere, it will bangs ups against particles and this friction will make it heat up and glow leaving a tail of burning gas behind them.

*Orbit the sun but takes a shorter time to do so when compared to a Comet

Meteor Hits Russia Feb 15, 2013 - Event Archive

Definition

Orbit - is a path an object follows

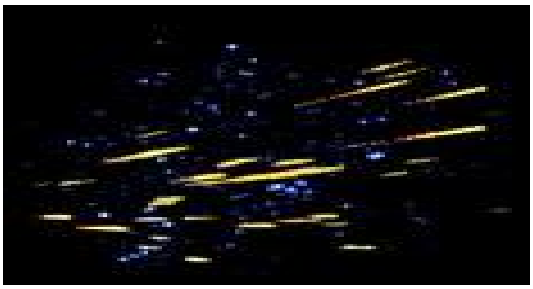
Russian City Hit by Meteor: 1,200 People Hurt - YouTube

During a meteor shower, you may see several streaks of light every minute. The brightest meteors are caused by meteoroids that are only a few centimeters in diameters. The smallest meteoroids are just specks of dusk or pebble-sized. Pieces of rock left behind by a passing comet.

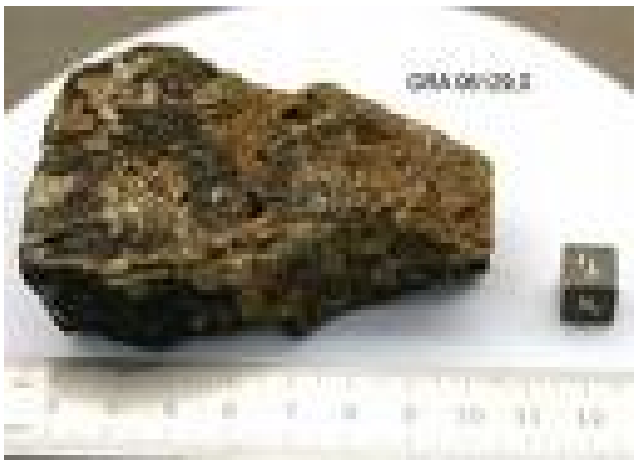

d Meteor Shower 2013

Perseid meteor shower in 2015

A bright streak of light across the sky is a meteor.



http://ca.geocities.com/spacephysicsisu/



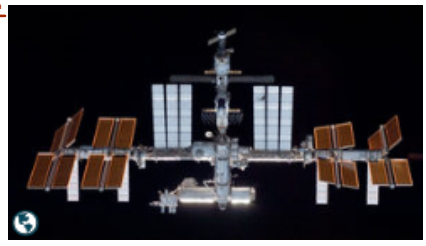
If the meteor hits the earth before vaporizing it is called a meteorite.

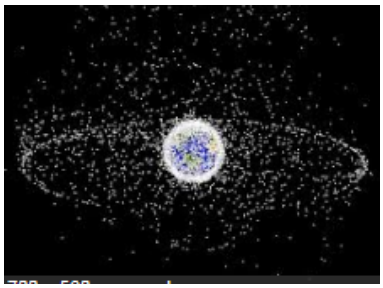
SATELLITES

Are bodies orbiting around a planet

The Moon is earth's natural satellites.

There are man-made or artificial satellites such as the International Space Station.





Reading on how many

How Do We Launch Satellites Into Space? - YouTube

How did the Space Shuttle launch work?

How many satellites are there in Space? (youtube.com)

Asteroids:

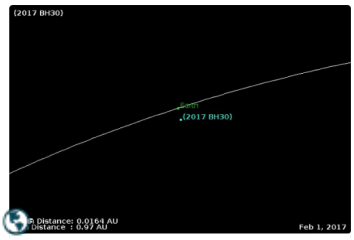
*Similar to meteoroid but MUCH bigger

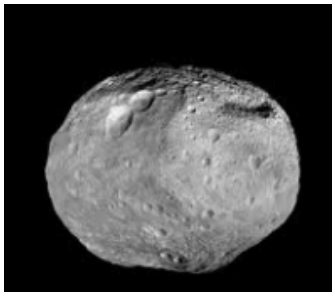
*Thousands of asteroids in solar system

*Known as airless worlds that orbit the sun but too small to be called planets

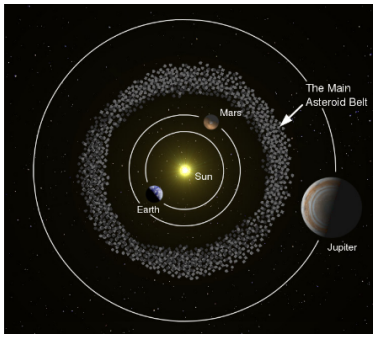
*Asteroid belt is found between Mars and Jupiter

(Has thousands located making a donut shape or belt)





What If an Asteroid Hit Earth in 2024? (youtube.com)



May 14

Theory of How Planets formed

13 min

Cosmology: A Big Bang and the Beginning of the Universe (youtube.com)

1) 13.7 Billion years there was an explosion in space

2) Dust from explosion starting banging into each other causing them to get bigger and bigger.

3) As they got bigger they spun around faster

4) As they spun they began to flatten out and a bulge formed in the center (know as our sun).

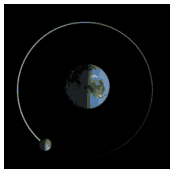
5) The heavy dust particles began to circle closer to the center.(4 inner planets)

6) The lighter gas particles mixed with dust floated past the heavier planets and began to spin around the sun (4 Outer Planets)

7) All left over material of dust and gas formed the comets, meteoroids, and asteroids.

Recall

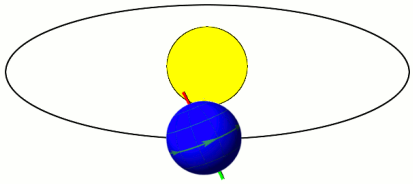
Revolve - means to move an object around an other object



Rotate - means to spin

Earth

- The Earth revolves around the sun, which means it travels in a loop around the sun know as an **orbit**.

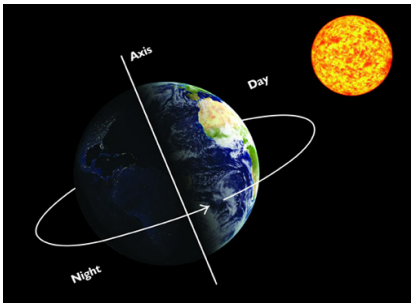


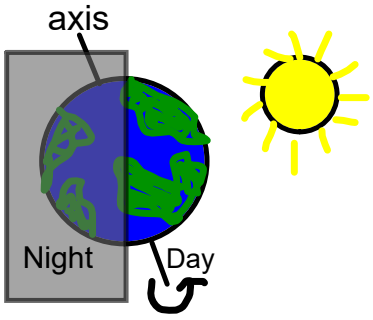
-revolves counter-clockwise

-As Earth revolves around the sun it is also spinning on a **tilted axis**

- An **axis** is an imaginary line from the north pole to the south pole

Reason For Day & Night

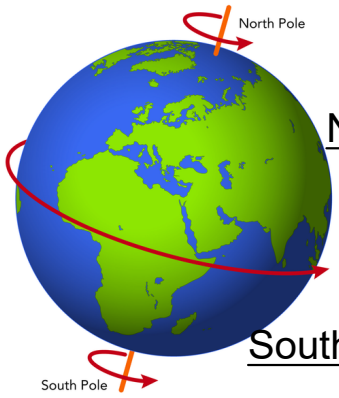




Rotating on axis makes Earth's night and day.

- As the earth spins on its axis only half of the earth is facing the sun at a particular time. This is when we have daylight. The back half is dark which is night.

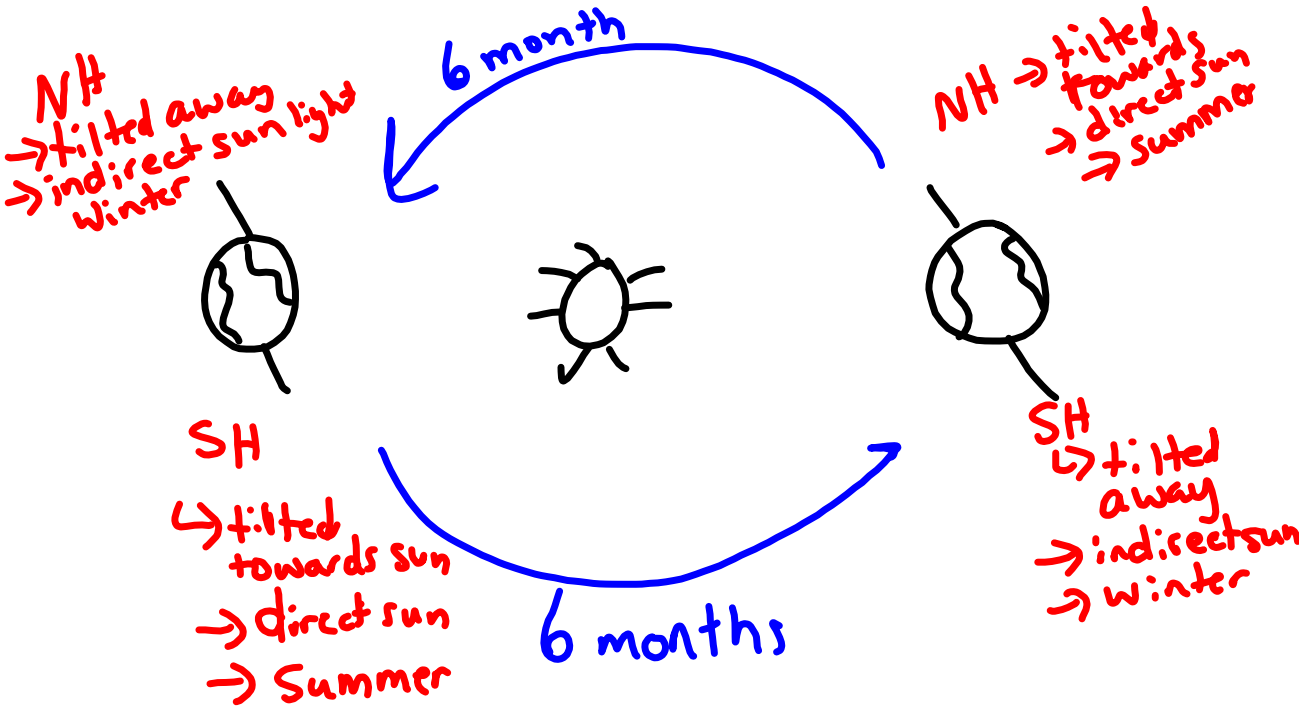
- It takes Earth 24 hours (1 day) to make a complete rotation.



Northern hemisphere (NH) is the top part of Earth

Remember we live on the northern hemisphere

Southern hemisphere (SH) is the bottom part of Earth


NH
→ tilted away
→ indirect sun light
→ winter
6 month
NH → tilted towards
→ direct sun
→ Summer
SH
↳ tilted towards sun
→ direct sun
→ Summer
6 months
SH
↳ tilted away
→ indirect sun
→ winter

STARS

-Stars are large balls of gas that are on fire.

-The closest Star to Earth or any other planet is the sun.

-Luminous

-Stars are very far away and that is why they appear so small.

For instance a rocket that travels 1000 miles an hour would take 450 years to reach the sun just from Pluto.

Constellations- are a group of stars that are grouped together that seems to form a shape/picture

The Moon

The moon is closer to the earth than any other object in the solar system. People have visited the moon.

With the pictures and rocks that the astronauts have brought back from the moon during the Apollo Missions, scientist have been able to study what the moon is like.

The moon's surface is covered with **craters.** Craters are large, shallow holes in the ground on the moon. They are formed by the impact of meteorites smashing into its surface.

An Italian scientist called Galileo Galilei, in 1609, took a closer look at the moon through a telescope. He drew pictures of the things he saw there. He saw an uneven rough surface full of peaks and valleys.

Robert Hooke, an English scientist, wondered how the craters on the moon were made.

There are two ways to form craters to form on earth:

1) Something huge hits the surface of the planet and makes an impact (dent) --> **These are how the moon has craters**

2) Volcanic Craters - when the top of a volcano collapses (NOT on the moon)

Why Does the Moon Have Craters? | NASA Space Place – NASA Science for Kids

Robert Hooke said that the craters on the Moon were from volcanic craters(Proven wrong later). Many scientists agreed with him but could not prove it until they had samples of the Moon or Lunar, rock. In 1969, Astronauts travelled to the moon on the Apollo missions and bought back samples of the rock in and around the Moon's craters.

When the scientist on Earth studied these rocks they realized that some were pieces of meteorites. They then realized that the craters on the moon were caused by this impact. The craters are called Impact Craters.


Astronauts Neil Armstrong, Mike Collins and Buzz Aldrin flew on the Apollo 11 mission. Image Credit: NASA

First People to Walk on the Moon

Apollo 11 blasted off on July 16, 1969. Neil Armstrong, Edwin "Buzz" Aldrin and Michael Collins were the astronauts on Apollo 11.

Four days later, July 20, 1969, Armstrong and Aldrin landed on the moon. They landed on the moon in the Lunar Module. It was called the Eagle. Collins stayed in orbit around the moon. He did experiments and took pictures.

On July 20, 1969, Neil Armstrong became the first human to step on the moon. He and Aldrin walked around for three hours. They did experiments. They picked up bits of moon dirt and rocks.

First Moon Landing 1969

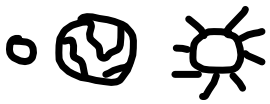
First words as he step onto the moon, "One small step for man, one giant leap for mankind"

Original Recorded Footage Of The Moon Landing Found | NBC Nightly News (youtube.com)

How Does the Moon Affect the Earth?

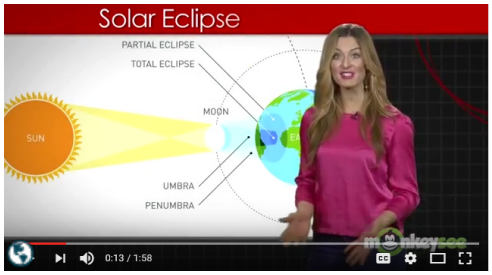
As the Moon and the Earth move in space, they sometimes block each other from the sun's light. When this happens, we see an **eclipse.**

Lunar Eclipse - the Earth blocks the sun's light from reaching the Moon.



total lunar eclipse

Solar Eclipse



Solar Eclipse - the Moon blocks the sun's light from reaching the Earth.

Solar eclipse

Full Solar Eclipse - April 8, 2024

Both solar and lunar eclipses are alike in that one body blocks the sun's light from reaching another body. The shadow of the moon on the Earth in a solar eclipse is very small and only covers a small portion of the Earth, while the shadow of the Earth on the moon in a Lunar eclipse easily covers the whole face of the moon.

Feb. 10, 2017 Lunar Eclipse Pictures

To see a solar eclipse, you have to be on the daylight-facing side of Earth. To see a Lunar Eclipse you can be anywhere on the night-facing side of Earth.

The moon travels around the Earth every 29.5 days BUT we do not have a solar eclipse every month because the plane that the Moon orbits around the Earth is a little tilted, so that the moon is not always perfectly in line with the sun and the Earth. Because of this tilt, the solar eclipses are very rare.

How does the Moon Move?

The Moon is the largest and brightest object in the night sky. The Moon does not give off its own light, it reflects the sun's light.

To us the Moon appears to change shape over the course of several nights. We call these different shapes the phases of the moon.(Look at Page 24 Exploration) 

The Moon, like the Earth, has two kinds of motion.

1) revolves around the Earth in an orbit

2) rotates on its axis.

(It takes the Moon 29.5 Days to make a complete rotation around the Earth). It takes the Moon the same amount of time to make one rotation on its axis.

Attachments

Unit 1 Space Test Outline.notebook

Outer Space Assignment (Research).pdf

Grade 8 Constellation Project.docx