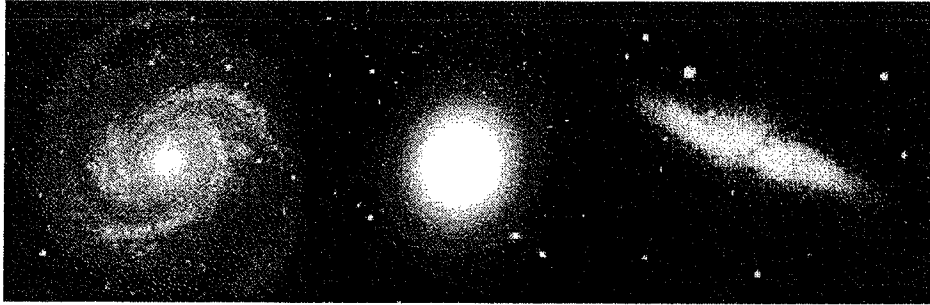


Study Guide- Sky Science
Our Solar System

- Our solar system is made up of planets, satellites and asteroids.
- Our solar system is part of the Milky Way Galaxy
- There are 3 basic shapes to galaxies



Spiral	Elliptical	Irregular
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Layers of the Atmosphere

<p>Troposphere</p> <ul style="list-style-type: none"> • Lowest atmosphere • Goes to 15 km above the Earth's surface • Where weather happens • Clouds happen 	<p>Stratosphere</p> <ul style="list-style-type: none"> • 35 km thick • ozone layer is found here • middle layer
<p>Mesosphere</p> <ul style="list-style-type: none"> • middle layer • 35 km thick • ionosphere starts at the top- where Northern lights occur • radio waves can be bounced off the electrons in the ionosphere making satellite communications possible 	<p>Thermosphere</p> <ul style="list-style-type: none"> • thickest layer – 515 km thick • top layer

The Earth's Moon

- Neil Armstrong became the first person on the moon on July 20, 1969
- The lunar surface contains **maria, craters, and mountains**
- **Maria** are lunar basins or seas. They are broad and smooth plains. They were formed from hardened lava.
- **Craters** are impressions on the moon's surface. They are round with rugged rims. They are formed when meteorites impact upon the moon's surface.
- **Mountains** are mountains on the moon. The tallest mountain is 1 930 meters tall.
- Impacts from meteorites break up the moon's rock into a fine dust which covers the moon's surface.
- The moon is Earth's satellite- it travels around the Earth
- The moon is 4 times as small as the Earth.
- The moon has a weak gravitational pull and has lost its atmosphere.
- Life cannot exist on the moon. It has no surface water or air.
- The moon has no weather
- The temperature for the side of the moon that faces the Sun can rise to over 250oF (121oC). At night the moon loses that heat and temperature drops to -260oF or (-162oC)
- The moon reflects the light of the Sun
- The moon always keeps the same side facing the Earth
- The period of rotation and period of revolution are both 27 days.

PHASES OF THE MOON

- The Moon rotates on its axis every 27 1/3 days.
- The Moon revolves around the Earth every 27 1/3 days.
- New Moon means no moon. The Moon is between the Earth and the Sun.
- The new Moon rises at sunrise, is highest in the sky at noon, and sets at sunset. No lunar surfaces are visible.
- The first quarter Moon rises at noon, is highest in the sky at sunset, and sets at midnight.
- The full Moon has the Earth between the Sun and the Moon.
- The full Moon rises at sunset, is highest in the sky at midnight, and sets at sunrise. During a full Moon, the maria (light areas) and the craters (the dark areas) are easy to see.
- The last quarter (3rd quarter), the position of the Sun, Moon, Earth is as follows:
- During the last quarter, the Moon rises at midnight, is highest in the sky at sunrise, and sets at noon.
- During the quarter and crescent phases, the craters and mountains cast shadows and become very visible.

Planets

The order of the planets, from the Sun out are:

Mercury

Venus

Earth

Mars

Jupiter

Saturn

Uranus

Neptune

Pluto

(My Very Excellent Mother Just Sent Us Nine Pizzas)

The Inner Planets are Mercury, Venus, Earth, Mars. They are called the Rocky planets. The outer planets are Jupiter, Saturn, Uranus, Neptune, Pluto. They are the Gas planets. The inner and outer planets are separated by the asteroid belt between Mars and Jupiter.

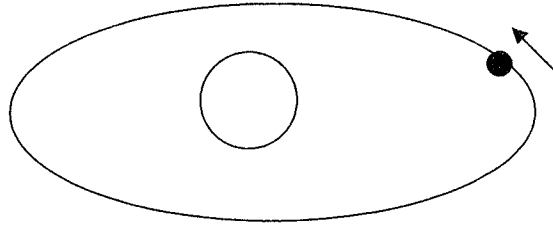
Category	Sun	Mercury	Venus	Earth	Mars	Jupiter	Saturn	Uranus	Neptune	Pluto
Distance from Sun (Millions of Km)		57.9	108.2	149.6	227.9	778.3	1 427	2 871	4 497	5 913
Period of revolution		88 days	224 days	365 days	687 days	12 years	29 years	84 years	165 years	248 years
Diameter (km)	1.39 million	4880	12 100	12 756	6 786	143 200	120000	51 800	49 528	2330
Atmosphere	Hydrogen Helium	Virtualy none	Carbon Dioxide	Nitrogen Oxygen	Carbon Dioxide	Hydrogen Helium	Hydrogen Helium Methane	Hydrogen Helium	Hydrogen Helium	Methane ?
Moons		0	0	1	2	16	18+ (?)	15	8	1
Rings		0	0	0	0	1	1 000 (?)	11 (?)	4	0
Rotation Period	26.8 days	58.9 days	243 days	24 hours	24 hours	10 hours	10 hours 40 min.	17 hours.	16 hours	6 days 9hours

Moons of other planets have similarities and differences to our own Moon.

Similarities	Differences
Are called satellites	Some are different shapes- not all are spherical (circle shaped)
Orbit around the planet	Some are made up of different materials
	Some are different weight and mass

The Sun

- Our sun is a yellow dwarf star which means that it is relatively young. It is about 5 billion years old.
- The sun provides the Earth with heat and light.
- We orbit the sun in an elliptical orbit counterclockwise



- The Sun's temperature is about 31 350 000 ° C.
- Viewing the sun directly is very dangerous. Telescopes and probes help us to view the sun indirectly and safely.

The Seasons

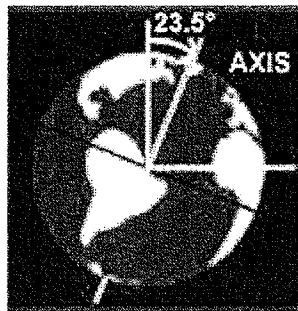
There are 4 main seasons in the Northern Hemisphere

Season	Date it begins	Tilt	Rays
Summer	June 21	Northern hemisphere towards the sun	Direct Not slanted Warm
Fall	September 21	Neither tilted towards or away from the sun	Neither direct nor indirect rays
Winter	December 21	Northern hemisphere tilted away from the Sun	Indirect rays Slanted Not as warm
Spring	March 21	Neither tilted towards or away from the sun	Neither direct nor indirect rays

- March 21(1st day of Spring) and September 21 (1st day of Fall) are **equinoxes**.
On those dates, there are 12 hours of sunlight and 12 hours of night.
- June 21 (1st day of summer) and December 21 (1st day of Winter) are solstices.
On June 21 we have the longest day of sunlight and the shortest night.
On December 21, we have the shortest day of sunlight and the longest night.
- The Southern Hemisphere has the opposite seasons that we do.

Northern Hemisphere	Southern Hemisphere
Summer	Winter
Fall	Spring
Winter	Summer
Spring	Fall

- We have seasons because of the tilt of the Earth on its axis and the revolution of the axis around the Sun.
 - The Earth takes 365 days to revolve around the Sun and complete all 4 seasons.

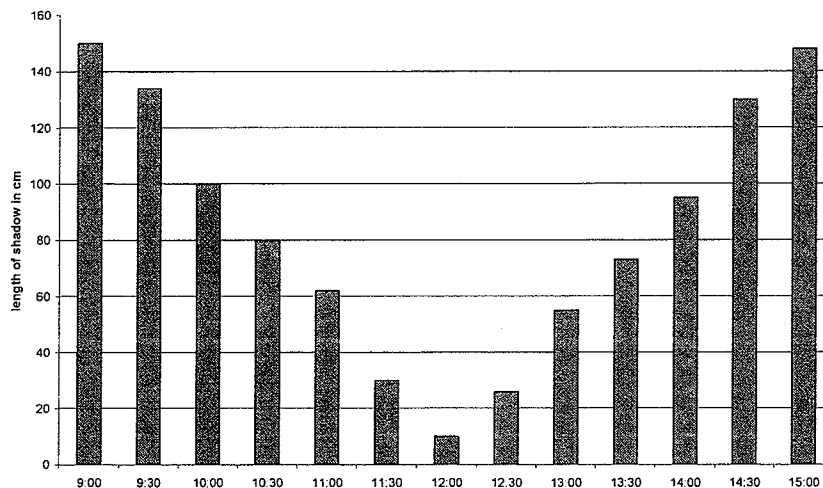


Day and Night

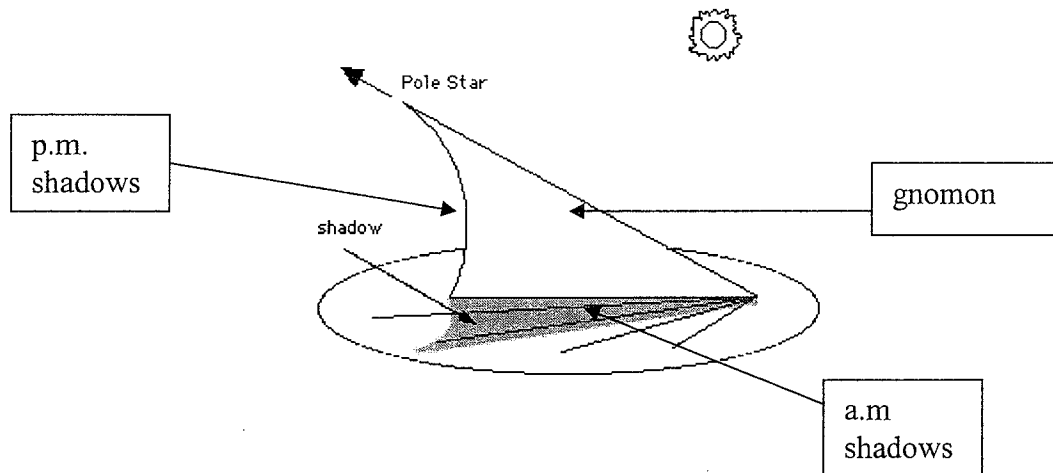
- Day and night occur on Earth because of the rotation of the Earth on its axis.
- The Earth takes 24 hours to rotate.
- The Earth rotates counterclockwise from West to East. This causes the Sun to look like it rises in the East and sets in the West.
- Only ½ of the Earth is facing the Sun at a time.

Sun Shadow on June 05

Sun shadows



- The sun's shadows are longest during the summer and shortest during the winter.
- You can tell the time of the day in the summer time by looking at the position of the sun the sky and the position of the shadow on the ground.
- If the sun is directly above you, it is around noon.
- A sundial can be used to tell the time. It casts a shadow on the ground that can be used to judge what time it is. When the shadow line up with the gnomon, it is noon.



Stars and Constellations

- Our nearest star is the Sun
- There are millions of stars in our Solar System
- Stars can be beginning their life cycle, in the middle of their life cycle, or ending their life cycle.
- A constellation is a group of stars that form a pattern in the sky.
- **Polaris** is the North Star. It is in the constellation the little dipper (Ursa Minor) over the North Pole.
- All other constellations in the Northern hemisphere seem to rotate around Polaris.

Space Exploration

- We use different technology to explore space.
- Telescopes are used to view space from Earth
- The Hubble telescope sends back pictures from outer space.
- A satellite is something that orbits another object in space.

	Earth Sensing Satellites	Space Sensing satellites	Communication Satellites	Navigation Satellites
What they do	Sensors study different places on Earth	Above the Earth's atmosphere to study space clearly	Send radio signals from one place on Earth to another	Help guide ships and planes by listening to the signals sent
Examples	Weather satellites	Solar Maximum satellite	Intelsat	Navstar

- Space probes are robots that are sent out into space to study it.
- *Voyager 1* and *Voyager 2* are famous probe that have been sent out to study our planets.
- Humans are sent into space on shuttle missions and study space from the international space station