Grade 6A & 6C: Science

Name: _____ _ **Date:** - _j_ _j_ - - _(dd/mm/yyyy)

Topic C: Sky Science

Overview:
Students learn about objects in the day and night sky. Through direct observation and research, students learn about the motions and characteristics of stars, moons and planets. Using simple materials, such as balls and beads, students create models and diagrams which they use to explore the relative position and motion of objects in space. As a result of these studies, students move from a simple view of land and sky, to one that recognizes Earth as a sphere in motion within a larger universe. With new understanding, students revisit the topics of seasonal cycles, phases of the Moon and the apparent motion of stars.

General Learner Expectations
Students will:
6-7: *Observe, describe and interpret the movement of abjects in the sky; and identify pattern and order in these movements.*

Classroom assessment is divided into three types: assessment/or learning (Diagnostic Assessment: **0),** assessment *of* learning (Summative Assessment: S), assessment *as* learning (F).

Lesson #	Curriculum Specific Learner Exuectations	Lesson (s) Tittle	Agenda**	Done
1		Introductory Activities	o WS: KWEL chart **(D)** o Activity: Sky Detective Folder **(F)** An Islamic Perspective: Sky Science o Sky Science PowerPoint Interactive PowerPoint notes	
2	1	Emit vs. Reflected Light	o Activity: Starlight, Moonlight **(F)**	
3	2	Moving through the night sky	o Activity: Shining Students Role play (Master 4) **(F)**	
4	3 and 4	Earth's rotation	o Activity: Pinhole Camera (F) o Activity: Casting Shadows (Master #9a and #9b) **(F)**	
5	5	A device that uses a shadow to tell the time!	o Activity: Sundials (Master IIC) **(F)**	
6	**6**	Seasonal Changes	o Activity: The reasons for the seasons (Master 12a, 12b, and 12c) **(F)**	
7	7 and 8	Moon's Phase	o Activity: OREO Cookie Moon Phases **(F)** o Activitv: The changing moon (Master 14. 15, 16a and 17) **(F)**	
8	9	our Solar System	o Activity: Exploring the Planets (Master 19 and 20) **(Fl**	
9	10	The other planets	o Activitv: Satellites (Master 22) **(Fl**	
10	11	Knowledge about plants	o Activity: Time line **(Fl**	
11	12	Exploring our galaxies	o Demonstration: Spiral Galaxies **(Fl**	
12		Unit Tasks:	D **Task: (S)** Mind Map (Study Questions): Sky Science What's in the News? Unit Project: Solar System Trading Card Sky Science Unit Portfolio Reflection on Learning: KWEL, 1Can Statement, How Did You Do? and Field Trip	

**If the class work is not completed during class time, must be done for homework.

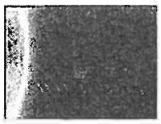
I have read and went over this *"Sky Science- Unit Plan"* with my child. JazakAllahu khayran

_____ Parent/Guardian name (print)

_____ Parent/Guardian signature

_j _j ____ (dd/mm/yyyy)

Grade 6A & 6C: Science



Topic C: Sky Science

K What We Think We Know	L What We Learned	E What Evidence We Have	W What We Still Wonder

- Glossary -

Altitude:	The distance a heavenly body appears above the horizon as measured in degrees.
Annual Motion:	The Earth's orbital motion around the Sun every year.
Asteroid Belt:	The area between the inner and outer planets that is filled with asteroids.
Asteroids:	Chunks of rock that vary in size from very large (approximately 1030 km in diameter) to quite small. They orbit the sun between the orbits of Mars and Jupiter. About 3000 asteroids have been discovered.
Asterism:	Stars that form patterns but are generally smaller than or part of a constellation. The Big Dipper is an asterism and forms part of the constellation Ursa Major.
Astronomy:	The study of the Universe and all of the bodies that appear in the skies.
Atmosphere:	A layer of air between the Earth and outer space.
Axis:	A straight line that an object or body rotates, or seems to rotate around.
Binary Stars:	When two relatively close stars revolve around each other, often appearing as single stars because they are so far away from the Earth.
Black Hole:	An intense gravitational field created when a star runs out of fuel and collapses. Nothing, not even light can escape its pull.
Blue Moon:	The second full moon in the same calendar month.
Calibrate:	To determine, check or adjust a scale of any measuring instrument.
Celestial Equator:	An imaginary line in the sky directly above the Earth's equator.
Celestial Hemisphere:	The heavens surrounding the Earth, split into two parts directly above the Earth's equator, can be identified as the northern and southern celestial hemispheres.
Celestial Sphere:	The heavens surrounding the Earth.

Comet:	A large ball of ice, dust, rock and gas that orbits the Sun, circling the dark edges of the Solar System.
Constellations:	Bright stars grouped according to the patterns they make in the sky (such as Orion or Ursa major). There are 88 constellations or star clusters that cover the sky; many of their names coming from characters in ancient mythology.
Copernicus, Nicolaus (14 3-1543):	A Polish scientist who was the first to re-introduce the idea originally stated by some radical Greek philosophers 2000 years earlier, that the Sun and not the Earth, was the center of the solar system.
Crater:	A hole created on the surface of an object or body, made by falling meteorites or by erupting volcanoes.
Emit:	To send or give out.
Eclipse:	Of two types, solar and lunar. A solar eclipse is when the moon passes in front of the Sun, covering the Sun's disk, either partially or totally. A lunar eclipse is when the full moon passes through the Earth's shadow, and sunlight is prevented from falling onto the moon's surface. From Earth, The moon appears to grow dark.
Ecliptic:	The apparent great-circle annual path of the Sun, as seen from the Earth. It is called the ***ecliptic*** because eclipses occur only when the moon is on or near this path.
Equator:	An imaginary circle around the centre of the Earth, perpendicular to the axis of rotation.
Equinox:	During the Sun's annual path in the sky it crosses the celestial equator at two points - the equinox points. On these two days on or about March 21, September 23, of every year, the day is divided between twelve hours of sunlight and twelve hours of darkness.
Galaxy:	A spiral island of stars in space. Our galaxy is called the Milky Way.
Gibbous:	A phase in the Moon's cycle when more than half of the moon, but not the entire face of the Moon, is illuminated.
Gravity:	A force that attracts and holds the universe together. It gives objects weight.

Hemispheres: Either the north or the south half of the Earth divided by the equator, or the east or west half divided by the prime meridian.

Inner Planets: The four hard rocky planets - Mercury, Venus, Earth, Mars - closest to the Sun.

Latitude: The distance of a point on the Earth's surface north or south of the equator, measured in degrees. For example, Edmonton's latitude is 53.5° North. The latitude of the Canada - USA border in western Canada is 49° North.

Light Year: The distance light travels in a year. This unit is used to measure distances in space. One light year is about 9.5 trillion km.

Longitude: This distance of a point on the Earth's surface measured parallel to the equator west from the 0° Greenwich Meridian. Edmonton's longitude is 113.4° west.

Lunar Eclipse: When the moon moves into the Earth's shadow, preventing sunlight from falling onto the moon's surface.

Lunar Month: The time it taJces the moon (27 1/3 days) to go around the Earth.

Lustre: Sheen or shine.

Magnitude: A six class scale used to measure the brightness of stars. The brightest stars in the sky are of the 1st magnitude; the faintest ones are of the 6th magnitude.

Meteor: When a meteoroid enters the Earth's atmosphere, creating a bright streak of light, it is called a meteor or a shooting star.

Meteorite: Larger meteors that fall to the surface of the Earth.

Meteoroids: These rocks, usually not much bigger than grains of sand, may have been swept off asteroids and comets. They also orbit the Sun, sometimes entering the Earth's atmosphere.

Midnight Sun: On June 21st from a point on the ***Arctic Circle,*** the Sun will appear to descend into the north-west, but instead of setting it will appear to skim the northern horizon and rise up again in the north-east. This never-setting sun known as the *Midnight Sun.* The further north you go the more days of Midnight Sun you experience during the year.

Moon: The name of the satellite that orbits the Earth.

Moon Phases: A cycle in which the Moon appears in different forms as it orbits the Earth.

Orbit: The path of a planet or other heavenly body as it revolves around another body in space.

Outer Planets: The four giant, gaseous planets - Jupiter, Saturn, Uranus, Neptune - that orbit the Sun.

Planets: Large bodies that can only be seen by reflected light, as they revolve around the sun. The word planet comes from the Greek word wanderer.

Pole Star: A bright star, also known as North Star or Polaris, that appears in the sky in the northern hemisphere. A useful bench mark as it always stays in the same position in the northern sky.

Revolution: The motion of a planet along its orbit around the Sun. For example, the Earth takes one year to "revolve" around the Sun.

Rotation: The motion of a planet satellite, or the Sun around its north-south axis. It takes 24 hours for the Earth to rotate once on its axis.

Satellite: A man made or heavenly body (Moon) that orbits around a larger object.

Solar Eclipse: When the Moon passes in front of the Sun, partially or totally covering it.

Solar Noon: The time of the day when the Sun casts its shortest shadow and shadows face true north.

Solar System: The Sun and all of the bodies - planets, satellites, asteroids, comets, etc. that orbit around it.

Solstices: Once a year the Sun reaches it highest and lowest points in the sky at noon. In the northern hemisphere, the lowest point and least number of daylight hours takes place on or about December 21st. It reaches its highest point and greatest number of daylight hours on or about June 21st. In the Southern Hemisphere the dates are reversed.

Star:	A gaseous body that produces its own energy, releasing it as light and heat.
Stellar Astronomy:	The study of the stars.
Sublimate:	To tum directly from a solid into a gas.
Sun:	The closest star to the Earth, measuring more than a million kilometers across.
Sundial:	A device that uses shadow to tell time.
Texture:	The surface look or feel of something.
Universe:	Everything that exists: the Earth, the Sun, the Moon, satellites, stars, asteroids, all the galaxies and the space in between them.
Waning Moon:	When the Moon grows gradually more illuminated when passing from new to full moon.
Waxing Moon:	When the Moon grows gradualy more illuminated when passing from new to full moon.
Year:	The time it takes for a planet to go all the way around the Sun i.e., on Earth a year is 365 days. One year on Uranus is 84 earth years.

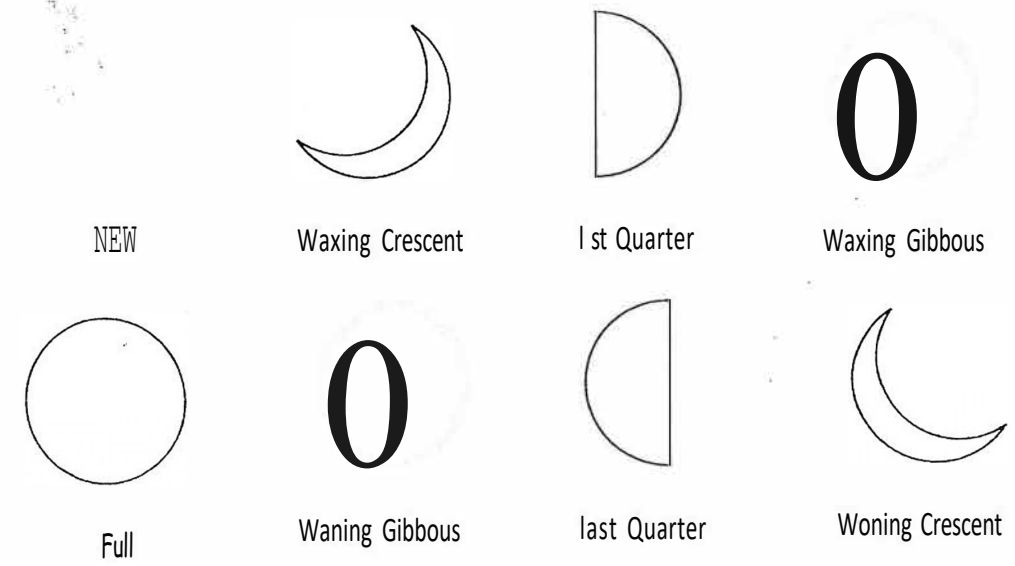
Name: ----------

Mastcr#t

Date: _____

Moon Recording Sheet

Phases ·of the ·moon:



Date and Time Observation	Phase of Moon	Date and Time Observation	Phase of Moon

Sky Science Notes

OBJECTS IN SPACE THAT EM/TLIGHT:	OBJECTS IN SPACE THAT *REFLECT* LIGHT:
-Sun -Other Stars -Galaxies -Emission Nebulae -Meteors in Earth's Atmosphere -Aurora Borealis	-Comets -Planets -Asteroids and meteoroids in SPACE -Moons or natural satellites -Artificial satellites

A LITTLE ABOUT A LOT

SUN: Did you know the sun is a GIANT STAR. It is the center of our solar system. It emits light when hydrogen is converted to helium through something called nuclear fusion reaction. It won't burn out until 4-5 BILLION years from now.

STARS: They are heat sources in the universe and come in all sorts of sizes and temperatures. Some last only millions of years while other last billions. The closest star to earth is the Proxima Centauri. It's 4 light years away. A Light year is the distance light travels in a year. (300 000km/sec) Light can travel around the world 7 and a half times in ONE SECOND!

GALAXIES: Are made of billions of stars. These stars, when grouped together can EMIT an enormous amount of light. Our sun is one of about 200 billion stars in our galaxy, which is called the MILKY WAY.

EMISSION NEBULAE: They are clouds of dust and gases. Some are pieces of a star after it exploded others can be star nurseries, where stars are born.

METEORS: THEY ARE KNOWN AS SHOOTING STARS. They Are meteoroids that burn up after enter earth atmosphere from outer space. Usually, they burn up and never reach earth.

AURORA BOREALIS: (Northern lights) Particles of solar wind collide with atoms of gas in the atmosphere.

COMETS: They are made of rock, dust, and ice. As it moves closer to the sun it begins to melt making a gas vapour trail. (looks like a tail) It is this vapours that REFLECTS the light from the sun.

PLANETS: Are big bodies in the sky made up of solids, liquids, and gases. Some of the planets can be seen from earth because they reflect the light of the sun.

ASTEROIDS and METEROIDS in space: are pieces of rock and metal found in outer space. Asteroids orbit the sun and are bigger than meteoroids. BUT both reflect the sun.

MOONS OR NATURAL SATELLITES: There are many planets, like ours, that have natural satellites. They are seen because the sun reflects off their surface.

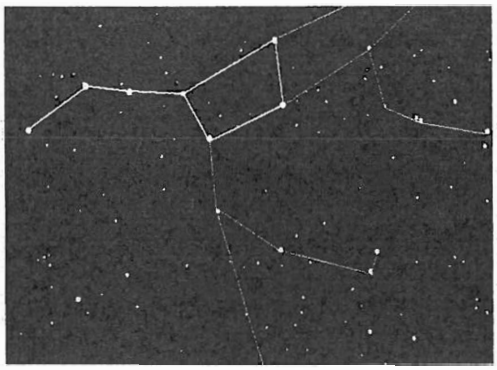
ARTIFICAL SATELLITES: Are objects sent into orbit, like the Hubble space telescope.

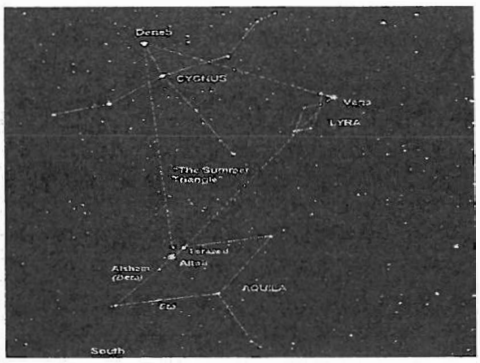
Constellations and asterisms

There are 88 recognized constellations. (International Astronomical Union) There are many unofficial star groups called asterisms.

ASTERISMS: Create patterns, like constellations, however they can be a small part of a bigger picture-constellation. The Big Dipper is really an asterism of the bigger Ursa Major (Great Bear) constellation.

OR it could contain stars from 2 or more different constellations like the summer triangle which contains three bright stars from three different constellations-Cygnus the swan, Aquila the eagle, and Lyra the Harp.





Constellations and asterisms are useful markers in the sky. If I wanted you to find a new star I discovered that is by the Ursa Major then I can direct you to find the Big Dipper first.

The patterns stars make on earth wouldn't be visible in space because those stars are actually REALLY FAR away from each other. (Light years)

Stars can only be seen in the night because the sun's light is too bright during the day. At night, you can only see the stars that are in the part of the sky that is away from the sun.

Stars appear to move across the night sky. They move east to west because the Earth is rotating. So the sky isn't moving the earth is.

Circumpolar constellations can be seen all year long. They circle around a single point. (the point is the Polaris-North star) Ursa Major, Ursa Minor, and Cassiopia are all circumpolar constellations.

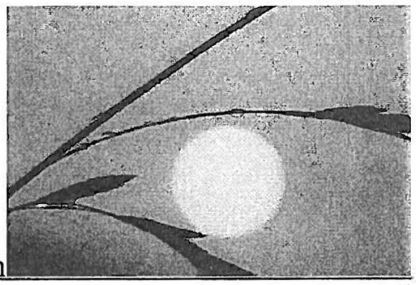
Stars appear to move across the night sky. EXCEPT FOR ONE: THE POLARIS

The POLARIS: Also known as the Northern Star. (Because it's found in the North, so it can't be seen in the Southern Hemisphere) It does NOT move so it can be used for navigation

Draw the next two slides:

Stars appear to move across the night sky. They move east to west because the Earth is rotating. So the sky isn't moving the earth is. The stars, sun, and moon all appear to rise and set everyday.

The earth rotates in a counter-clockwise manner, giving the illusion of the sun rising in the east and setting in the west.

The Sun 

The earth rotates in a counter clockwise manner, giving the illusion of the sun rising in the east and setting in the west.

Depending on the time of day the sun can be seen at different heights in the sky.

SAFELY VIEWING THE SUN

If you look at the sun for a short time it can cause burns to the retina. (YOUR EYEBALL) Even worse these burns don't hurt, instead they appear as white spots in your field of vision. The earth's atmosphere reduces the rays but does not eliminate them. EVEN SCIENTISTS have to use special glasses to study the sun.

Name two ways you could safely view the sun:

1.
2.

REASONSFORTHESEAONS

There are seasons because the earth is tilted on an axis and revolves around the sun. What does this mean?

Earth's axis is tilted _____ degrees.

It takes the earth _____ to revolve around the sun

Since the axis is tilted _____ of the earth are turned toward the sun at of the year

Northern hemisphere is tilted toward the sun during the

In Canada, summer is warmer than winter because Canada gets more DIRECT sunlight during summer. The sun is warmer when it is directly overhead. Think of the hottest time of the day during summer, where is the sun?

The days are longer during summer because the sun is angled more directly onto Canada warming the earth(ground) much longer. The days in the winter are shorter

PHASES OF THE MOON

As the moon orbits earth you can see parts of the moon that are lit up by the sun. These are called the PHASES OF THE MOON. On Earth, you never see the whole moon because only one side faces earth at all times. As the moon moves in its orbit, you gradually see more of its sunlight.

PHASES OF THE MOON

L	2.	3:	4:
5:	6:	7:	8:

AND REPEAT

PLANETS IN OUR SOLAR SYSTEM

-+The solar system is the sun and all of it's bodies (planets, stars, comets, asteroids, meteoroids, dust and bits of rock)

-+The main bodies are the planets, an asteroid belt, and five dwarf planets.

-+PLANETS: are made up of rocks, gases, or both. They all orbit the sun. The 4 closest to the sun are called the "inner planets" They are small, and rocky.

MERCURY:	**VENUS:**	**EARTH:**	
♦ Is the smallest planet in our solar system. ♦ Closest to the sun ♦ Small rocky and covered with craters (like our moon) ♦ It has very little atmosphere ♦ No moons	♦ Second from the sun ♦ Small and rocky ♦ No moons ♦ Thick atmosphere made up of CO2 (carbon dioxide) ♦ Several miles of thick sulfuric acid clouds that cover the planet ♦ Hottest planet in the solar system ♦ Temperature reach over 465 degrees Celsius ♦ No chance of life on Venus	♦ Third planet from the sun ♦ A consistent flow of heat and light from sun heating the atmosphere ♦ Small and rocky ♦ Surface of rock and water ♦ Only planet to support life ♦ One moon	♦ Fourth planet from the sun ♦ Icecaps on both of its poles ♦ Many strong wind and dust storms in atmosphere ♦ Surface is covered in iron-rich dust (red appearance) ♦ 2 little moons very close to the surface

ASTEROID BELT:

This is found between the inner planets and the outer planets. It is a compilation of rocks, ices and metal. Some scientist believes these pieces are parts left over from the originally formation of our solar system. The asteroid belt also orbits the sun, just like the other planets.

The Outer Planets:

They are also referred to as the GAS GIANTS. They are much larger then the inner planets and are mostly made up of gases.

Jupiter:	SATURN:	Uranus:	Neptune:
♦ Fifth planet from the sun ♦ Largest of the planets ♦ 90% hydrogen ♦ 10% helium ♦ lOOOX bigger than Earth ♦ Has a great RED spot, thought to be a storm ♦ Because of it's size it has a huge gravitation pull, attracting small bodies from space into it's orbit. ♦ 63 moons (maybe more)	♦ Sixth planet from the sun ♦ Second largest planet ♦ Made up of materials are lighter than water ♦ 75% hydrogen ♦ 25% helium ♦ Most rings are frozen water but some are rocks covered in ice ♦ 61 moons	♦ Seventh planet from the sun ♦ Third largest planet ♦ Consists of rock and ice ♦ Atmosphere has hydrogen and some helium ♦ Tilted sideways ♦ 27 moons	♦ Eighth planet ♦ Sometimes it's orbit crosses over with Pluto's ♦ Inner core of ice and rocks (Scientists think) ♦ Blue colour comes from the methane gas in atmosphere ♦ Winds are fastest in the solar system(2000km/h) ♦ 13 moons

Dwarf Planets:

-+There are other bodies in the solar system, like former planet Pluto, that cannot be called planets because the are too small. However, they aren't asteroids because they are too big.

-+There are five known Dwarf Planets: Ceres, Pluto, Makemake, Eris, and Haumea.

Pluto is the largest of the Dwarfs.

The Moons of Our Solar System:

PLANET	# of MOONS
Mercury and Venus	
Earth	
Mars	
Jupiter	
Saturn	
Uranus	
Neptune	

Il.112itec'smoans;	Mar's moans.	Earth'smoan;	Saturn'smoans;	I\le12tune'smoans;
lo: Volcanic activity, volcanic plumes can reach S00KM above the surface Callisto: had an ice layer and many craters caused by comets and asteroids crashing into it Europa: has a thick layer of ice with cracks in it. Appears to have dark lines in it which are the cracks. Ganymede: The Largest moon in the solar system, larger than Mercury and Pluto. Made up of silicate rock and ice.	Phobos: Made up of carbon rich rock and ice, many craters, and is shaped like a potato Deimos: Made up of carbon rich rock and ice, many craters	rocky, dusty, and has no atmosphere	Titan: Largest moon of Saturn (larger than Mercury but not larger than Ganymede), atmosphere made up of nitrogen and methane gas, body made up of ice and rock material lapetus: Furthest moon of Saturn's, one side dark and other side bright	Triton: Orbit is the reverse of other moons; outer layer is frozen nitrogen with many geysers that are thought to be erupting nitrogen and inner core is a rocky metal.

Technology in Space

+optical telescopes are used on earth to see a variety of objects in space like planets, stars, moons and so on. Sometimes they are so big they are put in observatories so that scientist can observe far off galaxies, stars, and nebulae.	.+Space telescopes are used IN SPACE (Hubble) they orbit Earth and their view isn't interfered with by air and atmosphere.	Radio telescope: don't use pictures and sight. They use radios waves to collect data, which is then sent to a computer. Then the computer composes pictures.

Most of what is known about space is due to space exploration using ROCKETS. The first rocket was liquid fueled in 1926. However, now rockets are power by the sun (Solar powered) like the ion rocket.

Space Probes:	**Orbital Spacecraft:**	Space Shuttles	Space stations	**Landers:**
are robots used to gather information from moons and other planets. They leave earth's orbit and sometime return back to earth with the information. Example: Voyageur and Pioneer	*A* SATILLITE! They orbit Earth or other planets. Weather satellites and International Space Station are some examples.	are just like orbital spacecrafts.	act like orbital spacecrafts but have living quarters in them.	Just like they sound, they land on other planets or moons. Example: the Mars rover. They collect data on rocks, soil. Mars rover studied these things to see if there was once water on the planet.

Where do I live?

- D House/Apartments number
- D Street Address
- D City
- D Province
- D Country
- D Continent
- D Planet
- D Solar System
- D Galaxy
- ☐ Universe

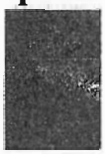
The universe is so big it is believed on go on forever. We know that in space things are not usually measured in kilometers they are measured in light years. What is the only thing NOT usually measured in LY? Earth to Moon

BIG BANG

Big Bang Theory is one of theory as to how the universe started. It says the universe was created 13 billion years ago by a big explosion. After the explosion galaxies of stars started to appear pulling inwards and outwards.

EXTRA NOTES:

An Islamic Perspective: Sky Science



CREATION OF THE UNIVERSE: 'THE BIG BANG'

The creation of the universe is explained by astrophysicists in a widely accepted phenomenon, popularly known as the 'Big Bang'. It is supported by observational and experimental data gathered by astronomers and astrophysicists for decades. According to the 'Big Bang', the whole universe was initially one big mass (Primary Nebula). Then there was a 'Big Bang' {Secondary Separation) which resulted in the formation of Galaxies. These then divided to form stars, planets, the sun, the moon, etc. The origin of the universe was unique and the probability of it occurring by 'chance' is zero.

The Quran contains the following verse, regarding the origin of the universe: **"Do not the Unbelievers see That the heavens and the earth Were joined together (as one Unit of Creation), before We clove them asunder?"** [Al-Quran 21 :30)

The striking congruence between the Quranic verse and the 'Big Bang' is inescapable! How could a book, which first appeared in the deserts of Arabia 1400 years ago, contain this profound scientific truth?

THE LIGHT OF THE MOON IS REFLECTED LIGHT

It was believed by earlier civilizations that the moon emanates its own light. Science now tells us that the light of the moon is reflected light.

However this fact was mentioned in the Quran I ,400 years ago in the following verse:
"Blessed is He Who made Constellations in the skies, And placed therein a Lamp And a Moon giving light." (Al-Quran 25:61)

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The Arabic word for the sun in the Quran, is *shams*. It is referred to as *siraoj*, which means a 'torch' or as *wohhooj* which means 'a blazing lamp' or as *diyo* which means 'shining glory'. All three descriptions are appropriate to the sun, since it generates intense heat and light by its internal combustion. The Arabic word for the moon is *qamor* and it is described in the Quran as muneer, which is a body that gives *nur* i.e. light. Again, the Quranic description matches perfectly with the true nature of the moon, which does not give off light itself and is an inert body that reflects the light of the sun. Not once in the Quron, is the moon mentioned as *siraoj*, *wahhaoj* or *diyo* or the sun as *nur* or *muneer*. This implies that the Quran recognizes the difference between the nature of sunlight and moonlight.

Consider the following verses related to the nature of light from the sun and the moon:

"It is He who made the sun To be a shining glory And the moon to be a light (Of beauty)." [Al-Quran I 0:5)

"See *ye* not How Allah has created The seven heavens One above another, "And made the moon A light in their midst, and made the sun As a (Glorious) Lamp?" [Al-Quran 71: 15-16)

Muslims and the Moon

It may come as a surprise to many that because of major contributions made to the knowledge base of the world, more than two dozen lunar features have been named after Muslim scientists and scholars.

Following is a list of these Muslim scientists and scholars who have lunar craters named after them along with the exact locations of those lunar features:

	Name	Lat.	Long.	
1	**Abul Wafa**	[illegible]	29.0E	Astronomer, Mathematician (940-998)
2	**Abulfeda**, [illegible]	13.8S	13.9[illegible]	Geographer (1273-1331)
[illegible]	**Albategnius**, [illegible]	11.7S	4.3E	[illegible]
[illegible]	**Al-Biruni**	17.9[illegible]	92.5E	Astronomer, Mathematician Geographer (973-1048)
[illegible]	**Alfraganus**, [illegible]	5.4S	19.0[illegible]	[illegible]
6	**Alhazen**, [illegible]	15.9N	71.8E	[illegible]athemati[illegible] (9[illegible]7-1038)
7	**Al-Khwarizmi**	7.1[illegible]	106.4E	Mathematician (Unknown-825)
8	**Almanon**, [illegible]	16.8S	15.2E	[illegible]
9	**Al-Marrakushi**	10.4S	55.8E	Astronomer, Mathematician (1262)
10	**Alpetragius**, [illegible]	16.[illegible]S	4.5[illegible]	Astronomer (Unknown-1100)
[illegible]1	**Avicenna**, [illegible]	39.7N	97.2W	Phyician (980-1037)
12	**Azophi**, 'Abd al Rahman Al-Sufi	22.1S	12.7E	Astronomer (903-986)
15	**Firdausi**, [illegible]	24.8 [illegible]	34.0W	Author (940-1020)
[illegible]	**Geber**, [illegible]	19.4S	13.9E	Astronomer (Unknown-1145)
13	**Ibn Firnas**	6.8[illegible]	122.3[illegible]	Technologist (Unknown-887)
1[illegible]	**Ibn Battuta**, [illegible]	[illegible].9S	50.4E	Geographer (1304-1377)
17	**Ibn Yunus**, Abul Hasan bin Ahmad	14.[illegible]	91.1E	Astronomer (950-1009)
18	**Ibn-Rushd**, Abu al-Walid Ibn Rushd (Averroes)	[illegible]1.7[illegible]	21.7E	[illegible]
19	**Messala**, Masha Allah	39.[illegible]	[illegible]0.5E	[illegible]
10	**Nasireddin**, [illegible]	41.0S	0.2[illegible]	Astronomer (1201-1274)
21	**Omar Khayyam**, [illegible]	58.0 [illegible]	102.1W	Mathematician, Astronomer, Poet (1050-1123)

Connecting personal experience to texts

1. What were my feelings when I read this?

2. Have I changed my thinking as a result of reading this?

3. What have I learned?

Activity: Pinhole Camera

Students review the importance of never directly viewing the Sun and will construct a pinhole camera for safe viewing.

Materials:

shoebox
pm:-
s et of white paper
tin foil
tape

Procedure:

1. Cut a 5 cm square out of one end of a shoebox.

2. Cover with a piece of tin foil. Tape into place making sure the tin foil is flat.

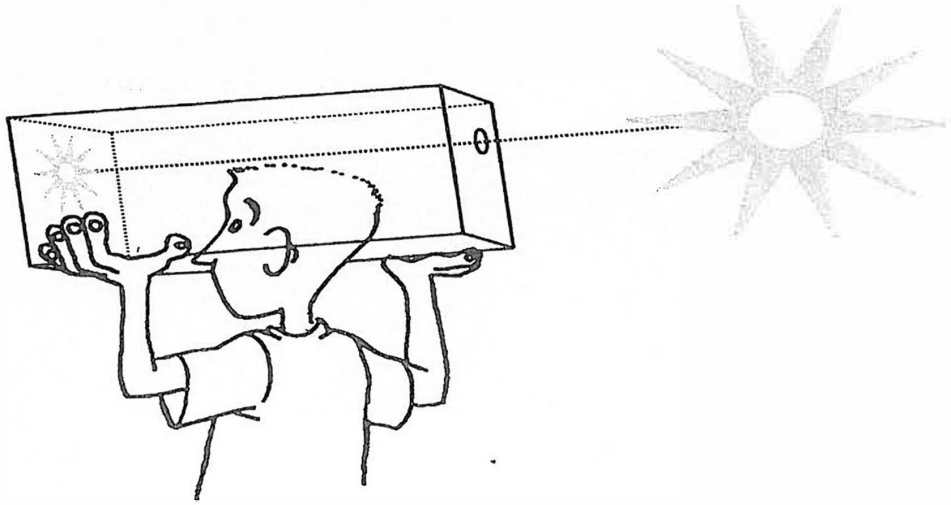
3. Poke a small hole in the center of the tin foil with a pin.

4. Place a sheet of white paper on the inside of the box at the opposite end.

5. To view, hold the box above your head with the pinhole facing toward the eclipse. You will face the screen with your back to the eclipse. An upside down image will form on the screen.

Teacher's Notes and Debriefing:

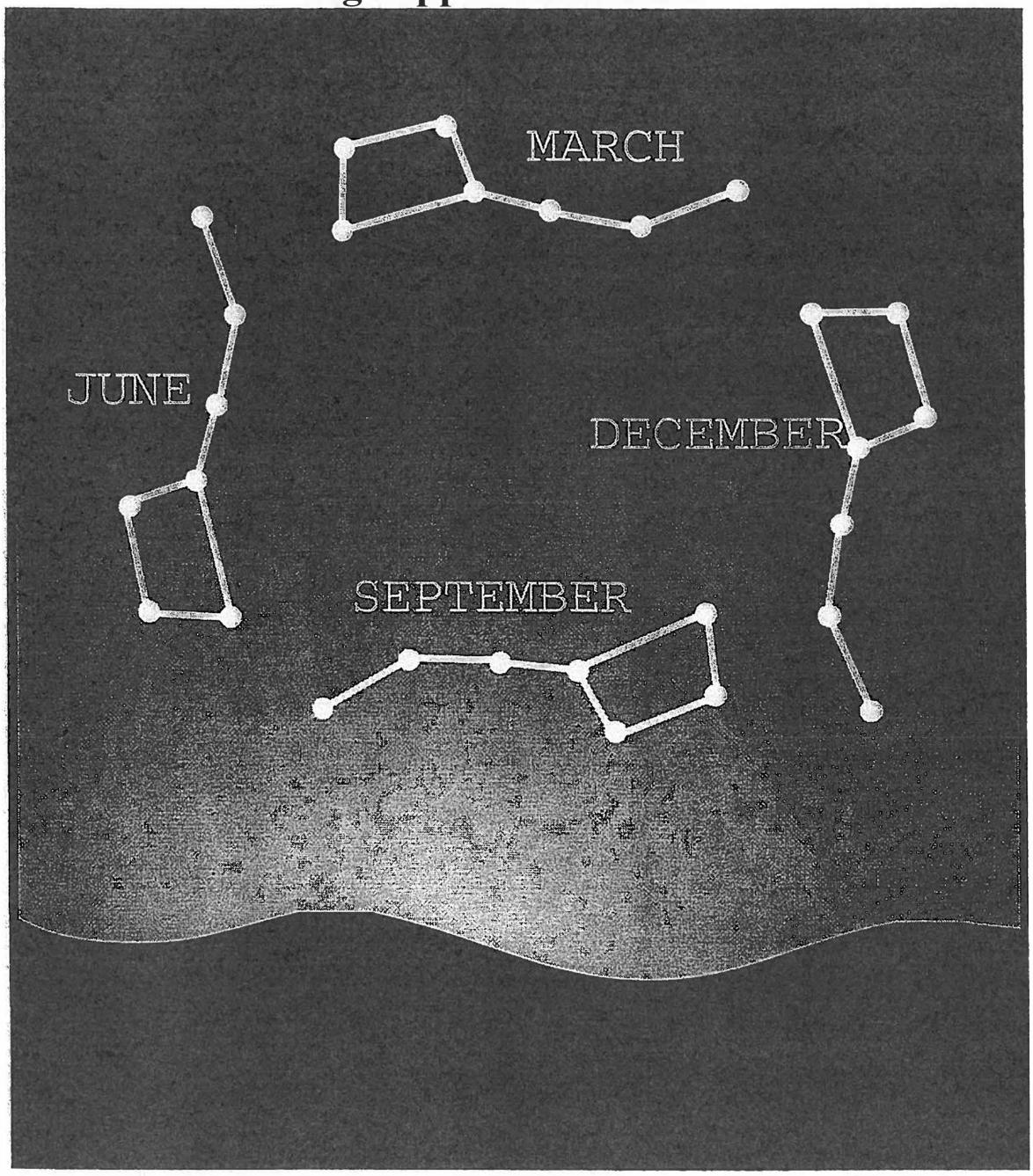
The pinhole camera is a simple and safe way to view an eclipse of the Sun. Students should be reminded that viewing the Sun can be dangerous and proper precautions must be taken.



Name: _____ *Master#4*

Date: _____

Big Dipper Movement



Name: _____

Master#9a

Date: _____

Casting Shadows - Recording Sheet

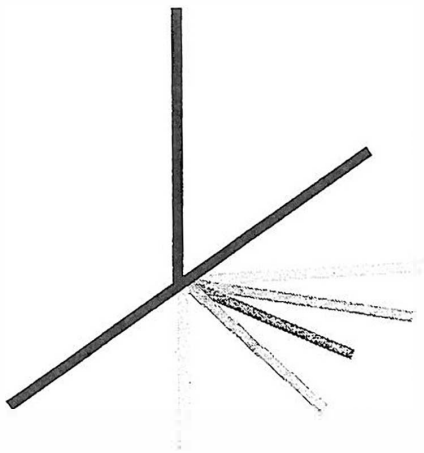
SHADOWS	
Time	**Length of Shadow**

Name: _____ *Master#9h*

Date: _____

Casting Shadows

SHADOWS	
9:00	**191 mm**
9:30	**186mm**
10:00	**177mm**
10:30	**168mm**
11:00	**150mm**
11:30	**147mm**
12:00	**149mm**
12:30	**145mm**
1:00	**159mm**
1:30	**163mm**
2:00	**179mm**
2:30	**182mm**



Measuring the length of shadows cast by a stick at various points throughout the day, provides you with data that can easily be turned into a bar graph. Use the data in the table above to complete this graph.

Shadow length *(mm)*

9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	1:00	1:30	2:00

Time

Name: _____ *Master#11c*

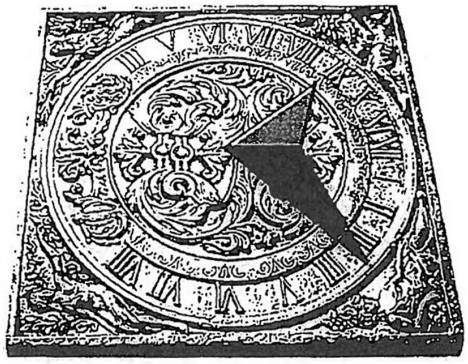
Date: _____

Sundials

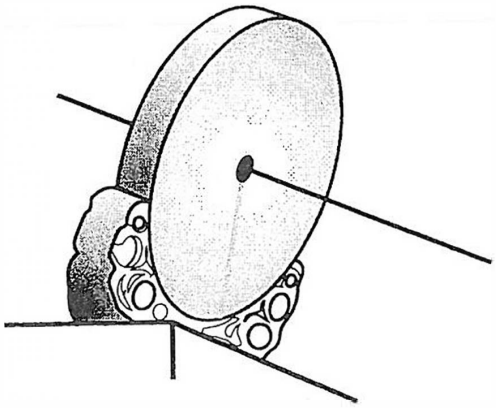
A sundial an instrument that uses shadows to tell time.

The Sun's apparent movement across the sky acted as the principal timekeeper for early people, and predominated as the main means for telling time. The sundial consists of a triangular central piece *(gnomon)* which casts a shadow on a numbered scale of hours.

*The numbers are placed *closer* together towards noon, and *farther* apart towards morning and evening, because the shadow moves more slowly over the sundial at midday when the sun is overhead.



Ancient Sundial:



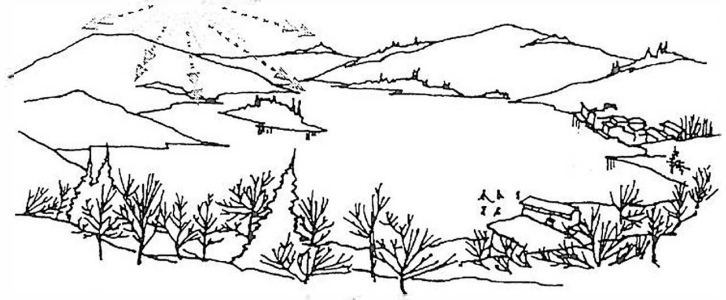
Sundial from China

Name: - - - - - - - - - - - - - - - - - - -

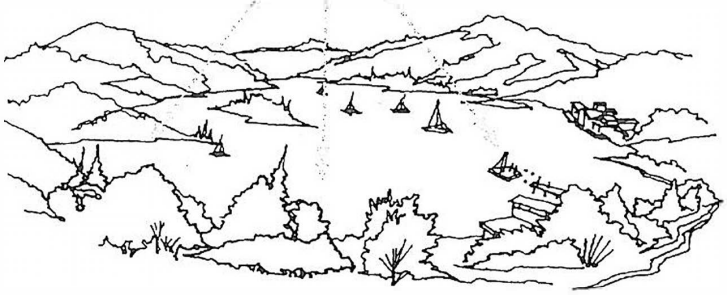
Mastet#12a

Date: _____

Reasons For The Seasons - Pictures



WINTER

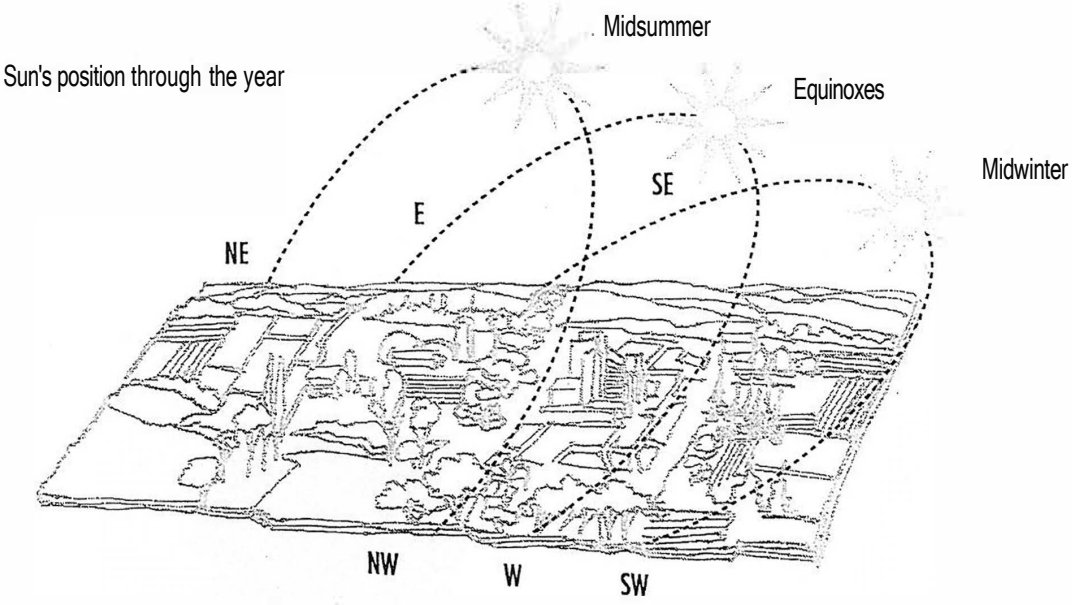


SUMMER

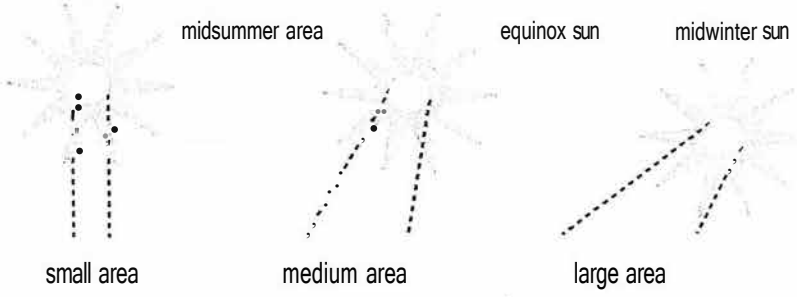
Name: _____ *Mastet#12b*

Date: _____

Reasons For The Seasons - Sun's Position and Heating Effect



Sun's heating effect through the year

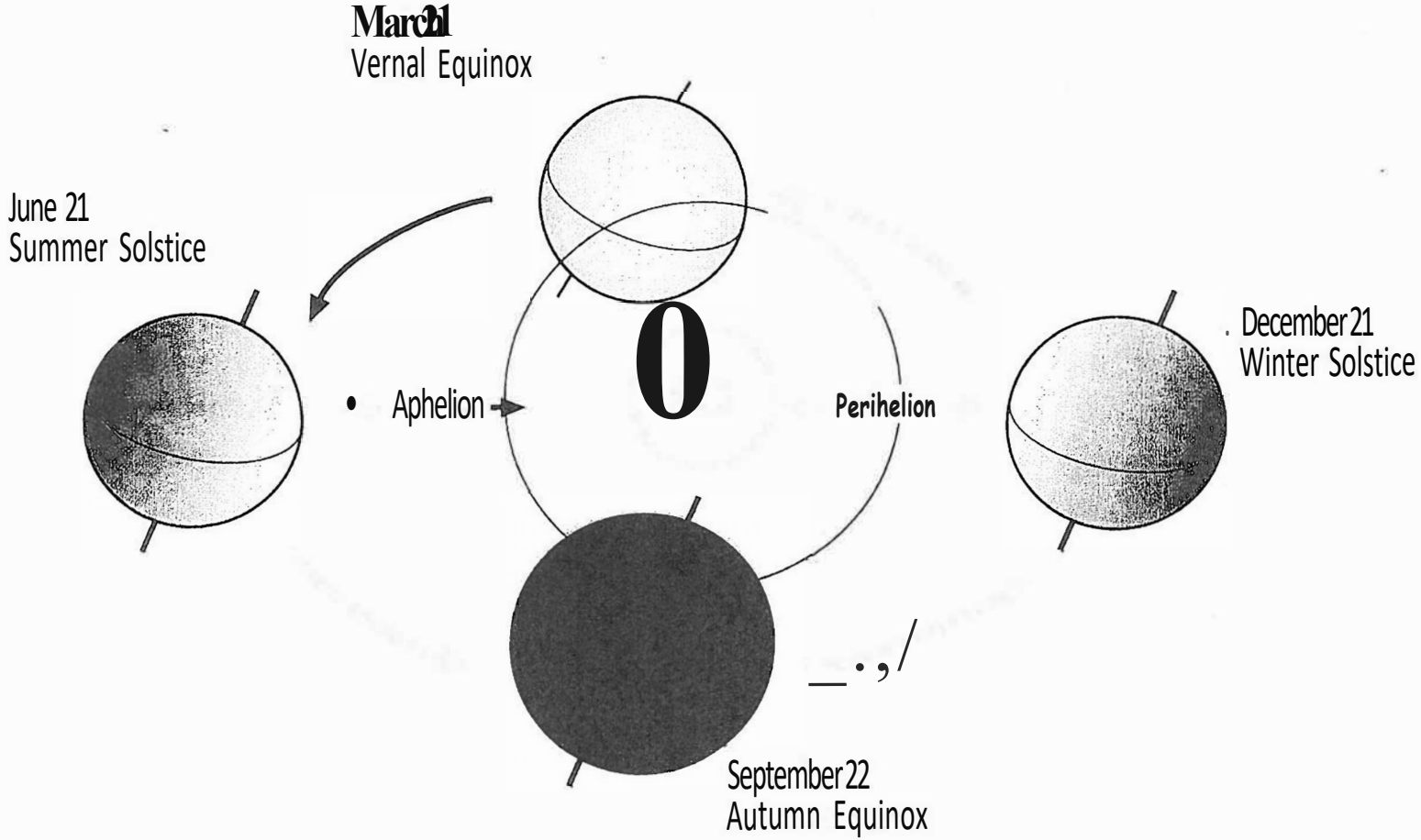


Name: -

Master#12c

Date: _____

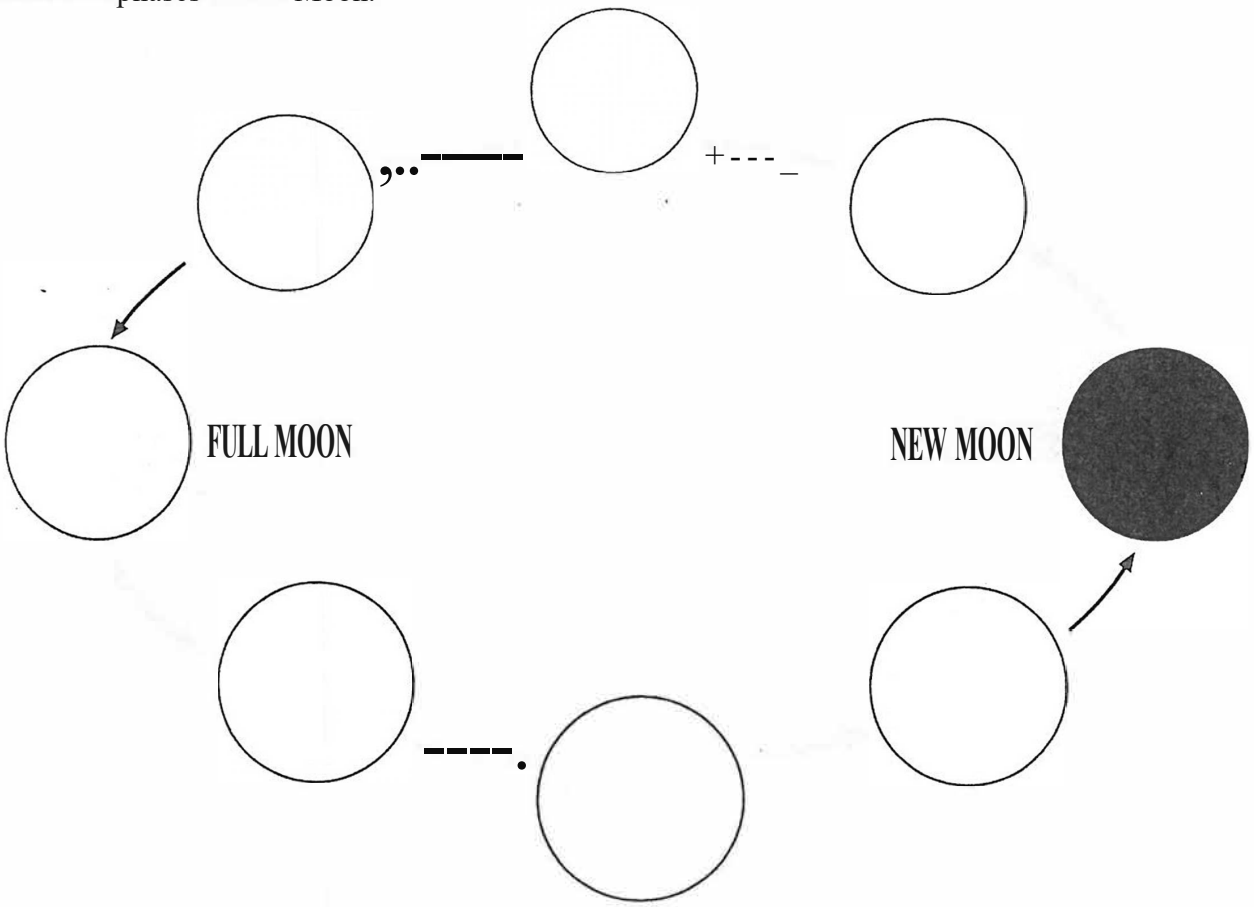
Reasons For The Seasons - Diagram



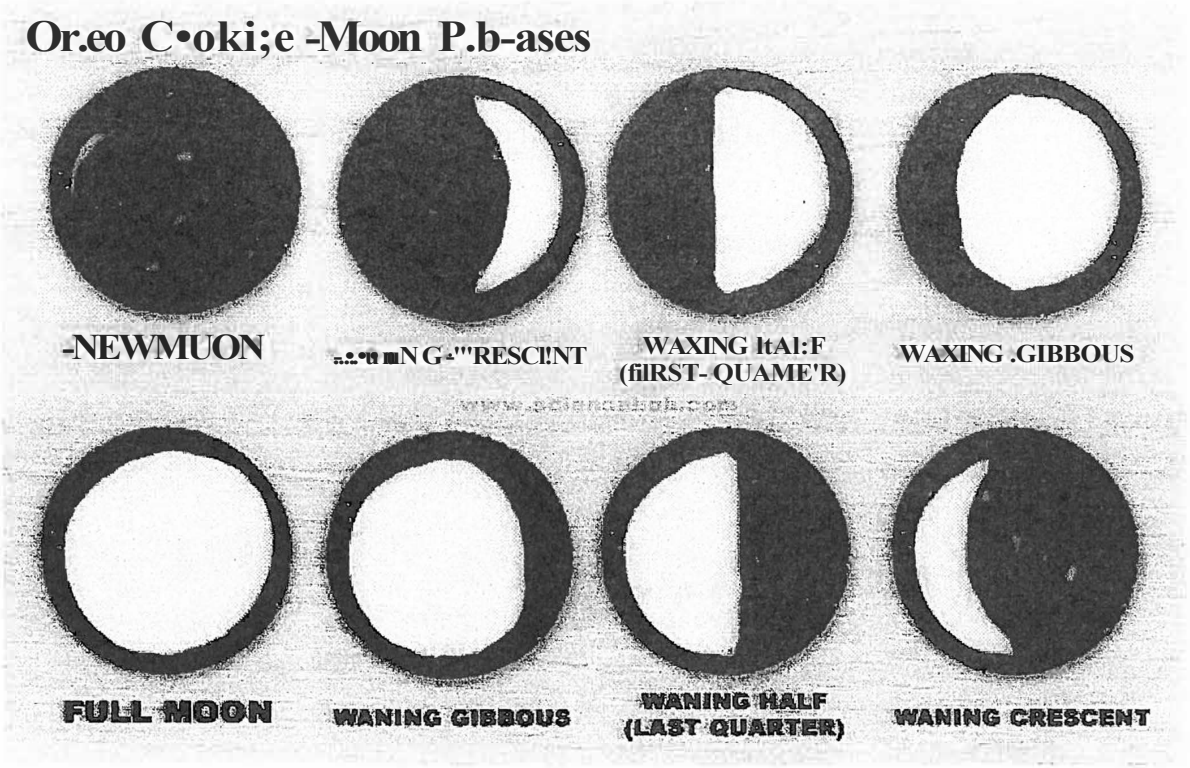
Date: _____

The Phases of The Moon

Draw, colour and label the phases of the Moon.



OREO COOKIE MOON PHASES



YOU WILL NEED:

- 8 Oreo cookies
- A popsicle stick or other tool for scraping the frosting

WHAT TO DO:

1. Slowly twist an Oreo to maximize the amount of frosting on one side when you separate the halves. If if doesn't work, you should probably eat the cookie ... and then try again.
2. Use the popsicle stick to create the phases of the moon out of the frosting.
3. Arrange the phases of the moon in order.

FUN MO(}JW FACT :

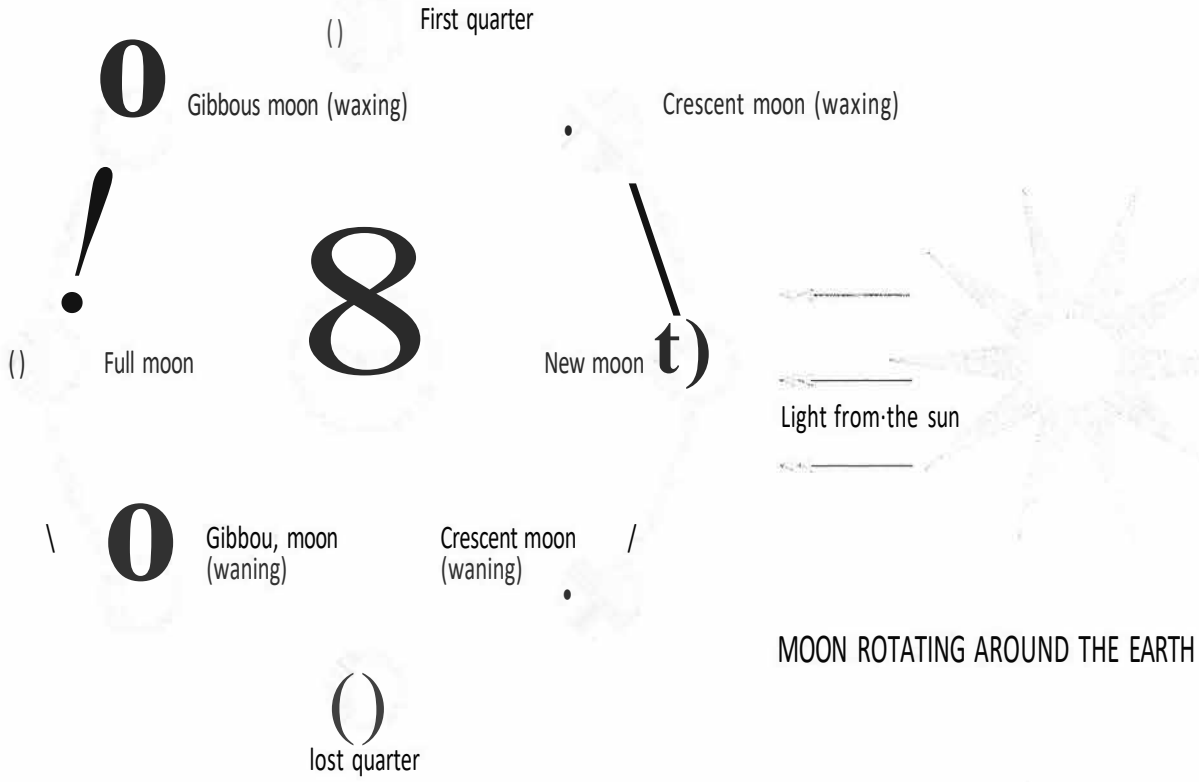
- The moon moves away from the Earth about 2.8 cm every year
- 12 humans have walked on the moon
- The gravity on the moon is 1/6th the gravity of the Earth
- The moon averages about 238,600 miles from Earth

Name: _____

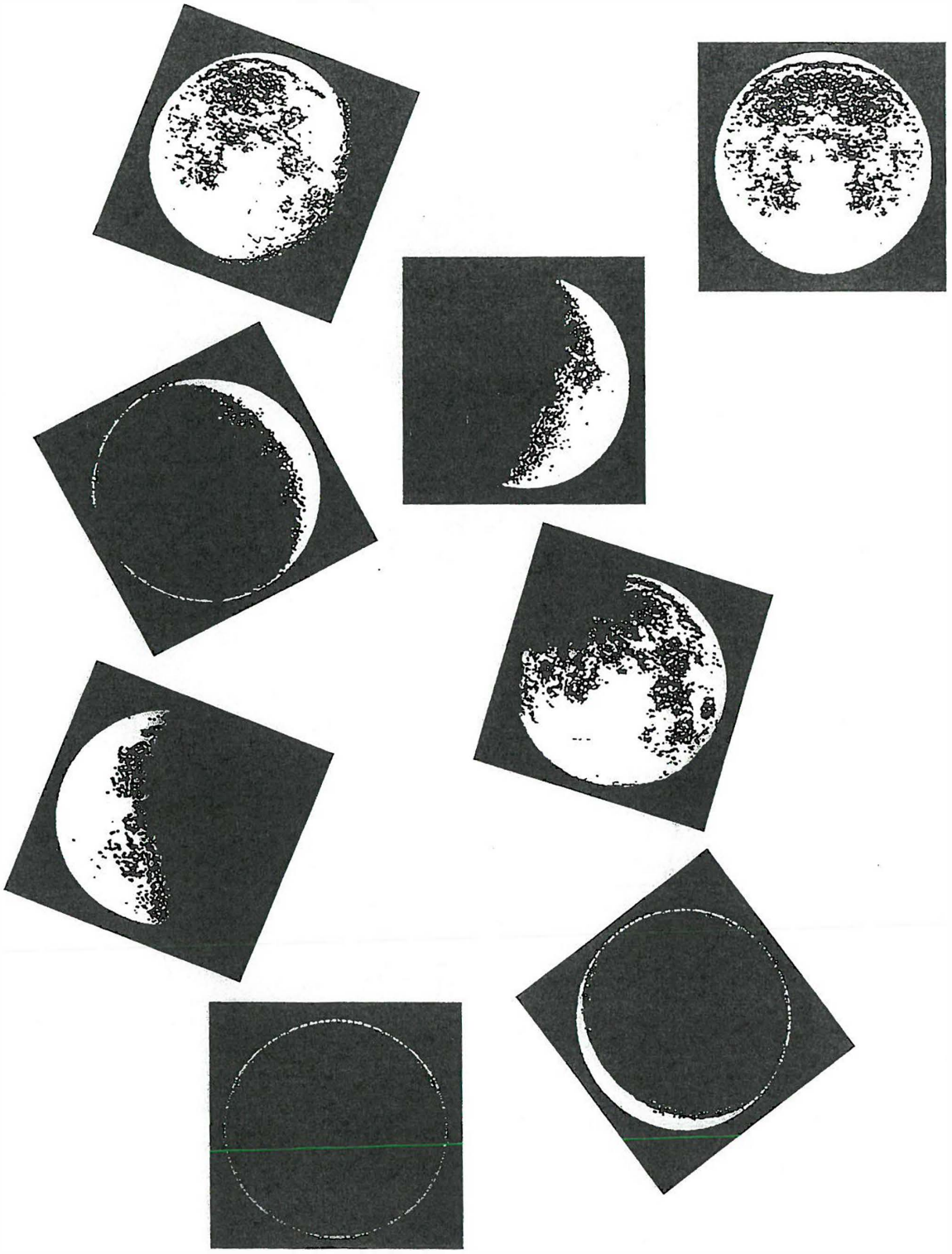
Master#1li

Date: _____

Introducing the Moon



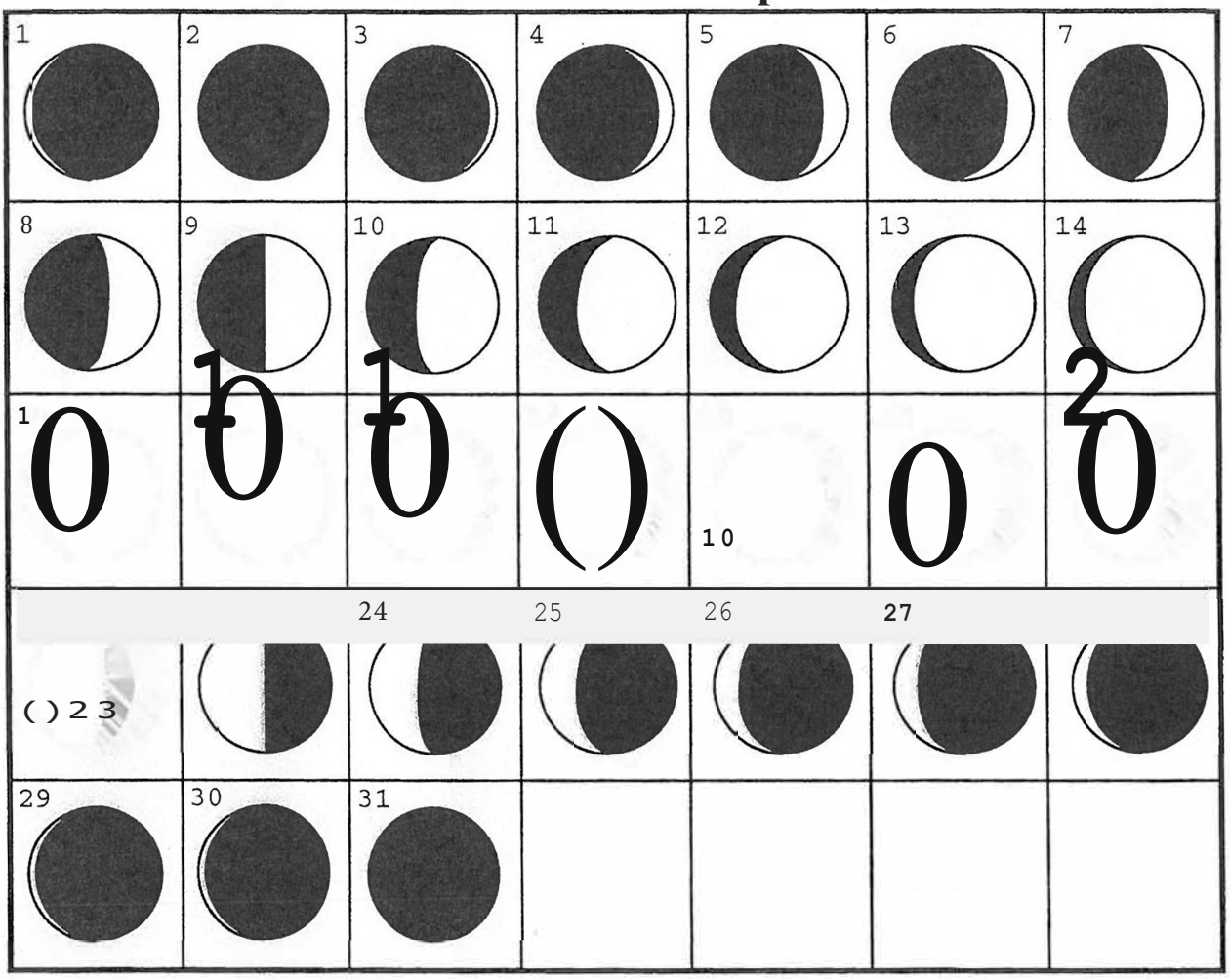
Changing Moon - Student Sheet



Name: _____ *Master#11*

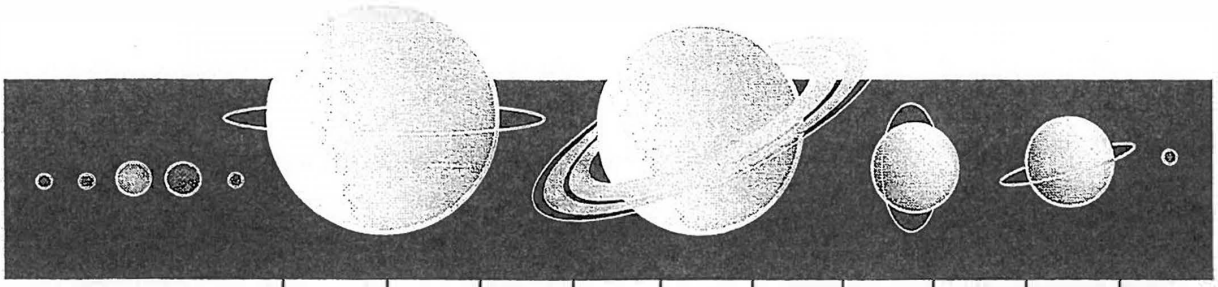
Date: _____

Moon Animation - Flip Book



Master#20

SOLAR SYSTEM STATISTICS



CATEGORIES										
1. Mean Distance From Sun (millions of Kilometers)	—	57.9	108.2	149.6	227.9	778.3	1,427	2,871	4,497	5,914
2. Period of Revolution	—	88 days	224.7 days	365.3 $d_{ay}s$	687 days	11.86 years	29.46 years	84 years	165 years	248 years
3. Equatorial Diameter (Kilometers)	1,390,000	4,880	12,100	12,756	6,786.8	143,200	120,000	51,800	49,528	2,330
4. Atmosphere (Main Components)	Hydrogen Helium	Virtual none	Carbon Dioxide	Nitrogen	Carbon Dioxide	Hydrogen Helium	Hydrogen Helium	Helium Hydrogen Methane	Hydrogen Helium Methane	Methane +?
5. Moons	—	0	0	1	2	16	18	15	8	1
6. Rings	—	0	0	0	0	3	1,000(?)	11	4	0
7. Inclination of Orbit to Ecliptic	—	7'	3.4·	0'	1.85'	1.3'	2.5'	a.a·	1.8'	17.1'
8. Eccentricity of Orbit	—	.206	.007	.017	.093	.048	.056	.046	.009	.248
9. Rotation Period	26.8 days	59 days	243 days retrograde	23 hours 56 min.	24 hours 37 min.	9 hours 55 min.	10 hours 40 min.	17 hours 12 min.	16 hours 7 min. retrograde	6 days 9 hours 18 min. retrogmde
10. Inclination of Axis	7.25'	Near 0'	177.2"	23' 27'	25' 12'	3· 5'	26' 44'	97' 55'	28' 48'	120·

Inclinationsgreaterthon 90· imp retrogmderototi011.

Name: _____ *Mastct#19*

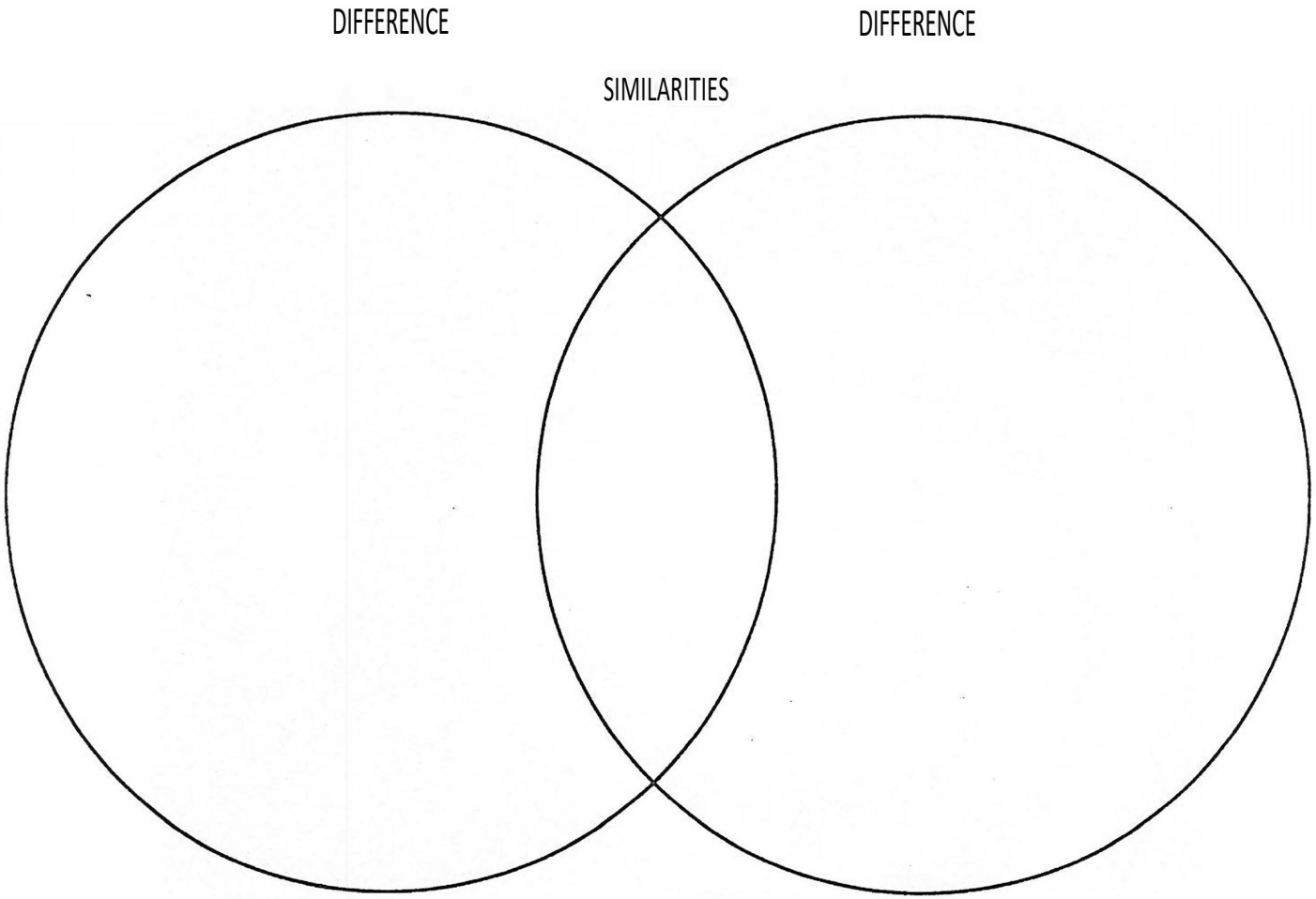
Date: _____

Planet Research

Surface appearance:	Distance from the Sun: _____ Period of revolution: _____ Diameter: _____ Number of Moons: _____ Number of rings: _____ Rotation period: _____
	Weather:
Picture:	Other interesting details/facts:

Name: _____ Date: _____ *Master#22*

Satellites - Venn Diagram



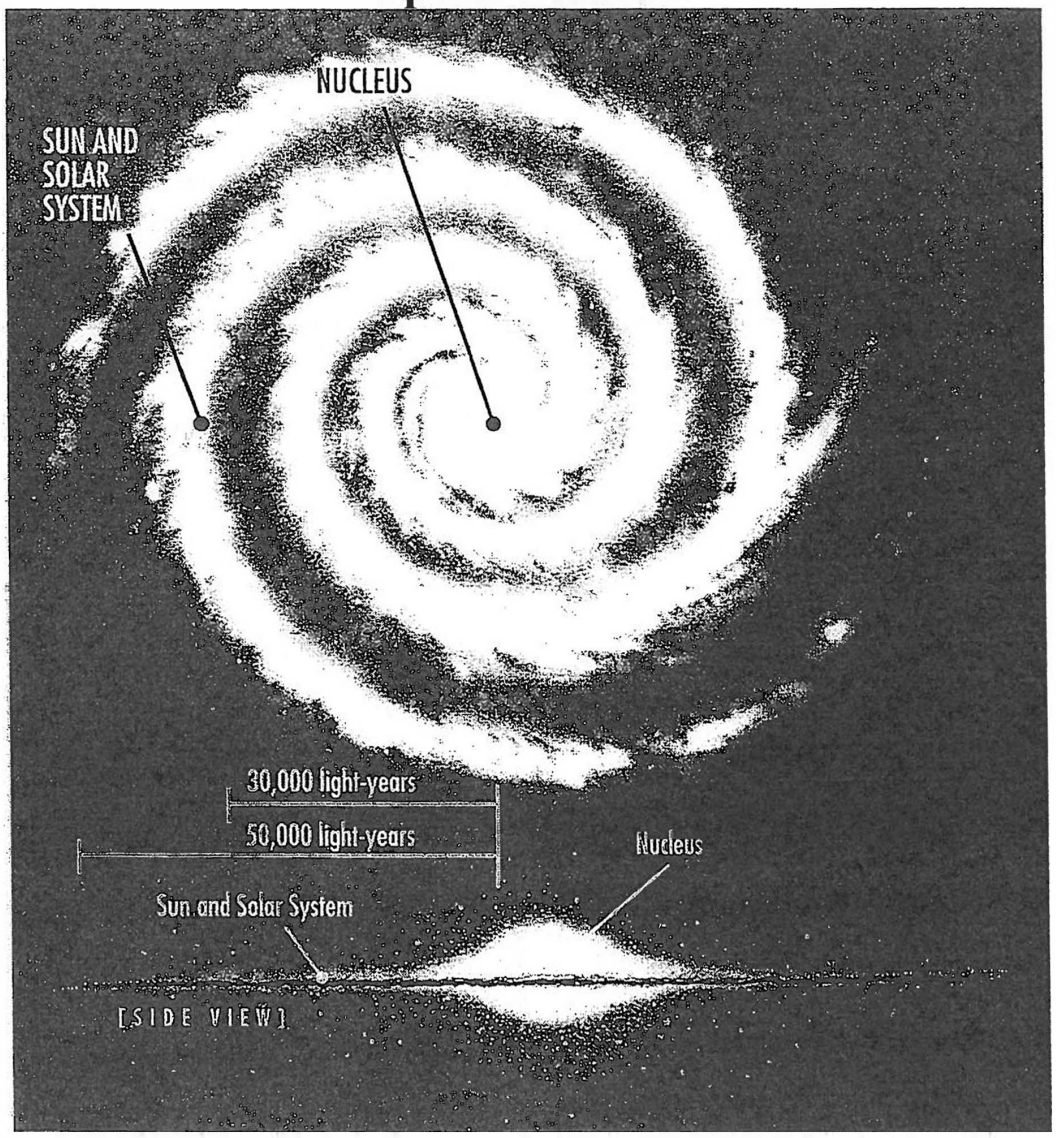
Name of Satellite

Name of Satellite

Name: _____ *Master#23*

Date: _____

Spiral Galaxies



Note:
At times, the spiral arms are not that well-defined in our galaxy, and astronomers are only taking educational guesses as to what the galaxy actually looks like. They do this by comparing our galaxy to the Andromeda galaxy which is our closest galactic neighbour and which we believe looks like the Milky Way.

Topic C: Sky Science
MIND MAP QUESTIONS

1. What in space reflects light?
2. What in space emits light?
3. What are constellations?
4. How do constellations move in the night sky and during the seasons?
5. What is a circumpolar constellation?
6. What star is used for navigation?
7. How do you safely view the sun and why?
8. When is the sun the most powerful?
9. How do sundials work? (Think shadows)
10. How does Earth's tilted axis affect Canada's seasons and the sunlight?
11. How long does it take Earth to rotate on it's axis?
12. How long does it take for Earth to revolve around the sun?
13. What are the phases of the moon and their order? Can you identify the difference between a 1st quarter moon and a last quarter moon just by looking at two pictures?
14. What is the order of the planets from the sun?
15. What is the order of the planets biggest to smallest?
16. Which planet has the biggest moon?
17. Which planet has the most moons?
18. Which planets have no moons?
19. What are the different technologies used in space?
20. Do you know how to classify what's found in the universe according to size? (Example: Sun, Moon, Planets, Galaxies, Solar System, Comets, Asteroids, Dwarf Planets)

Solar S stem Trading Cards

The assignment is due on __/__/____ (dd/mm/yyyy)

Task:

You have probably seen various kinds of trading cards. Some of these feature sports figures and include information about the player, statistics relating to his or her skills as an athlete, and a picture.

Your job is to ***create a* set *of five trading cards*** for the objects in our solar system including the sun; the inner planets; the outer planets; and the comets, asteroids, and meteoroids. *You may choose to do this project with anyone on our group.*
You will be graded on ***thoroughness, accuracy, and creativity.*** You may use any style of trading card as a template: hockey cards, baseball cards, Pokemon, so on and so fourth.

Materials needed:

Five 4 x 6 index cards, colored pencils, markers, etc. and possibly pictures from magazines or websites if you are not artistic.

Procedure

1. Select a total of five objects from the solar system to investigate. You must select the **sun,** at least **one inner planet, one outer planet,** and **either comets, asteroids or meteoroids** then your final card can be **a free choice** from any of the groups or a dwarf planet.

2. Gather the information and make a design for your cards.

3. Draw and color a picture of the planet on the front of the card. Include...

   [R] Planet's name.
   [R] Planet's position from the Sun. **(If you are doing Mercury, its position form the Sun would be #1.)**

4. On the back of the card, organize and provide the following information ***(Note: A table is a good way to organize the information).***

   [R] Distance from Sun.
   [R] Diameter.
   [R] Composition (what the planet's made of- gas giant or rocky planet).
   [R] Number of moons.
   [R] Does it have rings?
   [R] Length of day.
   Length of year.

5. List the sources from which your information was obtained at the bottom of each card.

Solar System Trading Card Research Websites

-+Use the sites below to help you complete your research sheet.
h1tp://solarsystem.11asa.gov/planets/
http://www.kidsastronomy.com/solar_system.htm
http://kids.nineplanets.org/
hHp://science.nationalgeographic.com/science/space/solarsystem
-+You may certainly visit other sites and don't forget the images!

Have fun and be creative.

Grade 6

The Solar System Trading Cards

Date: _ _/_ _/_ _ _ _(dd/mm/yyyy)

Term: a 1 a 2

Name: _ _ _ _ _ _ _ _ _ _ _ **Assessment type: a D a F S** **Overall: Marki/Level:_ _ _ //_ _ ; Class Average:_ _ _ Parent Signature:_ _ _ _ _ _ _**

Criteria / Level	Excellent Level4	Proficient Level3	Adequate Level2	Limited* Level 1	Insufficient/ Blank*
Stats (_/2)	There is a card for each group All stats are includes most are correct	There is a card for each group All stats are included	Most cards have Most stats included	there is a group missing	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Card design (_/2)	Cards are in color Include a clear representation of the objects There is a card for each group	Most Cards include a clear representation of the objects There is a card for each group	Most cards Include a representation of the objects	There is a group missing	
Days Late (_/1)	0	1	2	3++	--Not Hand In

Teacher's Comments - Area for Growth and Action Plans (if below "level 2"):

□ Please use the given time in the classroom wisely by *asking questions to further clarify the assignment or focus on the task at hand.* Also, you need to follow the sample work shown in the class (if *applicable)* as a guideline to achieve *level 3* in this rubric.

Name: _____ _ **Date:** - _j_ _j_ - - _(dd/mm/yyyy)

Topic C: Sky Science

What's in the news?

Purpose: The purpose of this assignment is to encourage ***students to connect what we are learning about in science class*** to the bigger picture.

Task: In this current events assignment, you will find, read and write a 2 paragraph summary of a science news article.

Procedure:

1. You will need to choose a science news article from a magazine, newspaper or Internet. To find an interesting science news research article. See the web sites below.
2. ***You may not use Wikipedia, encyclopedias, or textbooks. You cannot watch TV and write about it.***
3. Paragraphs should be doubled spaced and neatly written or typing in Calibri at a 12-pt. size. Make sure the article is long enough for you to gather enough information to write at least two paragraphs about it.
4. Read the entire article then summarize what the article is about in YOUR OWN WORDS.
5. A good summary should include WHO did WHAT, WHERE it occurred, WHEN it happened, and WHY it is important.
6. Second paragraph, relate the article to unit along with any new vocabulary words you learned (include meaning).
7. ***Be careful not to plagiarize.*** This means does not just change a few words and copy the rest of the article. You need to rephrase the information in your OWN words. I want to know what you learned from reading the article. Ifyou are using someone else's words, you must put them in quotes.
8. The second paragraph of the assignment must include why it relates to science and/or how the information was beneficial to you or may be beneficial to someone else. For example, an article about pesticides might be relevant to a farmer or an article on a new drug might be relevant to someone who has cancer.
9. You must attach a copy of the article with your summary. If it is an internet source you can print out a copy of the article. If you used a magazine or newspaper, you must photocopy or cut out the article.
   You need to plan ahead to copy the article or print out your summary. If you have printer problems, you may use the school library computers. If you do not have access to a computer, you need to handwrite or save the file (e.g. USB Flash Drive) and bring to me at least 48 hours in advance of the due date to print the document for you. I will not accept any e-mails. ***Computer problems will not be an acceptable excuse for an assignment turned in late.***

Where do I **find a science research article?** (Possible Web sites):

Popular Science **http://www.popsci.com/**	**http://www.sciencenews.org/**
Discovery Magazine **http://www.discovery.com/news/news.html**	http://science.nasa.gov/ **www.sciencedaily.com** (higher level)
www.eurekalert.org/kidsnews/ (short and easy- must have my permission)	**www.sciencenewsforkids.org** (short and easy- must have my permission)
Time Magazine for Kids - Science **http://www.timeforkids.com/news-archive/Science**	Scientific American **http://www.scientificamerican.com**

Grade 6A & 6C: Science

What's in the News? Unit C

Term: a 1 2

Date: __ /__ /____ (dd/mm/yyyy)

Name: ----------

Assessment type: a D a Fa S

Overall: Marki/Level: ___//__;Class Average: ___ Parent Signature: ________

C	Excellent Level4	Proficient Level3	Adequate Level 2	Limited* Level 1	Insufficient/ Blank*
Organization: **>> Date of Article (_/0.5)** » **Bibliography/Article** (_/1) **>> Vocabulary (_/1.5)**	Within 90 days of due date Within 90 days of due date Copy of article present Citation present with no errors Vocabulary words with definition are included.	Within 120 days of due date Copy of article present Citation present with no major errors Vocabulary words with definition are some included.	Within 180 days of due date Copy of article present Citation present with major errors Vocabulary words section is incomplete or incorrect.	Over 180 days of due date No article present Citation present with major errors Vocabulary and definition are missing from the assignment	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Paragraph 1: Summary (_/3)	The main idea of the article is clearly explained. The reader of your summary understands exactly what the article is about. A thesis statement and supporting quote from the article are included.	The main idea some of the article is clearly explained. The reader of your summary understands exactly what the article is about. A thesis statement and supporting quote from the article are included.	The main idea of the article is not clear or key information is missing.	The summary is unclear, confusing, and/or contains mistakes.	
Paragraph 2: Reaction **(_/3)**	Reaction is thoughtful, reflective, and connects the information in the article to new situations, class topics, or further exploration	Reaction is thoughtful, reflective, and connects the information in the article to new situations, some class topics, or further exploration	Reaction is brief and/or not much detail was used. Student did not connect to or expand on the information learned.	Reaction does not demonstrate much thought or expansion and application.	
Days Late r-;11	0	1	2	3++	--Not Hand In

Teacher's Comments-Area for Growth and Action Plans (if below "level 2"):

□ Please use the given time in the classroom wisely by *asking questions to further clarify the assignment or focus on the task at hand.* Also, you need to follow the sample work shown in the class **(if** *applicable)* as a guideline to achieve *level 3* in this rubric.

J

Grade 6

Portfolio Rubric

Date: __ /__ /____ (dd/mm/yyyy)

Subject: _____ // Unit: _____ ; Term:□ 1 □2

Name: ---------- Assessment type: □D □F □S Overall: Marki/Level:___ //__ ; Class Average:___ Pa1·ent Signature:_____

Level / Criteria	Excellent Level4	Proficient Level3	Adequate Level 2	Limited* Level 1	Insufficient/ Blank*
MISSING SECTIONS (_/2)	NO SECTIONS OF THE PORTFOLIO ARE MISSING.	ONE SECTION OF THE PORTFOLIO IS MISSING.	TWO SECTIONS OF THE PORTFOLIO ARE MISSING.	THREE OR MORE SECTIONS OF THE PORTFOLIO ARE MISSING.	No score is awarded because there is insufficient evidence ofstudent performance based on the requirements ofthe assessment task.
ORGANIZATION (_/1)	ALL ASSIGNMENTS AND/OR NOTES ARE KEPT IN THE CORRECT SECTIONS.	ONE OR TWO ASSIGNMENTS AND/OR NOTES ARE NOT IN THE PROPER SECTION.	THREE OR FOUR ASSIGNMENTS AND/OR NOTESARENOTINTHE PROPER SECTION.	MORE THAN FOUR ASSIGNMENTS/AND OR NOTES ARE NOT IN THE PROPER SECTION.	
NEATNESS/ARTISTIC QUALITY (_/1)	OVERALL PORTFOLIO IS KEPT VERY NEAT AND VISUALLY PLEASING.	OVERALL PORTFOLIO IS KEPT IN A SATISFACTORY CONDITION.	OVERALL PORTFOLIO IS KEPT BELOW SATISFACTORY CONDITION.	OVERALL PORTFOLIO IS UNKEPT AND VERY DISORGANIZED	
Days Late (_/1)	0	1	2	3++	--Not Hand In

Teacher's Comments - Area for Growth and Action Plans (if below "level 2"):

□ Please use the given time in the classroom wisely by *asking questions to further clarify the assignment or focus on the task at hand.* Also, you need to follow the sample work shown in the class (if *applicable)* as a guideline to achieve *level 3* in this rubric.

Unit - Sky Science

"I Can Statements"

At the end of the Sky Science Unit, I am able to make the following statements:

_ I can explain the difference between reflect and emit and give examples of each.

_ I can describe the location and movement of individual stars and groups of stars (constellations) as they move through the night sky.

_ I can explain how the movement of objects in the night sky is predictable.

_ I can explain how this movement is related to the Earth's rotation.

_ I can explain the safe/unsafe ways to view the sun.

_ I can explain how a sundial or shadow sick works.

_ I can explain how the seasons affect the length of a day and how this is related to the angle of the sun.

_ I can describe and illustrate the phases of the moon and explain that they are predictable.

_ I can explain that there are other planets that revolve around the sun.

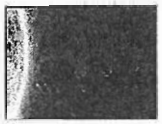
_ I can explain the similarities and differences of these planets when I compare them to Earth.

_ I can understand that other planets have moons and explain the similarities and differences of these when I compare them to Earth's moon.

_ I can identify technologies that help us understand other planets.

_ I can understand that the Earth and Sun are just a small part of the known universe.

Name: _____ _ **Date:** - _;_ _;_ - - _(dd/mm/yyyy)



Topic C: Sky Science

Reflection: How Did You Do?

1. List three things you didn't know before this unit started.

2. Describe what you liked best in this unit.

3. Give yourself a pat on the back! What did you do well in this unit?

4. List three questions you still have about *Sky Science.*

Field Trip Report

Date_____ With Who?_____

Where?_____ How long did it last? ____

What was your favorite part about this field trip?

Why_____

In complete sentences, tell about three new things you learned.

Would you recommend this field trip to your friends? Why or Why not?

e''

Grade 6

Rubric for Student Reflections: _____ _

Term: a I a 2

Date: _ _/_ _/_ _ _ _(dd/mm/yyyy

Name: _ _ _ _ _ _ _ _ _ _

Assessment type: a D a F a S

Overall: Marki/Level:_ _ _//_ _ ; Class Average:_ _ _ Parent Signature:_ _ _ _ _ _ _ _

Level / Criteria	Excellent Level4	Proficient Level3	Adequate Level 2	Limited* Level 1	Insufficient/ Blank*
Reflective Thinking (_/2)	The reflection explains the student's own thinking and learning processes, as well as implications for future learning.	The reflection explains the student's thinking about his/her own learning processes.	The reflection attempts to demonstrate thinking about learning but is vague and/or unclear about the personal learning process.	The reflection does not address the student's thinking and/or learning.	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Analysis (_/1)	The reflection is an in-depth analysis of the learning experience, the value of the derived learning to self or others, and the enhancement of the student's appreciation for the discipline.	The reflection is an analysis of the learning experience and the value of the derived learning to self or others.	The reflection attempts to analyze the learning experience but the value of the learning to the student or others is vague and/or unclear.	The reflection does not move beyond a description of the learning experience.	
Making Connections (_/1)	The reflection articulates multiple connections between this learning experience and content from other courses, past learning, life experiences and/or future goals.	The reflection articulates connections between this learning experience and content from other courses, past learning experiences, and/or future goals.	The reflection attempts to articulate connections between this learning experience and content from other courses, past learning experiences, or personal goals, but the connection is vague and/or unclear.	The reflection does not articulate any connection to other learning or experiences	
Days Late (_/1)	0	1	2	3++	--Not Hand In

Teacher's Comments -Area for Growth and Action Plans (if below "level 2"):

o Please use the given time in the classroom wisely by *asking questions to further clarify the assignment or focus on the task at hand.* Also, you need to follow the sample work shown in the class *(if applicable)* as a guideline to achieve *level 3* in this rubric.