

Unit 5 - Astronomy Vocabulary- Jan-Feb 2015

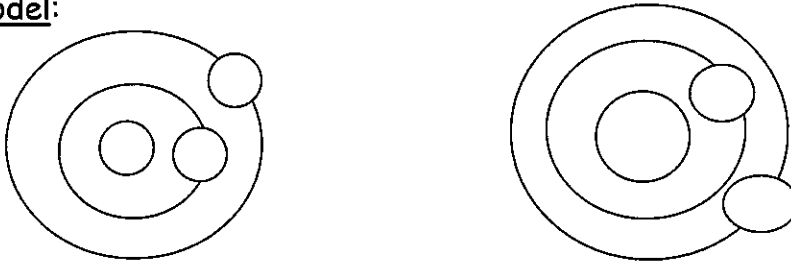
1. Astronomy
2. Universe
3. Galaxy
4. Solar System
5. Nuclear Fusion
6. Gravity
7. Ellipse
8. Ptolemy
9. Copernicus
10. Newton
11. Big Bang Theory
12. Rotation
13. Orbit
14. Revolution
15. Climate
16. Year
17. Month
18. Day
19. Vernal/Autumnal Equinox
20. Winter/Summer Solstice
21. Light Year
22. Life cycle of a Star
23. Gas Giants
24. Terrestrial Planets
25. Satellite (moon)
26. Solar Eclipse
27. Lunar Eclipse
28. Comet
29. Meteor
30. Asteroid
31. Moon Phases
32. Waxing phases
33. Waning phases
34. Tide
35. Spring Tide
36. Neap Tide

Complete on a separate piece of paper or note cards.

Unit 5 - Astronomy: The Study of the Universe

I) Early Astronomers: _____ : (140 AD) Greek Astronomer who theorized the model of the universe. The Ptolemaic theory suggested that the _____ of the Universe. Ptolemy's theory was popular for over 1,500 years in Europe.

Ptolemaic model:



_____ : (1543 AD)

A Polish astronomer revolutionized astronomy with his new model of the universe. He theorized that the _____ and all the planets, including Earth, orbited around it.

II) Electromagnetic Spectrum:

The Electromagnetic spectrum is made up of all the wavelengths of electromagnetic energy. (Ex: X-rays, radio waves, etc.). Telescopes are instruments that are used to observe electromagnetic radiation from space.

_____ - when light _____ because it is passing through mediums of different densities.

_____ - when light _____ off a surface.

III) Stars Composition (make-up):

Stars are made up of different elements in the form of gases. (Ex. Hydrogen)

Scientists classify stars by: _____, _____, _____

Star Color: H-R diagram classifies stars

- Stars vary in the color that they glow
- A star's color _____ and the elements it is composed of.
- _____ temperatures - a star will glow _____
- _____ temperatures - a star will glow _____

Types of Stars:

- Main Sequence Stars - _____ stage for a star. (OUR SUN is a main sequence star)
- Giants and Supergiants - After the main sequence stage, a star can enter the next stage: Red Giant. Stars become red giants after burning up all their Hydrogen (Red giants - _____ times larger than our sun and _____ 100 _____ times larger than our sun.)
- White Dwarfs - The final stage of a star's life cycle. _____, _____ that is leftover material from an older star (No more _____ to burn)

IV) The Life Cycle of Stars:

The Beginning:

- Stars begin as a ball of rotating gas and dust. _____ pulls the gas and dust together to form a sphere. As sphere becomes denser, it gets _____, causing _____ to change into _____. (Nuclear fusion).
- _____ is what gives a star its energy (Heat and Light).

The End:

- As a star gets older, it loses some of its _____. Star eventually runs out of gases to burn and dies or _____ into space. The material from old stars travels in space and can help form _____.
- If an old star explodes it can form a variety of new objects:
 - **Black holes**
 - The center of a star _____ under its own gravity.
 - The force of contraction _____ of the star forming a black hole
 - Nothing can escape the _____ of a black hole, not even light!
 - **Supernovas**
 - A massive star may explode in a _____ called a supernova
 - **Neutron stars**
 - Leftover material from a supernova can _____
 - The materials of the new star are neutron particles from old star.

Galaxies

- Large groups of stars, dust and gas
- _____ is in a spiral galaxy called _____

The Big Bang Theory

- 13.7 Billion years ago, all the _____ was compressed into one small point
- The universe started with a _____.
- All the material from the explosion is _____ !!!!!!!!!!!!!

Evidence supporting The Big Bang Theory

- **Cosmic background radiation** Scientists found radiation spreading out to all parts of the universe and The expanding universe (stars, planets)

V) The Solar System

- Consists of: 1 Star - (_____) and 8 Planets
 - _____ - Inner planet, rocky
 - _____ - Inner planet, rocky
 - _____ - Inner planet, rocky
 - _____ - Inner planet, rocky
 - _____ - Outer planet, gas giants
 - _____ - Outer planet, gas giants
 - _____ - Outer planet, gas giants
 - _____ - Outer planet, gas giants

My Very Excellent Mother Just Served Us Noodles

Our Solar System has two types of planets

Inner Planets: Also called terrestrial planets (Earth-like planets)

- Very _____, Composed mostly of _____, Smaller than the _____ giants
- Mercury, Venus, Earth and Mars

Outer Planets: Also called the Gas Giants, Composed mostly of gases (_____, _____)

- Massive Atmospheres, No solid surfaces, Jupiter, Saturn, Uranus, Neptune

Gravitational Attraction

- Gravitational attraction depends upon _____ of objects & _____ between them.
- The more _____ (_____) the planets the stronger the gravitational pull it has
- The _____ objects are, the _____ the gravitational pull

VI) Planetary Motion

Rotation vs. Revolution

- **Rotation** - the _____ of an object on its axis. Ex: Earth spins on its axis (Earth's _____)
- **Revolution** - the motion of a body that _____ body in space. Example: Earth _____ in _____ days



VII) Moons

- _____:
- A natural or artificial _____ that revolves around a larger body (planet)
 - Ex: Moons, television satellites, global positioning systems (_____)
 - All planets have moons except for _____ and _____

Our Moon: Luna

- _____ years old (same as Earth and our Solar system)
- Same composition as _____
- Formed when a large object smashed into the molten Earth and caused a piece of the mantle to fly off in space. The piece spun around and _____ pulled it into its spherical shape
- _____ atmosphere(air), Average distance between Earth and Luna: _____ miles

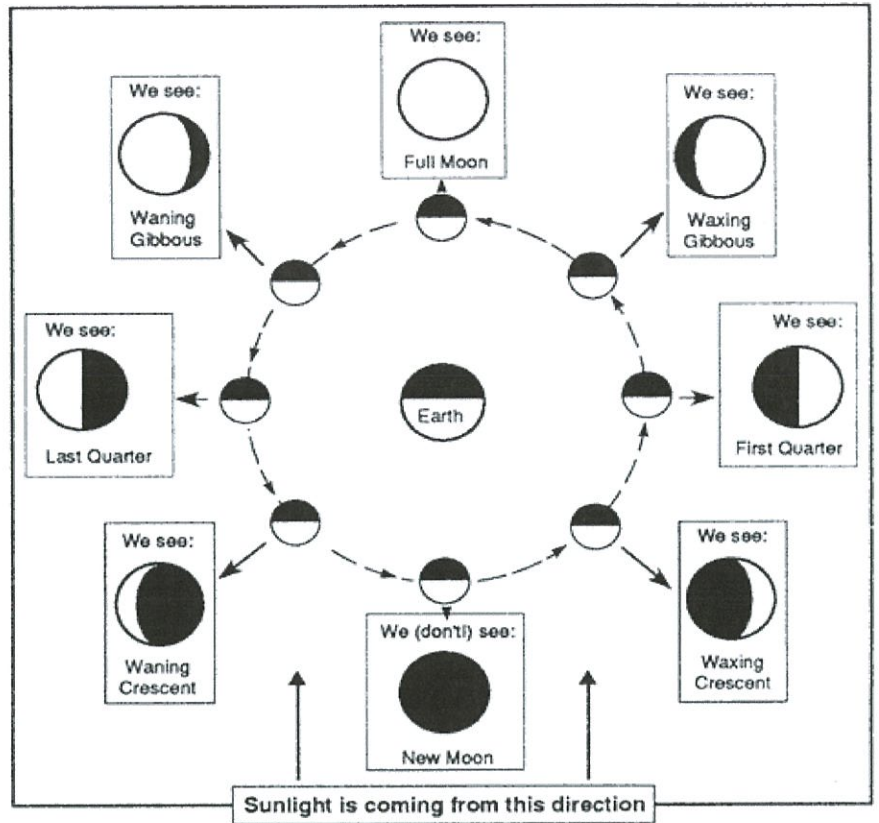
(One "Moonth") **The moon revolves around Earth about every 30 days**

Lunar Motions:

- Rotation - the moon rotates on its axis once every _____.
- Revolution - the moon makes one complete orbit around the earth _____.
- The moon's period of rotation and revolution are _____. **This means that the same side of the moon is always facing earth.** (The far side can _____ from space)

Phases of the Moon:

- The moon does not produce its own light; moonlight is _____ from the sun.
- As the moon _____ around the earth, the _____ light from the sun _____.
- **Waxing:** the illuminated part of the moon gets larger until you reach the **FULL MOON**
- (_____ - the _____ side is illuminated)
- **Waning:** the illuminated part of the moon gets smaller until you reach the **NEW MOON**.
- (_____ - the _____ side is illuminated)



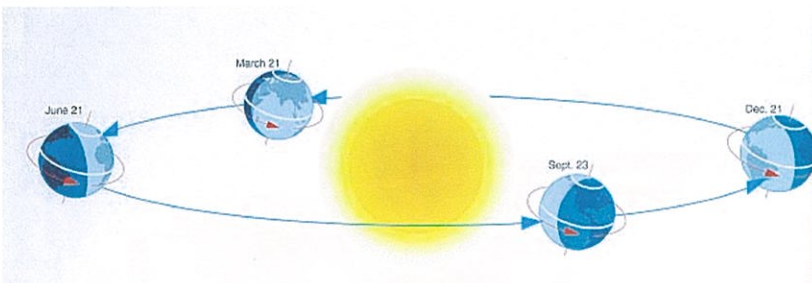
VIII) Solar Eclipse

- Can't see the _____ (blocked by the moon's shadow as it moves between the earth and the sun _____)

Lunar Eclipse

- Can't see the _____ (blocked by Earth's shadow when the earth is between the moon and the sun _____)

X) Seasons : New York has 4 seasons because of the _____ and the **EARTH's Revolution around the SUN**st



- _____ is **June 21**
- The _____ Hemisphere has warm, long days (Sun high in sky)
- _____, 9 hrs. darkness in Northern Hemisphere

- The _____ has cold, short days (Sun lower in sky)
- _____, 15 hrs. darkness in Northern Hemisphere (opposite in Southern hemi)

Equinoxes - There are two days of the year that THE HRS of day and night are EQUAL

- March 21st (_____ Equinox) - First day of SPRING
- September 21st (_____ Equinox) First day of FALL
- On these 2 days _____ have 12 hrs. daylight and 12 hrs. darkness

XI) **Tides** are influenced by the _____ and the _____ and occur in Cycles

_____ are the daily changes in the _____ of the water in the OCEAN

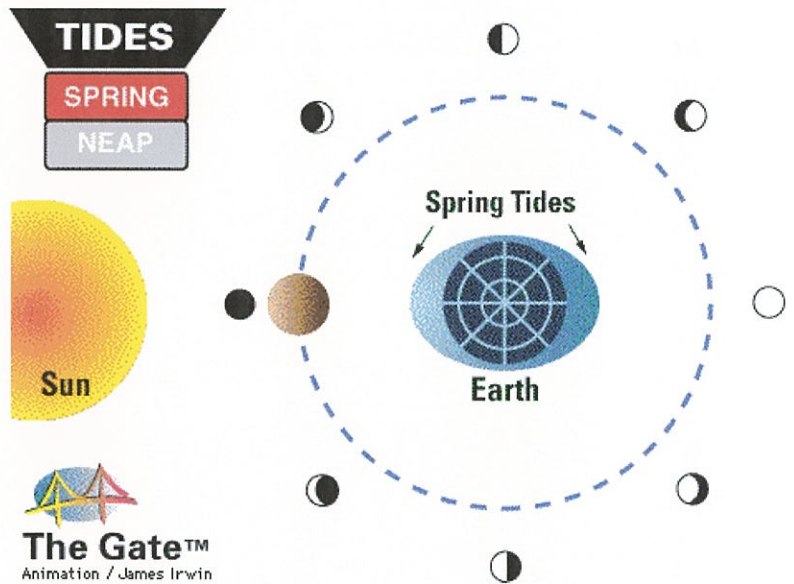
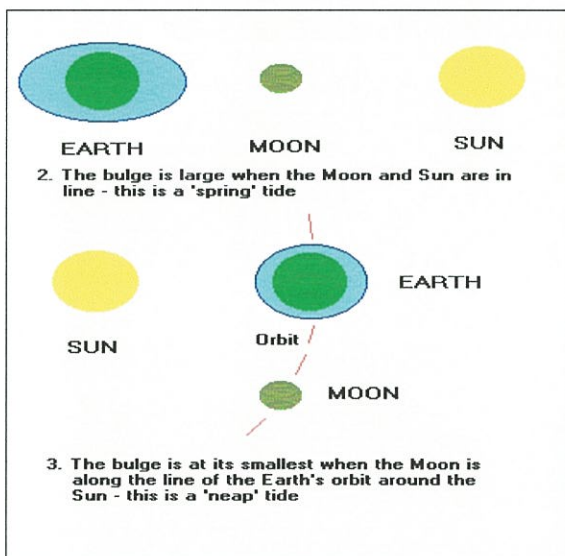
- The tide ranges from a _____ level to a _____ level
- Every day has 2 high tides and 2 low tides (every 6 hours is either high or low tide)

Tides are caused by: the gravitational forces of the moon & the sun on the earth's oceans

- The moons gravity is the MAIN force behind the tides
- The position of the sun and moon relative to the position of the Earth causes tidal ranges

These two types of DAILY tides due to the Earth's rotation (Day Night)

1. **High Tide** - happens at the part of the Earth _____ to the moon -
 - the water _____
2. **Low Tide** - at the part of the Earth at a 90° _____



These tides are affected by the LUNAR cycle and happen twice a month

3. _____ Tide - increased tidal range - occurs at _____ when the Sun and Moon are BOTH pulling the water in the same direction (SUPER HIGH Tide)
4. _____ Tide - smallest tidal range - occurs at _____ when the moon and sun are pulling in opposite directions - (90 ° Angle) (Extreme LOW Tide)

Name _____

Per. _____

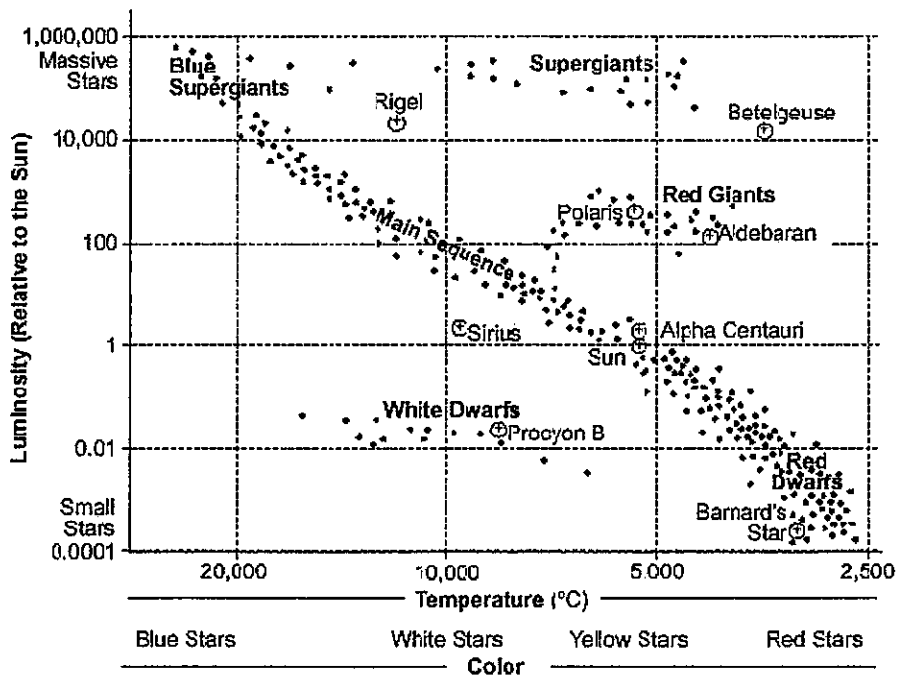


Do Now: Stars

1. _____: energy that is broken down into different wavelengths or colors.
2. _____: is the actual brightness of a star.
3. _____: is an instrument that separates visible light into the spectrum.
4. Five physical properties of stars are: _____, _____, _____, _____, and _____.
5. Hot stars are _____ in color.
6. Cool stars are _____ in color.
7. _____: is how bright a star appears to be to us on Earth.
8. Two elements that make up most stars are _____ and _____.
9. _____ is an average size, yellow star.
10. _____ is spiral shaped and contains our Solar System on one of its arms.
11. _____ is a theory used to explain the formation of galaxies where the universe was a big ball of hydrogen that exploded outward.
12. Light traveling from the Sun takes _____ and _____.
13. Stars are formed from large clouds of _____ and _____.
14. _____: can tell us what elements make up stars.
15. _____: is the distance that light travels in one year.



Directions: use the H-R Diagram to answer the questions below.



1. The brightest stars are called _____
2. As you move from left to right the temperature on the diagram _____.
3. Compared to a red dwarf, a white dwarf is _____ and _____.
4. The Sun is classified as _____.
5. Describe a Blue Supergiant in terms of luminosity and temperature.

6. Describe a Betelgeuse in terms of luminosity and temperature.

7. What color is Polaris? _____ Is it a hot or cool star? _____
8. What color is Rigel? _____ Is it a hot or cool star? _____

14-5 What are the motions of the Moon?

Lesson Review

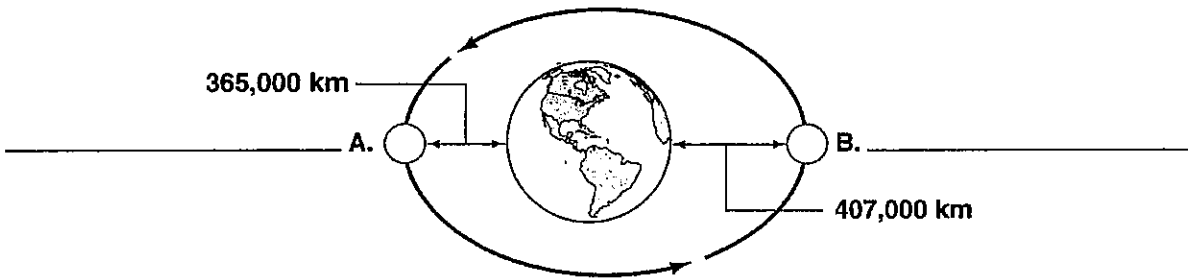
Complete the following.

1. When the Moon is closest to Earth, it is at _____.
2. When the Moon is farthest from Earth, it is at _____.
3. The Moon takes _____ days to make one complete revolution around Earth.
4. The Moon takes _____ days to rotate once on its axis.
5. From Earth, the Moon appears to rise in the _____.
6. The Moon appears to set in the _____.
7. The Moon rises and sets about _____ later each day.
8. Why does the same side of the Moon always face Earth? _____

Skill Challenge

Skills: identifying, calculating, applying concepts

Use the diagram to complete the following.



1. The diagram shows the distance of the Moon from Earth at apogee and at perigee. Label each of these positions on the diagram in the space provided.
2. What is the distance of the Moon from Earth at apogee? _____
3. What is the distance of the Moon from Earth at perigee? _____
4. How much closer to Earth is the Moon at perigee than at apogee? _____

14-6 What are the phases of the Moon?

Lesson Review

Match each term in **Column B** with its description in **Column A**. Write the correct letter in the space provided.

Column A

- _____ 1. changing shapes of the Moon
- _____ 2. phase when less than half of the Moon is visible from Earth
- _____ 3. phase when more than half of the Moon is visible from Earth
- _____ 4. phase when the part of the Moon that is visible increases
- _____ 5. phase when the part of the Moon that is visible decreases
- _____ 6. phase when the whole face of the Moon is visible

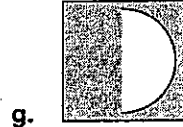
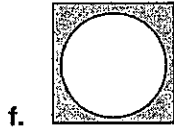
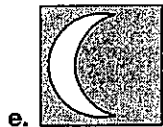
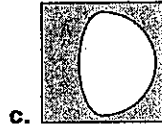
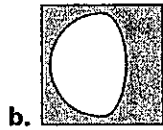
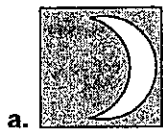
Column B

- a. waning Moon
- b. phases
- c. gibbous phase
- d. crescent phase
- e. waxing Moon
- f. full Moon

Skill Challenge

Skills: identifying, sequencing

In the spaces provided, identify the phase of the Moon shown in each drawing. Then, place the phases in the correct order by writing the letter of each drawing in the space provided. Begin with the new Moon phase.



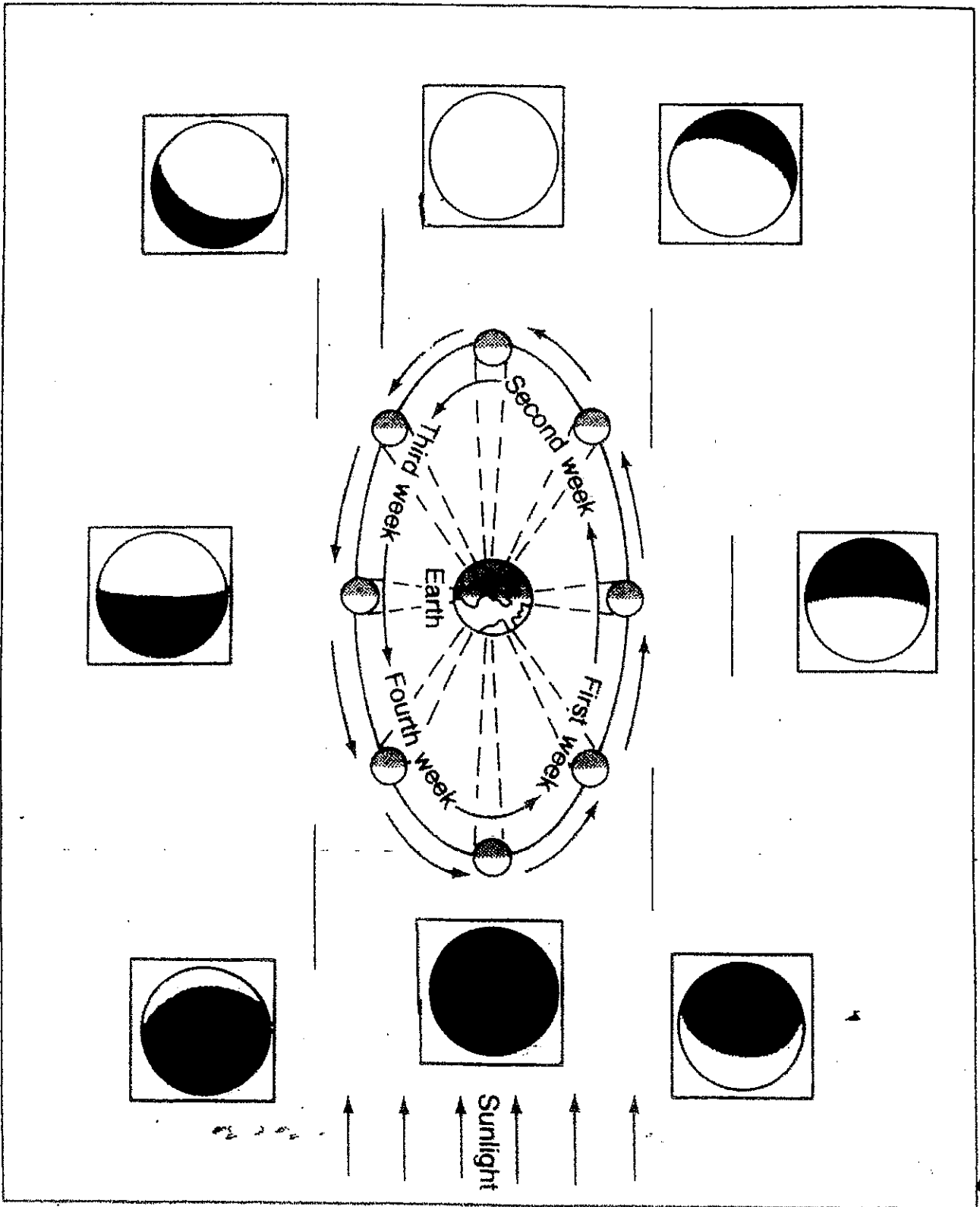
- a. _____
- c. _____
- e. _____
- g. _____

- b. _____
- d. _____
- f. _____
- h. _____

The correct order of the phases of the Moon: _____

Name _____

Date _____



Name _____ Period _____ Date _____

Earth-Moon System

1. What are moon phases?

2. What causes the moon phases?

3. How does a new moon differ from a full moon?

4. In terms of the moon, what do waxing and waning mean?

5. Why does the moon shine?

6. Following the new moon, does the moon begin to wax or wane?

7. Are there times other than the new moon when the moon can't be seen? Explain!

8. In which direction does the moon revolve around the Earth?

9. Why do we never see one side of the moon?

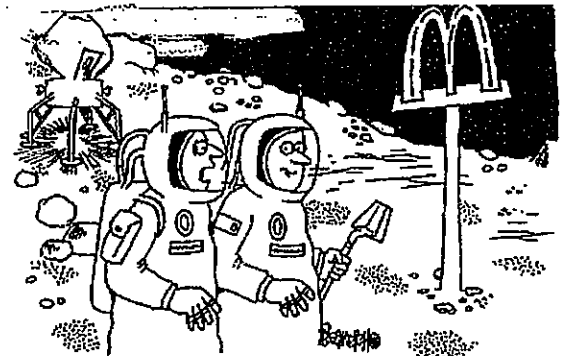
NAME _____ PER _____



VIDEO WORKSHEET- Moon- Bill Nye

1. Moon light is really _____
2. What is the moon's phase when the moon is in between earth and the sun? _____
3. Is it possible to see the moon in daytime? _____
4. What is "moon glow"? _____
5. How was the moon formed? _____
6. Does the moon have (more, less) gravity than the earth? (circle one)
7. The far side of the moon is also called the _____ side.
8. What makes the craters on the moon? _____
9. What causes the moon to stay revolving around the earth? _____
10. The moon's _____ makes the ocean move from low tide to high tide.
11. No moon. No _____.
12. Why don't we get eclipses every month? _____
13. The sun light on the moon always moves _____ to _____.
14. An eclipse is when the light from the sun is _____.
15. The gravity on the moon is _____ that of the gravity on earth.
16. What is the name of the last moon mission?

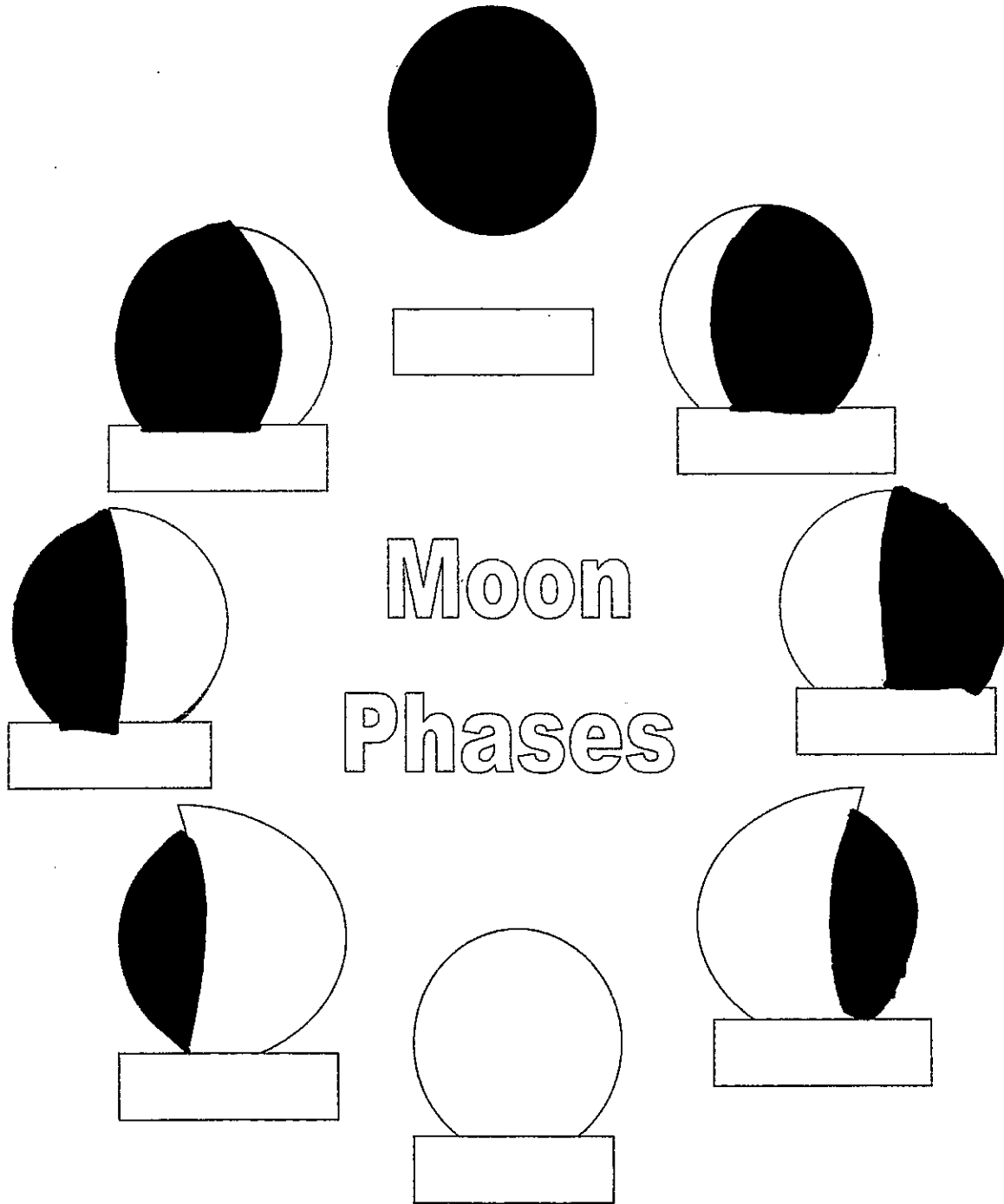
17. What year was this mission? _____



"IT'S PART OF THEIR GLOBAL EXPANSION."

Moon Phases Diagram

Label the phases of the moon.



13

On the back of this sheet, please explain why the appearance of the moon seems to change over time in the night sky?

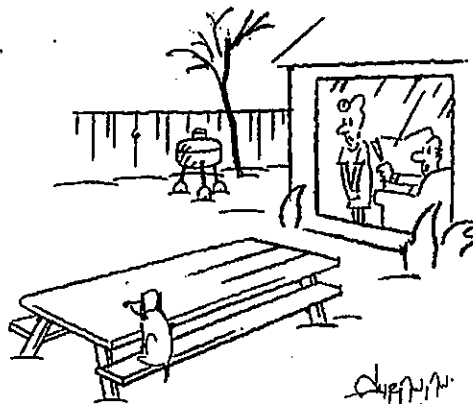
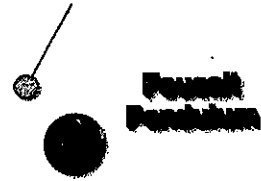
NAME _____ PER _____

VIDEO WORKSHEET- Earth's Seasons- Bill Nye



1. Why do we have seasons on earth? _____
2. When the part of the earth you are on is tilted toward the sun, what is the season? _____
3. What season is it on the opposite side of the earth from where you are? _____
4. Is the Earth's axis straight up and down? _____
5. What angle of the sun's rays hitting the earth produce the most heat? _____
6. In the winter the temperature is _____ than summer because of the _____ of the sun's rays.
7. Which season has the longest days? _____
8. What does the movement of the Foucault pendulum prove?

9. The reason that both the sun and the moon rise and set is the _____
10. In the Southern hemisphere in August it is _____. (winter or summer?)
11. How long does it take the earth to revolve around the sun? _____
12. Is the sun in the same place in the sky at the same hour every day? _____
13. What do June 21st and December 21st have in common? _____
14. In the northern hemisphere, which date has the longest day? _____
15. When are days the same length as nights all over the world? _____
16. Where on our planet are December, January, and February summertime? _____



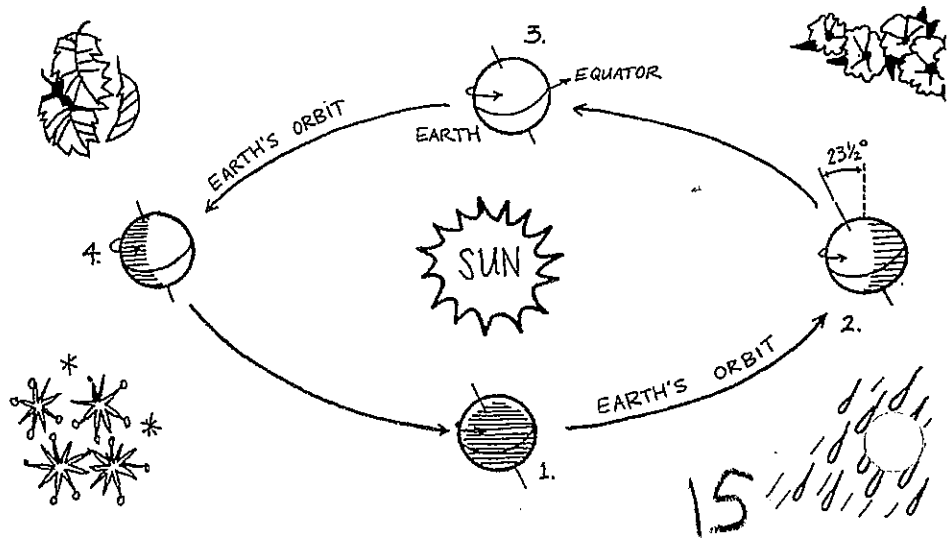
"I don't have the heart.
You tell him the barbecue season is over."

REASONS FOR SEASONS

What's with the seasons? How do they know when to come and go? It all has to do with the movements of Earth in relation to the sun. Here are some reasons. You fill in the blanks to tell what the reason explains.

1. Reason for _____: Because Earth is tilted $23\frac{1}{2}^\circ$ from a line perpendicular to its orbit, the length of daylight varies and because of the angle at which the sun's energy strikes a given location through the year.
2. Reason for _____ in the Northern Hemisphere: Because the Northern Hemisphere is tilted toward the sun for a few months.
3. Reason for _____ in the Northern Hemisphere and _____ in the Southern Hemisphere: Because Earth's tilt is sideways to the sun, and hours of daylight and darkness are the same in both hemispheres on about September 22.
4. Reason for _____ in the Northern Hemisphere: Because the North Pole is tilted almost directly toward the sun on about June 21.
5. Reason for _____ in the Southern Hemisphere: Because the South Pole is tilted away from the sun on about June 21.
6. Reason for _____ in the Southern Hemisphere: Because the Southern Hemisphere is tilted toward the sun for a few months.
7. Reason for _____ in the Northern Hemisphere: Because the South Pole is tilted almost directly toward the sun on about December 21.
8. Reason for _____ in the Northern Hemisphere and _____ in the Southern Hemisphere: Because Earth's tilt is sideways to the sun and hours of daylight and darkness are the same in both hemispheres on about March 20.
9. Reason for _____ in the Southern Hemisphere: Because the South Pole is tilted almost directly toward the sun on about December 21.
10. Reason for _____ hours of daylight at the South Pole: Because the South Pole is tilted directly toward the sun on about December 21.

On the diagram at the right, label winter solstice, summer solstice, fall equinox, and spring equinox for the Northern Hemisphere.



Name _____

14-3 What causes the seasons?

Lesson Review

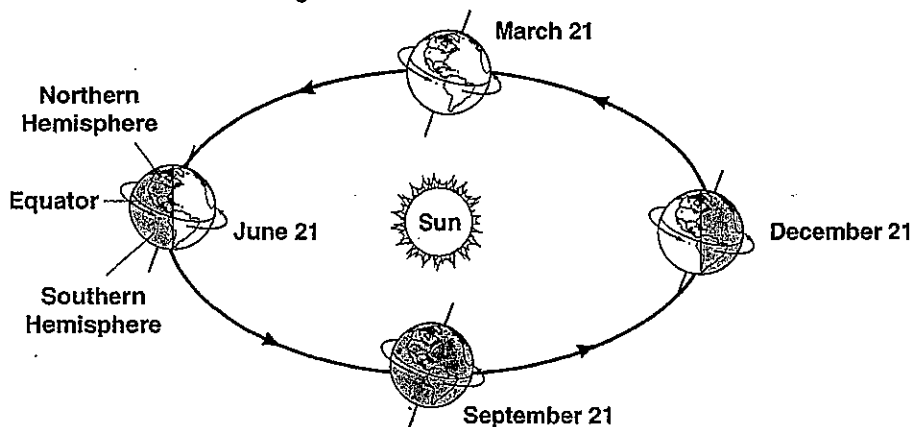
Write *true* if the statement is true. If the statement is false, change the underlined term to make the statement true.

- _____ 1. When the North Pole is tilted toward the Sun, the Northern Hemisphere has fewer daylight hours.
- _____ 2. During winter, the combination of fewer daylight hours and less direct rays of the Sun causes lower temperatures.
- _____ 3. When the Northern Hemisphere is tilted toward the Sun, it has summer.
- _____ 4. The seasons are caused in part by the tilt of Earth's axis.
- _____ 5. During summer, the Sun's rays are less direct.
- _____ 6. Direct rays produce more heat than indirect rays.
- _____ 7. The seasons in the Northern Hemisphere and the Southern Hemisphere are the same.

Skill Challenge

Skills: *interpreting, applying concepts*

Use the diagram to answer the following.



1. Does Earth revolve around the Sun in a clockwise or counterclockwise direction as viewed from above? _____
2. a. What season begins in the Northern Hemisphere on December 21? _____
 b. What season begins in the Southern Hemisphere on December 21? _____
3. a. What season begins in the Northern Hemisphere on March 21? _____
 b. What season begins in the Southern Hemisphere on March 21? _____
4. Does the Northern Hemisphere receive direct or indirect rays from the Sun on June 21? _____
5. Does the Northern Hemisphere have more daylight hours on December 21 or June 21? _____

14-4 What are the solstices and equinoxes?

Lesson Review

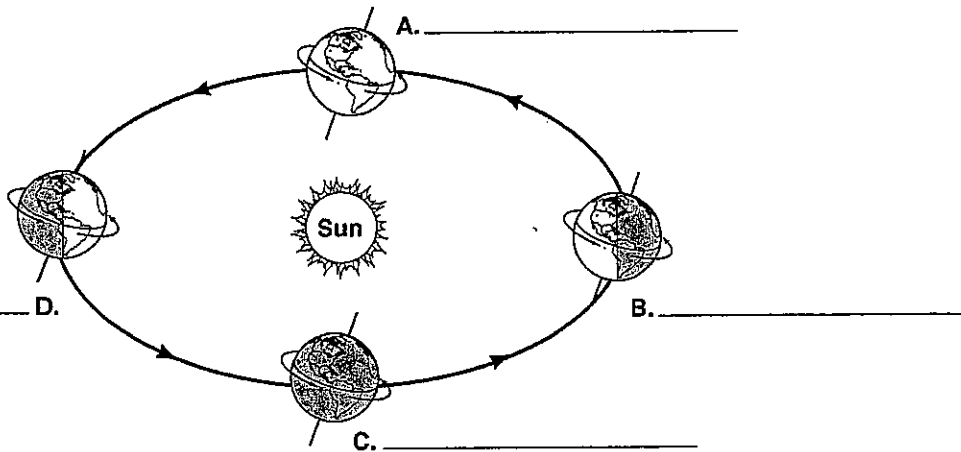
Answer the following questions. Write your answers in the spaces provided.

1. What does the term *solstice* mean? _____
2. What does the term *equinox* mean? _____
3. How many hours of daylight does the Northern Hemisphere receive on March 21? _____
4. When does the summer solstice occur in the Northern Hemisphere? _____
5. How many hours of daylight does the North Pole receive on June 21? _____
6. How many hours of darkness does the South Pole have on June 21? _____
7. The vernal equinox indicates the beginning of what season? _____
8. What is true of all places on Earth during the equinoxes? _____
9. What is the name for the time of year in which Earth is farthest from the Sun? _____
10. In what position is Earth in early January? _____

Skill Challenge

Skills: *interpreting, applying concepts*

Use the diagram to complete the following.



1. The diagram shows Earth's position in its orbit at the beginning of each season. Write the date for each position of Earth in the spaces provided.
2. What season begins in the Northern Hemisphere when Earth is at point A? _____
3. What season begins in the Northern Hemisphere when Earth is at point B? _____
4. At which point is Earth when the summer solstice occurs for the Northern Hemisphere? _____
5. At which point is Earth when the autumnal equinox occurs for the Northern Hemisphere? _____