

Earth & Space Science Packet

May 4th- May 8th, 2020

Griffin & King

This packet contains:

1. Worksheets for Astronomy and Space 1 & 2
2. Space Words Scramble

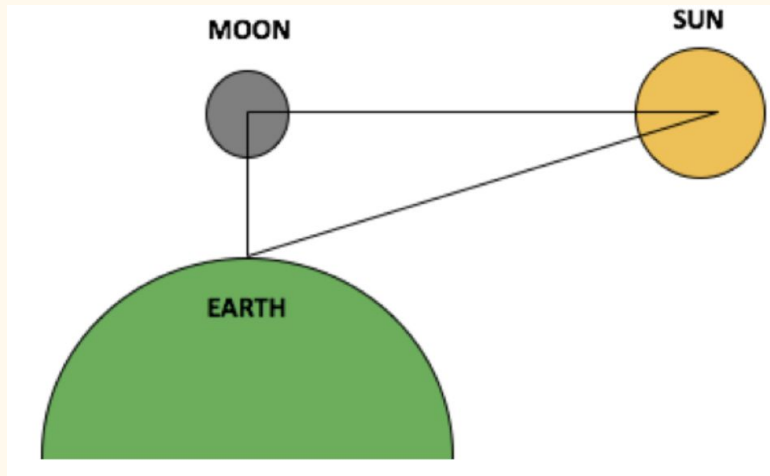
What needs to be turned in for a GRADE?

- Worksheets with questions answered

Optional/Enrichment included:

- Word Scramble

ASTRONOMY & SPACE 1



SUN, EARTH, MOON

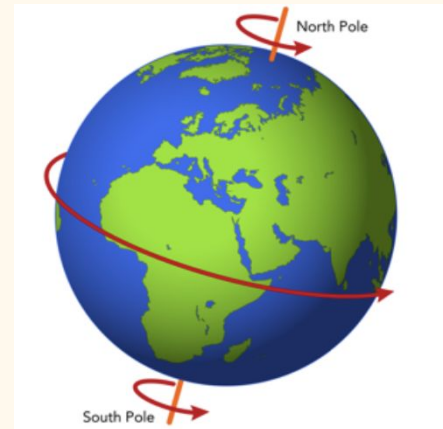
- **Sun-** is a source of heat and light for our world; a star (burning gas); it is a million times bigger than the Earth; rotates on an axis; temperature is 5600 degrees Celsius and is the shape of a sphere.
- **Earth-** 4 times larger than the moon; only planet which has life; 3rd in line of planets from the sun; 24 hours to rotate on an axis once; the shape of a sphere.
- **Moon-** rock; cratered surface; takes 29 days to revolve around the Earth; shape of a sphere.

EARTH-SUN-MOON SYSTEM

- The **Sun-** nearest star to Earth
- **Earth's orbit-** Earth moves around the Sun in a nearly circular path
- **Revolution-** Motion of one object around another object
- **Sun's gravitational pull-** the Earth orbits the sun due to the law of gravitational mass= greater gravitational pull
- Closer distance= greater gravitational pull

EARTH'S ROTATION & AXIS

- **Rotation**- spinning motion; Earth revolves around the sun
- **Rotation axis**- line on which an object rotates on an imaginary line through its center (axis)
- **Tilt of Earth's Rotation Axis**- Earth's rotation axis is tilted
- **Axis**- referring to the Earth, an imaginary line that runs through its center between the North Pole and the South Pole



THE MOON

- **Moon's Surface**- made of craters
- **Moon's Motion**- moon revolves around the Earth; gravitational pull of Earth causes moon to move in an orbit around Earth; DOES NOT ROTATE
- **Revolution** is 1 time every 27.3 days
- We only see one side of the moon from Earth
- Waning: more light; waxing: losing light

PHASES OF THE MOON

- Phases of the moon (Lunar Cycle)- phase is the lit part of the moon or a planet that can be seen from Earth
- **Waxing Phases**- more of the moon's near side is lit each night
- **Full Moon**- entire moon is seen
- **Waning Phases**- less of the moon's near side is lit each night
- **New Moon**- half of moon is seen



ECLIPSES

- **Solar eclipses**- Earth, the moon, and the sun are lined up- moon's shadow appears on Earth's surface; Total solar eclipses- moon appears to cover the sun completely

- **Lunar eclipses**- Moon moves into Earth's shadow; Total lunar eclipses- the entire moon moves through the Earth's umbra

SEASONS

- Climate has short-term cycles; Earth's **axis is tilted which causes seasons as it revolves around the sun.**
- Change in the amount of solar energy received at different latitudes at different times of the year; seasons are affected by the tilt of the earth's axis and the amount of solar energy the area receives
- When the northern hemisphere is tilted toward the sun- we experience more daylight hours, warmer temperatures, but the southern hemisphere gets fewer daylight hours and cooler temperatures because it is hidden from the sun.
- **Revolution**- Earth revolves around the sun once about **every 365 days**
- During revolution there are 4 days that mark the beginning of each season
 - **Summer Solstice**- June 21 or 22 in northern hemisphere, it is tilted towards the sun; December 21 or 22 in southern hemisphere, it is tilted toward the sun
 - **Winter Solstice**- December 21 or 22 in northern hemisphere, it is tilted away from the sun; June 21 or 22 in southern hemisphere, it is tilted away from the sun
 - **Equinoxes**- neither the northern hemisphere nor the southern hemisphere is tilted towards or away from the sun
 - **Spring Equinoxes**- March 21 or 22 for northern hemisphere; September 22 or 23 for southern hemisphere
 - **Fall Equinoxes**- September 22 or 23 for northern hemisphere; March 21 or 22 for southern hemisphere

THE MOON & TIDES

- The gravitational force that causes the largest tides is **between Earth and the moon**
- **Tides**- periodic rise and fall of sea levels caused by the gravitational force between the Earth and the Moon and the Earth and the Sun
- **High tide**- sea level is high; happens on the side that the Earth and moon are aligned and the opposite side of the Earth and moon
- **Low tide**- sea level is low; happens between the two bulges (high tide) on both sides of the Earth
- **Tidal range**- difference in water level between a high tide and a low tide

QUESTIONS

1. What is significant about Earth compared to other planets?
2. What is a rotation?
3. What is an axis? Can you see it?
4. What causes the moon to orbit the Earth?
5. What is a new moon?
6. About how long does it take the Earth to revolve around the sun one time?
7. Which gravitational force causes the largest tides?
8. What are tides?

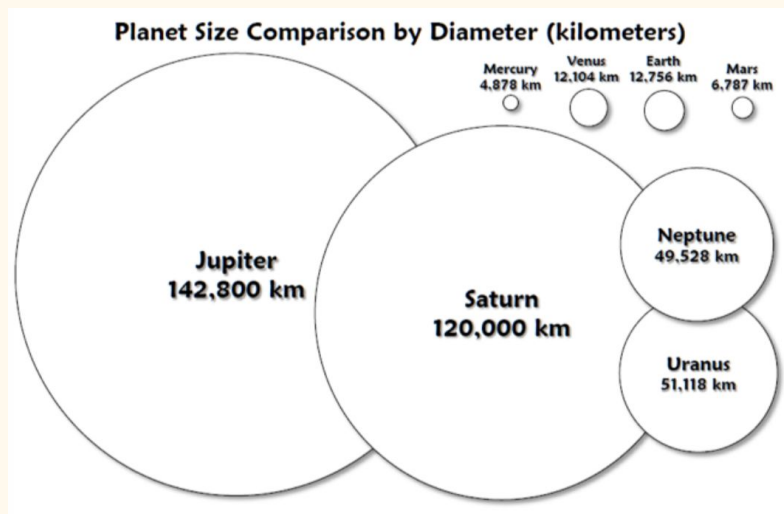
ASTRONOMY & SPACE 2



THE SOLAR SYSTEM

Objects that orbit the Sun-

- M, V, E, M, J, S, U, N
- Inner and Outer Planets
- Dwarf Planets
- Asteroids
- Comets



PLANETS

- **Inner planets**- terrestrial planets because surfaces are solid (Mercury, Venus, Earth, & Mars)
- **Outer planets**- further away, larger, and made of mostly gas
- **Dwarf planets**- small, but orbit the sun, and have spherical shape (Ceres, Makemake, Pluto, Eris, Earth's moon)

TERRESTRIAL PLANETS (INNER)

- Earth's Solar System has **four** terrestrial planets: **Mercury, Venus, Earth, and Mars**.
- **Earth**- active hydrosphere; earth-like planets (in Latin, *terra* means Earth) made up of rocks or metals with a hard surface; different from other planets that lack a solid surface
- Have a molten heavy metal core, few moons, and topological features such as valleys, volcanoes and craters.

GAS PLANETS (OUTER)

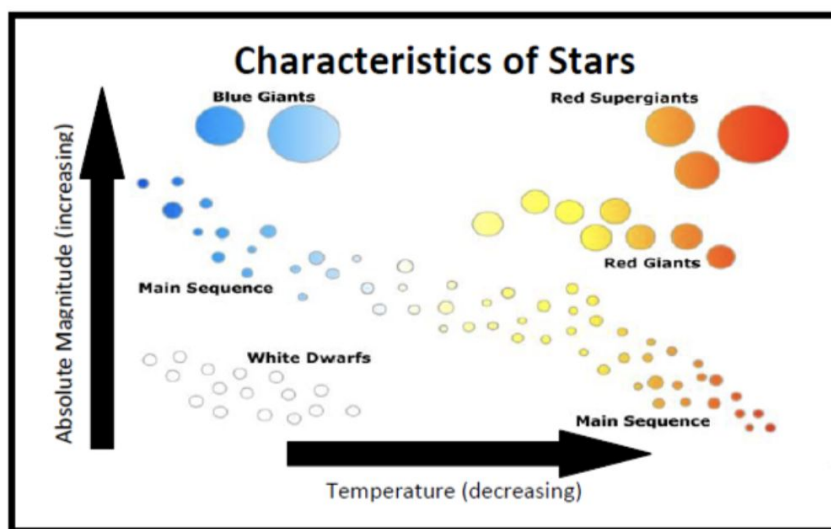
- **Gas giants** are large planets that contain more than 10 times the mass of Earth- known as the Jovian or Outer Planets
- Compositions are mostly gases, such as hydrogen, and small amounts of rocky material; **4 gas giants** in our solar system are **Jupiter, Saturn, Uranus, and Neptune**
- They take longer to orbit the sun because of their great distances; they are farther away from the sun than the terrestrial planets
- The **densities** of the gas giants are much less than the densities of the rocky, terrestrial planets; gas giants are not all gas
- Beneath the heavy atmospheres of **Jupiter and Saturn** are layers of molecular hydrogen and liquid metallic hydrogen
- **Uranus** has an icy layer over its solid rock core and is covered with a gaseous atmosphere; **Neptune** has a water-ammonia ocean for a mantle overlying its rocky core; metallic hydrogen layers in Jupiter and Saturn conduct electricity

SUN AND OTHER STARS

- **Star**- large ball of gas held together by gravity with a core so hot that nuclear fusion occurs

- **Classifying stars**- based on temperature, color, and mass; red is the coolest, blue-white is the hottest
- **Hertzsprung- Russell Diagram**- plots luminosity against temperature: y-axis=increasing luminosity; x-axis= decreasing temperature

HERTZ SPRUNG-RUSSELL DIAGRAM



STARS, GALAXIES, UNIVERSES

- **Constellations**- grouping of stars in the night sky; 88 officially recognized; stars appear near each other in the sky when viewed from Earth; Big Dipper, Little Dipper, Aries, Cancer, Orion's Belt
- **Galaxies**- huge collections of stars (hundreds of billions)- Milky Way
- **Universe**- contains hundreds of billions of galaxies

SPACE EXPLORATIONS AND DISCOVERIES

- **Telescopes**- gather and focus light from objects in space
- Rockets, satellites, space probes: Lunar (moon) probes- The Apollo program
- Planetary probes; space transportation systems- space shuttles
- **The International Space Station**- 1998 with 15 nations built a research laboratory
- Exploration of Mars

- Space discoveries have led to **new discoveries for the entire world**- new materials (running shoes, racing suits for swimmers, better tires, artificial limbs, robotic surgery, braces for teeth)
- **Other new discoveries** include light-emitting diodes (LEDs), infrared ear thermometers, firefighter uniforms, freeze drying technology, water purification.

SPACE MISSIONS

- Sputnik I- first man-made object to orbit the Earth
- Explorer 1 & 2- satellites in orbit
- N.A.S.A. is founded 1958
- Lunar probes- Luna 1- satellite orbits the moon (U.S.S.R.)
- Vostok I- U.S.S.R. Cosmonaut Yuri A. Gagarin is 1st in space
- Mercury Freedom 7- U.S. Astronaut Alan Shepard is 1st in space for U.S.
- Gemini Program- orbits Earth multiple times and proves we can get to the moon
- Apollo program- to the Moon!

QUESTIONS

1. How do we classify stars?
2. What are constellations?
3. What are galaxies?
4. What is the purpose of telescopes?
5. What are 3 major discoveries or inventions that help us today that came from space exploration?

Space Word Scramble

Challenge your knowledge with our space word scramble. Do you have what it takes to unscramble the range of word problems related to space, astronomy, our solar system and the wider universe?

QUESTIONS	ANSWERS
1. ESURVNEI	1.
2. NOMO	2.
3. TONASRUTA	3.
4. RUNAST	4.
5. ASTR	5.
6. NAPELT	6.
7. EMTOC	7.
8. ITVYAGR	8.
9. RMAS	9.
10. CPEOELSTE	10.
11. EUVNS	11.
12. SULHTET	12.
13. BTIOR	13.
14. NUS	14.
15. LGLXAY	15.
16. EOARISTD	16.
17. ETMORE	17.
18. UYRCREM	18.
19. YROMATSNO	19.
20. NTUNEPE	20.