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| **IESS 8 Unit 2: Astronomy** |
| **REQUEST FOR PROPOSAL** Students will develop a display which explains and illustrates a proposed mission to send a probe to an assigned planet. |
| **SCIENCE CONCEPTS** | **LABS AND ACTIVITIES** | **CONNECTION TO R.F.P.** |
| **How does the Movement of the Earth Impact Us?*** *I can defend the heliocentric model against the geocentric model using the evidence of the apparent movement of the Sun, moon, stars and planet across the ecliptic.*
* *I can explain the Goldilocks Theory*
* *I can describe the relationship between a satellite and the body around which it revolves.*
* *I can describe a period of revolution and rotation.*
* *I can explain how a solar year is determined.*
* *I can explain how Earth’s motions affect its seasons.*
 | * READ: What causes seasons?
* INV: Tracking the Sun
* GRAPH ORG: How Does the Earth Move?
 | * We need to compare Earth’s rotation to the orbit of our planet in order to plan our mission’s launch window.
* We need to compare the predictable path of Earth’s orbit to our planet’s orbit in order to plan the path for our mission.
* We need to compare the tilted axis of Earth to the axis of our planet in order to predict possible seasonal patterns.
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| **How Does Gravity Affect Us?*** *I can describe Newton’s three laws of motion.*
* *I can explain Keplers three Laws*
* *I can explain the Universal Law of Gravity*
 | * INV: Loopy Ellipse Lab
* Newton and Planetary Graphic Organizer
* Kepler Mission Lab and Star Wheel
 | * We need to apply Newton’s three laws to the predictable patterns of the Sun and the planets in order to plan our mission.
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| **How does the Movement of the Moon Impact Us?*** *I can explain the role and interaction of revolution, rotation and gravity on the Sun-Earth-Moon system.*
* *I can identify the Moon’s phases and why they appear as they do: Waning, Waxing, Gibbous, Crescent, New, Full.*
* *I can explain the difference between Sidereal and Synodic Lunar Months*
* *I can compare and contrast Tides: Neap and Spring.*
* *I can identify the types of eclipses and explain why they happen(lunar, solar, total, annular, partial, umbra, penumbra, 2 eclipse “seasons” per Earth year, yearly/monthly variations in lunar position and length of visibility of the moon)*
* *I can describe the Earth-moon interactions. (relationship between lunar phase and tide, tidal bulge and rate of lunar revolution, tides and Earth-moon distance.)*
 | * INV: Motion of the Moon
* INV: Moon Calendar
* READING: Eclipses and Phases
* INV: Analyzing Tides
* READING: Tide Rises Tide Falls
* QUIZ: Moon Phases, Eclipses and Tides
* If We Had No Moon
 | * We need to compare movement of Earth’s moon to the satellites (moons) of our planet for flyby, orbit, or landings.
* We need to compare the impact of the gravity of Earth’s moon on its tides to the satellites of our planet in order to predict the impact of gravitational pull.
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| **What is the Story of Our Sun?*** *I can identify the interior and exterior properties of the sun.*
* *I can explain the following processes that occur on the sun:*

*thermonuclear process, sunspot cycle, coronal mass ejection, flares, solar wind, aurora* | * INV: Observe Sun Spots
* READ: Structure of the Sun
 | * We need to explain the ways in which the suns’ processes might impact our mission.
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| **What is the Story of Our Solar System?*** *I can explain the theories of the evolution of our solar system*
* *I can identify the physical and chemical components of the 4 inner planets.*
* *I can compare and contrast the 4 inner planets in list form and classify them based on different characteristics.*
* *I can use mathematics to create a scale model of the solar system and compare measurements.*
* *I can identify the physical and chemical components of the 4 outer planets.*
* *I can compare and contrast the 4 outer planets in list form and classify them based on different characteristics.*
* *I can use mathematics to create a scale model of the solar system and compare measurements.*
* *I can describe the properties of asteroids and where they are found.*
* *I can describe the characteristics of comets.*
* *I can explain the formation of meteoroids.*
 | * RESEARCH: Planetary Facts
* INV: Asteroids, Meteors and Meteorites
* INV: Comets
* Graphic Organizer: Geocentric Vs. Heliocentric
* Capture sheet for textbook reading
 | * We need to explain how our planet formed in the evolution of our solar system.
* We need to identify the makeup of our planets. (i.e. chemical makeup, type of atmosphere, etc.)
* We need to calculate the size of our solar system to different scales in order to accurately measure the distance of our mission probe path.
* We need to be able to explain the location, properties and paths of asteroids and comets in order to avoid possible collisions with our probe.
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| **What is a Star?*** *I can identify the different wavelengths of the electromagnetic spectrum.*
* *The student will describe the purpose and advantage of current tools, delivery systems and techniques used to study the universe. Assessment limits*
* *I can describe tools used to study the universe. (optical and radio telescopes, spectrometers)*
* *I can describe the systems used to deliver data gathered by tools used to study the universe. (satellite-based, ground-based, space probe)*
* *I can explain the techniques used to study the universe. (imaging, spectroscopy).*
* *I can describe properties of stars.*
* *I can use an H R Diagram**to compare different types of stars.*
* *I can describe the stages of medium and high mass stars.*
* *I can explain the processes that define each stage.*
 | * READ: Characteristics of Stars
* NOTES: Life Cycle of a Star
* INV: Spectrometers
* QUIZ: Life Cycle of a Star and Characteristic of Stars
* Model: Life Cycle of Star Comic Strip
* Research: Magnetosphere, Auroras, Storm Signals,
 | * We need to know how to sense different wavelengths in order to understand how to study our sun and its planets.
* We need to know the type of star our sun is in order to explain the history of our assigned planet and its possible future.
* We need to be able to understand the types and properties of stars in order to plan for an extension to our mission.
* We need to understand the stages of stars and the processes that define each, in order plan a mission extension.
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| **Galaxies*** *I can identify the shapes of galaxies.*
* *I can describe how scientists measure the distance of galaxies in space.*
 | * INV: A Galaxy Far Far Away
 | * NEED connections for this one.
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| **Expanding Universe*** *I can identify and explain evidence that proves that the universe is expanding.*
 | * INV: Now That’s a BIG Universe!
* READING: The Big Bang!
 | * We need to understand the Big Band Theory in order to understand the history of our planet and its place in the universe.
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