



Unit Planner: Unit 7: Astronomy Science 8

Monday, August 1, 2020

*Archdiocesan Essential Curriculum > 2020-2021 > Grade 8 > Science > Science 8 (BP) > Week 32 - Week 37

Unit 7: Astronomy

Stage 1: Desired Results	
General Information	Essential Question(s)
<p>In this unit, students will learn about space and Earth's place in the solar system. Use physics concepts from previous units (forces, gravity) in this unit to help students make connections.</p> <p>The force of gravity hold the planets in place around the Sun and the moons in place around the planets. The Law of Universal Gravitation states that the force of gravity between two objects increases when mass increases and decreases between objects when distance increases.</p> <p>Phases of the moon, seasons, and eclipses occur because of the movement of the Sun, planets, and moon in our solar system. We see different phases of the moon from Earth because we see a different amount of the moon lit up each night in the lunar cycle. Half the moon is always lit by the sun (the side facing the Sun). We see different amount of moon depending on the position of the moon around Earth. The moon's period of rotation and revolution is the same so we see only one side of moon from Earth.</p> <p>The Earth is tilted on its axis at 23.5 degrees. This causes different amount of solar energy to be absorbed in different hemispheres and contributes to the season a particular area on Earth is experiencing.</p> <p>When the Sun is blocked by the moon, a solar eclipse occurs. When the Sun blocks the moon, a lunar eclipse occurs. Because the Sun is so far away and the moon is so close to Earth, the moon can block the entire Sun. Total solar eclipses are rare. Partial solar eclipses and lunar eclipses occur more frequently.</p> <p>Two shadows are produced during an eclipse. An umbra is a complete shadow, which is when all light is blocked out. A penumbra is a shadow in which some light is able to pass through.</p>	<ul style="list-style-type: none">• What effects do the sun and moon have on the Earth?• How does the mass of an object affect its gravity?• What forces allow the solar system to continue to move?• How can humans measure factors about the outer reaches of space using an understanding of light waves?

<p>Enduring Understandings and Knowledge</p> <p>Students will understand:</p> <ul style="list-style-type: none"> • How the movement of the sun and moon affect tides on Earth • How the tilt of Earth's axis affects the seasons people experience in different climate zones • From our vantage point on Earth the moon appears to change shape, however, we see different amounts of the moon lit up as it revolves around Earth. • As the mass of an object increases, so does its gravitational pull on other objects • All planets and objects in our solar system are kept in orbit around the sun because of the gravitational pull of the sun • All objects in our milky way galaxy are constantly in motion and revolve around the center of the galaxy because of its gravitational pull • It is hard to accurately model the scale size of planets and objects in our solar system; if the sun was the size of grain of rice, the planets would be smaller than a grain of sand if the solar system was drawn on a meter-long strip of paper 	<p>Skills</p> <p>Students will be able to:</p> <ul style="list-style-type: none"> • Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. • Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. • Analyze and interpret data to determine the scale properties of objects in the solar system. • Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.
<p>Connections to Catholic Identity / Other Subjects</p> <p>Religion</p> <ul style="list-style-type: none"> • Psalm 89:37 • "Like the moon it shall be established forever, a faithful witness in the skies." • Students can reflect on this bible verse to make connections between God and themselves, and the moon and the Earth. How do both pairs of things effect and relate to each other? • The Big Bang Theory (the theory, not the show) was developed by a famous Catholic scientist, Msgr. Georges Lemaitre of Belgium. You can talk about the Vatican Observatory and help explain how science and our faith are not in conflict. This is important as this is the last unit you will have with your students. They need to understand that there is no conflict between faith & science and that many Catholics (both ordained/consecrated and lay) are heavily involved in the sciences. See the links in the "text and other media" section for help. <p>ELA</p> <ul style="list-style-type: none"> • Use content to write in a style that the students are working on in class (narrative, argument/persuasive, informative, drama/poetry). 	<p>Vocabulary</p> <ul style="list-style-type: none"> • electromagnetic spectrum • light-year • parts of the lifecycle of a star (i.e., nebula, protostar, white dwarf, etc.) • celestial objects (i.e., asteroid, planet, sun, etc.) • gravity • axis • rotation • revolution • equinox • constellations • galaxy • orbit • seasons • phases • lunar eclipse • solar eclipse • spring tide • neap tide

<p>Math</p> <ul style="list-style-type: none"> • Connect with math by calculating distances and forces. Connect with content earlier in the year by working in Newton's Laws. 	
<p>Standards & Frameworks Addressed</p> <p>NGSS: Science Performance Expectations (2013) <u>NGSS: MS Earth & Space Science</u> MS.Space Systems Performance Expectations MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons. MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system. MS-ESS1-3. Analyze and interpret data to determine scale properties of objects in the solar system.</p> <p>© Copyright 2013 Achieve, Inc. All rights reserved. Access the interactive version of the NGSS here</p>	
<p>Teaching Ideas/Resources</p> <ul style="list-style-type: none"> • Content Area Expert Resources 	