

<b>Thomas Edison EnergySmart Charter School - Grade 5</b>		
<b>Unit Title:</b>	<b>Time Frame:</b>	<b>21<sup>st</sup> Century Theme:</b>
Unit 4 : Astronomy and Alternative Energy	Fourth Marking period – 45 Days	<b>9.1</b> - Critical Thinking & Problem Solving Communication and Media Fluency Creativity and Innovation
<b>Standard:</b>		
<ul style="list-style-type: none"> <li>● <b>5.2 Physical Science:</b> Physical science principles, including fundamental ideas about matter, energy, and motion, are powerful conceptual tools for making sense of phenomena in physical, living, and Earth systems science.</li> <li>● <b>5.4 Earth System Science:</b> The Earth operates as a set of complex and dynamic interconnected systems, and is a part of the all encompassing system of the Universe.</li> </ul>		
<b>Strands:</b>		<b>Cumulative Progress Indicator Number(s):</b>
<ul style="list-style-type: none"> <li>● <b>(5.2) C. Forms of Energy:</b> <i>Knowing the characteristics of familiar forms of energy, including potential and kinetic energy, is useful in coming to the understanding that, for the most part, the natural world can be explained and is predictable.</i></li> <li>● <b>(5.4) A. Objects in the Universe:</b> <i>Our Universe has been expanding and evolving for 13.7 billion years under the influence of gravitational and nuclear forces. As gravity governs its expansion, organizational patterns, and the movement of celestial bodies, nuclear forces within stars govern its evolution through the processes of stellar birth and death. These processes also governed the formation of our Solar System 4.6 billion years ago.</i></li> <li>● <b>(5.4) E. Energy in Earth Systems:</b> <i>Internal and external sources of energy drive the Earth system.</i></li> </ul>		<ul style="list-style-type: none"> <li>● <b>5.2.6.C.2</b> - Describe how prisms can be used to demonstrate that visible light from the Sun is made up of different colors.</li> <li>● <b>5.4.6.A.1</b> - Generate and analyze evidence (through simulations) that the Sun's apparent motion across the sky changes over the course of a year.</li> <li>● <b>5.4.6.A.2</b> - Construct and evaluate models demonstrating the rotation of Earth on its axis and the orbit of Earth around the Sun.</li> <li>● <b>5.4.8.A.2</b> - Use evidence of global variations in day length, temperature, and the amount of solar radiation striking Earth's surface to create models that explain these phenomena and seasons.</li> <li>● <b>5.4.6.E.1</b> - Generate a conclusion about energy transfer and circulation by observing a model of convection currents.</li> </ul>
<b>Learning Objectives:</b>		

- Explain the process of **nuclear fusion** in the sun
- Know that the Sun is the major source of energy for circulating the atmosphere and oceans.
- Explain why the height of the path of the Sun in the sky and the length of a shadow change over the course of a year.
- Review how Earth's position relative to the Sun and the rotation of Earth on its axis results in patterns and cycles that define time units of days and years.
- Light travels in a straight line until it interacts with an object or material. Light can be absorbed, redirected, bounced back, or allowed to pass through. Predict the path of reflected or refracted light.
- Demonstrate how the mixtures of all colors of visible light create sunlight (white light).

<b>Essential Question:</b>		<b>Enduring Understanding:</b>	
<ul style="list-style-type: none"> <li>● (5.2)How do we know that things have energy?</li> <li>● (5.4)What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun?</li> <li>● (5.4)What causes these patterns?</li> </ul>		<ul style="list-style-type: none"> <li>● (5.2)Energy takes many forms.</li> <li>● (5.4)These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy).</li> <li>● (5.4)Observable, predictable patterns of movement in the Sun, Earth, and Moon system occur because of gravitational interaction and energy from the Sun.</li> </ul>	
<b>Unit Learning Targets:</b> <i>The student will be able to...</i>		<b>Suggested Activities:</b> <i>Including Differentiated Strategies (DI)</i>	<b>Vocabulary:</b>
<ul style="list-style-type: none"> <li>● Identify how the height of the path of the Sun in the sky and the length of a shadow change over the course of a year. NJCCCS</li> <li>● Explain how Earth's position relative to the Sun, and the rotation of Earth on its axis, result in patterns and cycles that define time units of days and years. NJCCCS</li> <li>● Explain how Earth's tilt, rotation, and revolution around the Sun cause changes in the height and duration of the</li> </ul>		CT:FOSS kit( <i>Solar Energy</i> ) Investigations 1-4  LC: Global Warming and Green House effect-Colin Hocking, Cary.I.Sneider, John Erickson and Richard Golden.	<ul style="list-style-type: none"> <li>● axis</li> <li>● equinox</li> <li>● light spectrum</li> <li>● orbit</li> <li>● prism</li> </ul>

<p>Sun in the sky. These factors combine to explain the changes in the length of the day and seasons. NJCCCS</p> <ul style="list-style-type: none"> <li>• Demonstrate how light travels in a straight line until it interacts with an object or material. Light can be absorbed, redirected, bounced back, or allowed to pass through. The path of reflected or refracted light can be predicted. NJCCCS</li> </ul>	<p>US: Alternate Energy in Action: A Visit to a Solar House</p> <p>IR:  <a href="http://www.energyquest.ca.gov/teachers_resources/lesson_plans.html">http://www.energyquest.ca.gov/teachers_resources/lesson_plans.html</a>  <a href="http://www.pbs.org/wgbh/nova/teachers/activities/3507_car.html">http://www.pbs.org/wgbh/nova/teachers/activities/3507_car.html</a></p> <p>CT:FOSS (<i>Planetary Science</i>) Investigation 10, part 1-Moving Stars; <i>Sun, Moon and Stars</i>-Investigation 3, refer FOSSWEB</p> <p>LC:Backyard Stars: A guide for Home and the Road</p> <p>US: Stargazing: The Cosmos; January to March</p> <p>IR:<a href="http://school.discoveryeducation.com/lessonplans/programs/exploringstars.html">http://school.discoveryeducation.com/lessonplans/programs/exploringstars.html</a>.</p> <p>SR:Photographs of constellations</p>	<ul style="list-style-type: none"> <li>• radiant heat (energy)</li> <li>• revolution</li> <li>• rotation</li> <li>• solstice</li> </ul>
<p><b>Resource Materials:</b></p> <ul style="list-style-type: none"> <li>• National Science Digital Library, Science Digital Literacy Maps The Physical Setting: Solar System <a href="http://strandmaps.nsd.org/?id=SMS-MAP-1282">http://strandmaps.nsd.org/?id=SMS-MAP-1282</a></li> <li>• NSDL Collection K-12 Short Cuts: Middle School <a href="http://nsdl.org/resources_for/k12_teachers/middle-school.php">http://nsdl.org/resources_for/k12_teachers/middle-school.php</a></li> <li>• <i>Science Curriculum Topic Study</i> Earth, Moon, and Sun System, p.194</li> <li>• National Science Digital Library, Science Digital Literacy Maps The Physical Setting: <a href="#">Waves</a> <a href="http://strandmaps.nsd.org/?id=SMS-MAP-1364">http://strandmaps.nsd.org/?id=SMS-MAP-1364</a></li> <li>• National Science Digital Library, <a href="#">Science Refreshers</a> <a href="http://nsdl.org/refreshers/science/">http://nsdl.org/refreshers/science/</a></li> <li>• <i>Science Curriculum Topic Study:</i> Visible Light, Color and Vision p. 225</li> </ul>	<p><b>Assessments:</b></p> <ul style="list-style-type: none"> <li>• Quizzes</li> <li>• Journals and Portfolios</li> <li>• Open-ended Questions with Scoring Rubrics</li> <li>• Assessment Labs</li> <li>• Quizzes and Tests</li> <li>• Presentations</li> <li>• Posters</li> <li>• Project</li> <li>• Benchmark</li> </ul>	

<b>Technology Integration:</b>	<b>Related Literature:</b>
<ul style="list-style-type: none"><li>● Computer</li><li>● SMART Board</li><li>● Ipads</li></ul>	<p>: Global Warming and Green House effect-Colin Hocking, Cary.I.Sneider, John Erickson and Richard Golden</p> <p><u>The Magic School Bus Lost in the Solar System</u> by Joanna Cole</p> <p>LC:Backyard Stars: A guide for Home and the Road</p>