

**Topic of Study:** Energy and Its Uses, Heat, Forces and Motion

**Standards:** Physical Science

**Big Ideas:** 10. Forms of Energy, 11. Energy Transfer and Transformations, 12. Motion of Objects

**Essential Questions:** What are some forms of energy? Where does energy come from? What is sound? How do we use wind and water for energy? What is heat? How is heat produced? What are conductors and insulators? Which materials are conductors? What is motion? What is speed?

**Optional Teacher Background:** *ScienceSaurus*- Physical Science

**RESOURCES**

**SCIENCE CENTER**

**Vocabulary:** energy, kinetic energy, potential energy, mechanical energy, chemical energy, electrical energy, wind energy, hydroelectric energy, solar energy, heat, conduction, convection, radiation, conductor, insulator, position, motion, speed, velocity, force, acceleration

**Common Inquiry Labs:**

- *Science Fusion* Inquiry Flipchart “Energy Source” & “Hybrid Car Case Study” p.25
- *Science Fusion* Inquiry Flipchart “Where Does Energy Come From?” p.26
- *Science Fusion* Inquiry Flipchart “What is Sound?” p.27
- *Science Fusion* Inquiry Flipchart “Make a Pinwheel” & “Make a Water Wheel” p.28
- *Science Fusion* Inquiry Flipchart “Heating Things Up” & “Can Color Affect Temperature?” p.29
- *Science Fusion* Inquiry Flipchart “How is Heat Produced?” p.30
- *Science Fusion* Inquiry Flipchart “Sunny Side Up” & “Ready to Insulate” p.31
- *Science Fusion* Inquiry Flipchart “Which Materials are Conductors?” p.32
- *Science Fusion* Inquiry Flipchart “Fast Walk, Slow Walk” & “Walk this Way” p.33
- *Science Fusion* Inquiry Flipchart “What is Speed?” p.34

	<b>Technology Links:</b>	
<b>Lab Assistance:</b>  <a href="#">Daily Inquiries</a> <a href="#">Logs and Mini Lessons</a> <a href="#">Health Activities</a>	<b>Science Links:</b>  <a href="http://www.Thinkcentral.com">www.Thinkcentral.com</a> <a href="#">Fusion Teacher Resources</a> <a href="#">Graphic Organizers</a>	<b>Online Guides:</b>  <a href="#">Above Level</a> <a href="#">On Level</a> <a href="#">Below Level</a>

St. Lucie County Public Schools Scope and Sequence 2012-2013

NGSSS	Content	Targets
<p>SC.4.P.10.1 Observe and describe some basic forms of energy, including light, heat, sound, electrical, and the energy of motion. Cognitive Complexity: <b>Moderate</b></p> <p>SC.4.P.10.2 Investigate and describe that energy has the ability to cause motion or create change. Cognitive Complexity: <b>Moderate</b></p> <p>SC.4.P.10.3 Investigate and explain that sound is produced by vibrating objects and that pitch depends on how fast or slow the object vibrates. Cognitive Complexity: <b>High</b></p> <p>SC.4.P.10.4 Describe how moving water and air are sources of energy and can be used to move things. Cognitive Complexity: <b>Moderate</b></p>	<p>What are some forms of energy?</p> <ul style="list-style-type: none"> <li>▪ What is energy?</li> <li>▪ Kinetic Energy</li> <li>▪ Potential Energy</li> <li>▪ Mechanical Energy</li> <li>▪ Light Energy</li> <li>▪ Sound</li> <li>▪ Chemical Energy</li> <li>▪ Electrical Energy</li> <li>▪ Energy Can Change Forms</li> </ul> <p>How do we use wind and water for energy?</p> <ul style="list-style-type: none"> <li>▪ Hydroelectric (Water) Energy</li> <li>▪ Wind Energy</li> <li>▪ Renewable Energy</li> <li>▪ Solar Energy</li> </ul>	<ul style="list-style-type: none"> <li>▪ Identify energy uses and their sources.</li> <li>▪ Describe the uses of chemical and mechanical energy and how chemical energy can be changed to other forms of energy.</li> <li>▪ Differentiate between potential on kinetic energy.</li> <li>▪ Understand that sound is a form of energy produced through vibrations.</li> <li>▪ Identify how potential energy is transferred into kinetic energy.</li> <li>▪ Investigate how energy has the ability to cause motion.</li> <li>▪ Experiment with sound by changing the pitch of a vibrating object.</li> <li>▪ Observe changes in pitch by using a rubber band stretched to different lengths.</li> <li>▪ Describe how wind, water, and the sun are sources of energy.</li> <li>▪ Describe how moving air, water, and sunlight can be used to produce mechanical or electrical energy.</li> </ul>
<p>SC.4.P.11.1 Recognize that heat flows from a hot object to a cold object and that heat flow may cause materials to change temperature. Cognitive Complexity: <b>Low</b></p> <p>SC.4.P.11.2 Identify common materials that conduct heat well or poorly. Cognitive Complexity: <b>Low</b></p>	<p>What is heat?</p> <ul style="list-style-type: none"> <li>▪ The Energy of Heat</li> <li>▪ Temperature</li> <li>▪ Conduction</li> <li>▪ Convection</li> <li>▪ Radiation</li> </ul> <p>What are conductors and insulators?</p> <ul style="list-style-type: none"> <li>▪ Conductors</li> <li>▪ Insulators</li> <li>▪ Heat Proofing a Home</li> </ul> <p>Which materials are conductors?</p>	<ul style="list-style-type: none"> <li>▪ Define temperature and heat.</li> <li>▪ Describe three ways to transfer heat.</li> <li>▪ Identify sources of heat.</li> <li>▪ Observe that an object's temperature increases when it is exposed to a heat source.</li> <li>▪ Identify materials that conduct heat well.</li> <li>▪ Determine which materials can be used to prevent the transfer of heat.</li> <li>▪ Recognize that some materials conduct heat better than others.</li> <li>▪ Classify a small group of objects by the observable property: objects that conduct heat well and those that do not.</li> </ul>
<p>SC.4.P.12.1 Recognize that an object in motion always changes its position and may change its direction. Cognitive Complexity: <b>Low</b></p> <p>SC.4.P.12.2 Investigate and describe that the speed of an object is determined by the distance it travels in a unit of time and that objects can move at different speeds. Cognitive Complexity: <b>Moderate</b></p>	<p>What is motion?</p> <ul style="list-style-type: none"> <li>▪ Motion</li> <li>▪ Position</li> <li>▪ Speed</li> <li>▪ Velocity</li> <li>▪ Forces</li> <li>▪ Pushes and Pulls</li> <li>▪ Gravity</li> <li>▪ Friction</li> <li>▪ Acceleration</li> </ul> <p>St. Lucie County's "Get Real About AIDS" Curriculum</p>	<ul style="list-style-type: none"> <li>▪ Observe and record changes of position.</li> <li>▪ Explain how to measure motion.</li> <li>▪ Compare the motion of various objects.</li> <li>▪ Describe how velocity and acceleration are related.</li> <li>▪ Determine the speed of a moving object by measuring the distance it travels and the time required.</li> <li>▪ Recognize the difference between speed and velocity and record both for a moving object.</li> <li>▪ Determine how to increase or decrease the speed of an object they are investigating.</li> </ul>