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| **Columbus County Schools** *Science Curriculum Guide* | | |
| **SUBJECT:** Science | **GRADE LEVEL:** 7th | **GRADING PERIOD:** 4th 9 weeks |
| Module(s): H – Matter and Energy and I – Motion, Forces and Energy | Time Frame: 4 weeks | **Unit:** Matter and Energy |
| Essential Standard: **7.P.2: Understand forms of energy, energy transfer and transformation and conservation in mechanical systems.** | | | |

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| **Lesson:**  **Forms of Energy**  **(1 Week)** | **Technology and Literacy Standards and Tasks** | | **Academic Vocabulary:** | | **Assessment(s):** | | **Additional Resources:** | | |
| **Clarifying Objectives:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Essential Questions:**  What is energy?  How is work related to energy?  What are kinetic and potential energy? | ***Science Fusion* Online Components and Digital Lessons**  **Write to Learn *(*See Additional Resources)**  **Technology Standards:**  7.TT.1:  7.SE.1:  **Literacy Standards:**  [CCSS.ELA-Literacy.RST.6-8.3](http://www.corestandards.org/ELA-Literacy/RST/6-8/3/)  [CCSS.ELA-Literacy.RST.6-8.8](http://www.corestandards.org/ELA-Literacy/RST/6-8/8/) | | * work * energy * power * kinetic energy * potential energy * mechanical energy | | **Formative:**  Bell Ringer/Exit Tickets  Quiz  Review Games  Labs  Summative:  Group Project  **Science Formative Assessment: 75 Practical Strategies (Keeley)**   * **KWL Variations page 128** * **Juicy Questions page 121** * **Muddiest Point page 138** * **Student Annotated Drawings page 53**   **Summative:**   * **Unit Tests** * **County Benchmarks** * **Projects** * ***Exam View* Test bank** * ***Schoolnet* Test bank** | | McDougal Littell 7th Grade Science page 112D – 141D  **Write to Learn**  [Science 6 18.1 How is thermal energy transferred?](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1352&classID=9733)  [Science 6 17.1 How can energy change?](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1350&classID=9733)  [Science 5 14.1 What is energy?](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1216&classID=9733) | | |
| **Lesson:**  **Energy Transfer, Work, and Circuits**  **(1 Week)** | **Technology and Literacy Standards and Tasks** | | **Academic Vocabulary:** | | **Assessment(s):** | | **Additional Resources:** | |
| **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Essential Questions:**  What makes something electrically charged?  What flows through an electric wire?  How do electric circuits work? | ***Science Fusion* Online Components and Digital Lessons**  **Write to Learn *(*See Additional Resources)**  **Technology Standards:**  7.TT.1:  7.SE.1:  7.SI.1:  **Literacy Standards:**  [CCSS.ELA-Literacy.RST.6-8.2](http://www.corestandards.org/ELA-Literacy/RST/6-8/2/)  [CCSS.ELA-Literacy.RST.6-8.3](http://www.corestandards.org/ELA-Literacy/RST/6-8/3/)  [CCSS.ELA-Literacy.RST.6-8.7](http://www.corestandards.org/ELA-Literacy/RST/6-8/7/)  [CCSS.ELA-Literacy.RST.6-8.10](http://www.corestandards.org/ELA-Literacy/RST/6-8/10/) | * electric charge * electrical conductor * semiconductor static electricity * electrical insulator * electric current * voltage * resistance * electric circuit * parallel circuit * series circuit. | | **Formative:**  Bell Ringer/Exit Tickets  Quiz  Review Games  Labs  Summative  Group Project  **Science Formative Assessment: 75 Practical Strategies (Keeley)**   * **KWL Variations page 128** * **Juicy Questions page 121** * **Muddiest Point page 138** * **Student Annotated Drawings page 53**   **Uncovering Student Ideas in Science Vol.3 (Keeley)**   * **Batteries, Bulbs, and Wires page 57**   **Summative:**   * **Unit Tests** * **County Benchmarks** * **Projects** * ***Exam View* Test bank** * ***Schoolnet* Test bank** | | McDougal Littell 7th Grade Science page 112D – 141D  **Write to Learn**  [**Science 6 15.1 What happens when forces act on objects?**](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1360&classID=9733)  [**Science 5 15.3 What are complex circuits?**](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1222&classID=9733) | |

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| **Lesson:**  **Simple Machines**  **(1 Week)** | **Technology and Literacy Standards and Tasks** | **Academic Vocabulary:** | **Assessment(s):** | **Additional Resources:** |
| **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Essential Questions:**  How do simple machines work?  What are the six types of simple machines?  What are the applications of mechanical advantage and mechanical efficiency? | ***Science Fusion* Online Components and Digital Lessons**  **Write to Learn *(*See Additional Resources)**  **Technology Standards:**  7.TT.1:    7.SE.1:  **Literacy Standards:**  [CCSS.ELA-Literacy.RST.6-8.3](http://www.corestandards.org/ELA-Literacy/RST/6-8/3/)  [CCSS.ELA-Literacy.RST.6-8.8](http://www.corestandards.org/ELA-Literacy/RST/6-8/8/) | * machine * mechanical advantage * mechanical efficiency * lever * fulcrum * wheel and axle * pulley * inclined plane | **Formative:**  **Bell Ringer/Exit Tickets**  **Quiz**  **Review Games**  **Labs**  **Summative**  **Group Project**  **Science Formative Assessment: 75 Practical Strategies (Keeley)**   * **KWL Variations page 128** * **Juicy Questions page 121** * **Muddiest Point page 138** * **Student Annotated Drawings page 53**   **Summative:**   * **Unit Tests** * **County Benchmarks** * **Projects** * ***Exam View* Test bank** * ***Schoolnet* Test bank** | McDougal Littel page 142D – 175D  **Write to Learn**  [**Science 6 16.2 What are types of simple machines?**](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1349&classID=9733)  [**Science 6 16.1 How do machines help people work?**](http://pearsonkt.com/cgi-bin/writeToLearn/teacher/displayText.cgi?textID=1348&classID=9733) |

**Technology Standards Used in This Unit:**

7.SI.1: Research topics, use graphic organizers, and evaluate the validity of resources both online and in text.

7.TT.1: Use technology tools to organize information and explore new ways to communicate with peers and teachers.

7.SE.1: Learn safe practices when using online resources and the proper way to summarize retrieved information.

**Literacy Standards Used in this Unit:**

[CCSS.ELA-Literacy.RST.6-8.2](http://www.corestandards.org/ELA-Literacy/RST/6-8/2/) Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.

[CCSS.ELA-Literacy.RST.6-8.3](http://www.corestandards.org/ELA-Literacy/RST/6-8/3/) Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.

[CCSS.ELA-Literacy.RST.6-8.7](http://www.corestandards.org/ELA-Literacy/RST/6-8/7/) Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

[CCSS.ELA-Literacy.RST.6-8.8](http://www.corestandards.org/ELA-Literacy/RST/6-8/8/) Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.

[CCSS.ELA-Literacy.RST.6-8.10](http://www.corestandards.org/ELA-Literacy/RST/6-8/10/) By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.

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| **Day 1**  **Lesson: Introduction to Energy** | **Day 2**  **Lesson: Introduction to Energy** | **Day 3**  **Lesson: Introduction to Energy** | **Day 4**  **Lesson: Forms of Energy** | **Day 5**  **Lesson: Forms of Energy** |
| **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. |
| **Bell Ringer: Engage Your Brain Questions 1 and 2 p. 101 SE**  **Instructional Tasks:** “Introduction to Energy” Digital Lesson with Fill in Notes (Module H) **Summarizer**: Active Reading Question #3 p. 101 SE | **Bell Ringer: Probing Questions p. 139 TE 1st Question**  **Instructional Tasks:** Discussion “Chemical Potential Energy p. 132 TE (Module H)  “Diagramming Mechanical Energy” p.132 TE (Module H)  **Summarize**r: Probing Questions p. 139 TE 2nd Question (Module H) | **Bell Ringer: Formative Assessment Questions p. 140 TE (Module H)**  **Instructional Tasks: “**Designing a Simple Device” S.T.E.M. Lab OR Quick Lab “Setting Objects in Motion” p. 133 TE (Module H)  **Summarizer:** Visual Summary p. 110 SE (Module H) | **Bell Ringer: Formative Assessment p. 142 TE**  **Instructional Tasks: “**Designing a Simple Device” S.T.E.M. Lab OR Quick Lab “Setting Objects in Motion” p. 133 TE (Module H) Continued…  **Summarizer:** Explain the difference between “energy conservation” and “conservation of energy”. | **Bell Ringer: What happens to the kinetic energy of a snowball as it rolls across the lawn and gains mass?**  **Instructional Tasks:**  “Work, Power and Energy” Digital Lesson with fill in notes (Module I)  **Summarizer:** Formative Assessment questions p. 115 TE (Module I) |
| **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation | **Assessment:** Participation, Observation, Summarizer |

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| **Day 6**  **Lesson: Forms of Energy** | **Day 7**  **Lesson: Energy Transfer, Work and Circuits** | **Day 8**  **Lesson: Energy Transfer, Work and Circuits** | **Day 9**  **Lesson: Energy Transfer, Work and Circuits** | **Day 10**  **Lesson: Energy Transfer, Work and Circuits** |
| **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. . | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy. | **Clarifying Objective:**  **7.P.2.1: Explain how kinetic and potential energy contribute to the mechanical energy of an object.**  **7.P.2.2: Explain how energy can be transformed from one form to another (specifically potential energy and kinetic energy) using a model or diagram of a moving object (roller coaster, pendulum, or cars on ramps as examples).**  **Academic Vocabulary:**  work, energy, power, kinetic energy, potential energy, mechanical energy | **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. |
| **Bell Ringer: Formative Assessment questions p. 116 TE (Module I)**  **Instructional Tasks:** Make a foldable to organize the information from the topics of work, power and energy.  **Summarizer:** Explain how work, power and energy are related. | **Bell Ringer:**  **Instructional Tasks:** “Kinetic and Potential Energy” Digital Lesson with fill in notes.  **Summarizer:**  Formative Assessment Questions p. 127 TE (Module I) | **Bell Ringer: What is the difference between potential and kinetic energy?**  **Instructional Tasks:** Math Practice calculating kinetic energy, potential energy, and mechanical energy.  [**http://www.softschools.com/quizzes/science/potential\_kinetic\_energy/quiz1691.html**](http://www.softschools.com/quizzes/science/potential_kinetic_energy/quiz1691.html)  **Search internet for practice worksheets that will work for your class**  **Summarizer:** “Do the Math” p. 95 SE | **Bell Ringer: “Calculate” p. 91 #7 and 93 #10 SE**  **Instructional Tasks: Lesson Review SE p. 97**  **Summarizer:** Draw a picture of three bicyclists going over a mountain (one at the bottom, one resting at the top and one coasting down the other side. Describe the kinetic and/or potential energy of each cyclist. | **Bell Ringer: What part of an atom has a negative charge? What are forces? Give an example of a force that acts over a distance.**  **Instructional Tasks:  “Electric Charge and Static Electricity” Digital Lesson with fill in notes**  **Summarizer:**  Show a picture of a girl with her hair standing on end when she is touching a charged dome. Ask the questions from “Formative Assessment” p. 179 TE (Module I) |
| **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation | **Assessment:** Participation, Observation, Summarizer |

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| **Day 11**  **Lesson: Simple Machines** | **Day 12**  **Lesson: Simple Machines** | **Day 13**  **Lesson: Simple Machines** | **Day 14**  **Lesson: Simple Machines** | **Day 15**  **Lesson: Simple Machines** |
| **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. | **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. | **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. | **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. | **Clarifying Objective:**  **7.P.2.3: Recognize that energy can be transferred from one system to another when two objects push or pull on each other over a distance (work) and electrical circuits require a complete loop through which an electrical current can pass.**  **Academic Vocabulary:**  work, energy, power, mechanical energy, electric charge, electrical conductor, semiconductor, static electricity, electrical insulator, electric current, voltage, resistance, electric circuit, parallel circuit, series circuit. |
| **Bell Ringer: List two conductors, two semiconductors and two insulators.**  **Instructional Tasks:** “Electric Charge Carousel” Review  **Summarizer**: Visual Summary SE p. 134 (Module I) | **Bell Ringer: Visualize It p. 128 and 129 SE (Module I)**  **Instructional Tasks:** “Electric Current” Digital Lesson with Fill in Notes  Double Door Foldable “Characteristics of AC/DC Current”  **Summarizer:** Explain the difference between AC and DC current | **Bell Ringer: Explain voltage and resistance.**  **Instructional Tasks:**  Have pairs of students make a children’s book about electrical safety. “Teaching About Electrical Safety”p.203 TE (Module I)  **Summarizer:** Explain the difference between static electricity and electric current. | **Bell Ringer: Formative Assessment Questions p. 203 TE (Module I)**  **Instructional Tasks: “Electric Circuits” Digital Lesson with Fill in notes**  **Summarizer:**  **Why are power cords coated with a material that has properties that are different from the wire inside?** | **Bell Ringer: How are series and parallel circuits similar and how are they different?**  **Instructional Tasks: Lesson Reviews for Lesson 1, 2, and 3**  **Summarizer: Visual Summary p. 154 SE (Module I)** |
| **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation | **Assessment:** Participation, Observation, Summarizer |

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| **Day 16**  **Lesson: Simple Machines** | **Day 17**  **Lesson: Simple Machines** | **Day 18**  **Lesson: Simple Machines** | **Day 19**  **Lesson: Simple Machines** | **Day 20**  **Lesson: Simple Machines** |
| **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Academic Vocabulary:**  machine, lever, pulley, mechanical advantage, fulcrum, inclined plane, mechanical efficiency | **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Academic Vocabulary:**  machine, lever, pulley, mechanical advantage, fulcrum, inclined plane, mechanical efficiency | **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Academic Vocabulary:**  machine, lever, pulley, mechanical advantage, fulcrum, inclined plane, mechanical efficiency | **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Academic Vocabulary:**  machine, lever, pulley, mechanical advantage, fulcrum, inclined plane, mechanical efficiency | **Clarifying Objective:**  **7.P.2.4: Explain how simple machines such as inclined planes, pulleys, levers and wheel and axles are used to create mechanical advantage and increase efficiency.**  **Academic Vocabulary:**  machine, lever, pulley, mechanical advantage, fulcrum, inclined plane, mechanical efficiency |
| **Bell Ringer: “Engage Your Brain” Questions #1 and 2 p. 103 SE (Module I)**  **Instructional Tasks:** “Machines” Digital Lesson with fill in notes  **Summarizer**: What elements of force might machines change? | **Bell Ringer: Name the six simple machines.**  **Instructional Tasks:** Simple Machines Foldable (choose a foldable to have students organize their information about the six simple machines)  **Summarizer:** Define the terms lever and fulcrum. What characteristic of a lever is used to classify it as a first-class, second-class, or third-class lever? Which type of levers change the direction of the force? | **Bell Ringer: Why does an inclined plane reduce the amount of force needed to move an object?**  **Instructional Tasks: “Using Machines” p. 144 TE**  **Summarizer: Formative Assessment questions p. 145 TE (Module I)** | **Bell Ringer: # 16 p. 122 SE (Module I)**  **Instructional Tasks:  Lesson Review p. 115 SE (Module I)**  **Summarizer: Visual Summary p.114 SE (Module I)** | **Bell Ringer: Unit 2 Review p.119 SE (Module I) only**  **Instructional Tasks:  Alternative Assessment “Machines”**  **Summarizer: Synthesize p. 118 SE (Module I)** |
| **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation, Summarizer | **Assessment:** Participation, Observation | **Assessment:** Participation, Observation, Summarizer |