

TRANSFORMATION OF ENERGY

Science and English/Language Arts

Grades: 5

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Acceleration Approach

Standard has been accelerated by moving grade level 5 up to the standard used for grade level 8.

1	2	3	4	5	6	7	8	9	CIM	CRLS/ CAM yes
				—————▶						

Organizing Overarching Concept (e.g. systems, patterns of change, models, scales)

- Systems

Organizing Higher Order Skills (e.g. Bloom's, Paul's Model of Reasoning)

- Paul's: inferring, analyzing and evaluating

Differentiation Features – Students:

- Use multiple higher-level skills
- Have additional variables to study
- Develops a product
- Design and/or construct a model based on principles or criteria
- Design a model that transfers energy.
- Present oral and written communication to a real world audience

COMMON CURRICULUM GOAL**Science-Physical Science**

Understand structures and properties of matter and changes that occur in the physical world.

Energy – Understand energy, its transformations, and interactions with matter.

Language Arts/English-Communications

Communicate supported ideas using oral, visual, written, and multi-media forms in ways appropriate to topic, context, audience, and purpose.

Language Arts/English-Reading

Use the structural features of text to increase comprehension of a variety of informational printed and electronic text.

CONTENT STANDARD**Science-Physical Science**

Explain and analyze the interaction of energy and matter.

BENCHMARKS**Science**

5th Grade – Identify forms of various types of energy and their effects on matter.

8th Grade – Compare forms and behaviors of various types of energy.

5th Grade – Describe examples of energy transfer.

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Archetypal Model

Culminating activity will be a unit of study by creating a multi-media presentation.

TASK DEMAND

Read and demonstrate how form of energy can transfer to perform task.

Use textbooks, encyclopedias, and internet resources.

Sample Task Activity

- Choose one form of energy (heat, light, electricity, chemical, sound).
- Identify different ways that the form of energy can be transformed and how it can affect matter.
- Explain the transformation of the form of energy chosen and how it interacts with matter.
- Design and create an invention that transforms the chosen form of energy into another form to perform a task. For example, something that uses a motor to turn electrical energy into mechanical energy.
- Keep an invention log.
- Demonstrate the invention.
- Explain your invention and trace the flow of energy transformation as it operates.
- Produce and perform a commercial for the invention, explaining its purpose and use.

Questions

- What do you learn by comparing two forms of energy and how they react with matter?
- How does energy flow through your invention? Account for all of it.
- Did your invention create and/or destroy any energy? Explain. (**Note: Energy is never destroyed.**)

Implementation Time

- 1-day to research their form of energy, identify ways it can be changed and affect matter.
- 3-4 days to design and build an invention, and write the commercial.
- 1-day presentations.

8th Grade – Describe and explain various energy transfers and resulting transformations.

Language Arts/English-Communication

5th Grade – Clarify and support spoken ideas with evidence and examples.

5th Grade – Use descriptive words that clearly convey the message and establish the tone.

5th Grade - Use appropriate technical words that support clear understanding.

8th Grade – Use language effectively and creatively to make a strong impact, evoke a responses from the audience, and convey a clear message.

Language Arts/English-Reading

5th Grade – Use the features of informational texts such as formats, graphics, diagrams, illustrations, charts, maps and organization to find information and support understanding.

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Scoring Guide	6 Exemplary	5 Proficient	4 Strong	3 Developing	2 Emerging	1 Beginning
SPEAKING: see Standards and Assessments Section VII						
SCIENCE						
Students will be able to:						
Explain the transformation of energy in a system.						
Describe various forms of energy and how they interact with matter.						
Explain the principle that energy is conserved, neither created nor destroyed.						

Resources

- Middle Tennessee State University Physics Department http://physics.mtsu.edu/~phys231/Lectures/L18_-_L23/L22/Energy_Transfer/energy_transfer.html
- NASA <http://nasaexplores.com/standards/standards-s3.html>
- Oregon Public Education Network (OPEN) <http://open.k12.or.us/openc01.html>
- Ask Jeeves <http://www.askjeeves.com/>
- How Batteries Work <http://www.howstuffworks.com/battery.htm>
- How Force, Power, Torque and Energy Work <http://www.howstuffworks.com/fpte.htm>
- What is Energy? <http://www.howstuffworks.com/fpte6.htm>

Note: For teachers in Portland Public Schools, use *Circuits and Science Curriculum Resource*

The editor used the internet for many resources listed in this document. The listed books and internet sites should be reviewed and evaluated by the teacher before using.

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TAG NEEDS ADDRESSED

INTELLECTUALLY GIFTED	ADVANCED SCIENCE KNOWLEDGE/SKILLS	ACADEMICALLY TALENTED ENG/LA	CAREER RELATED LEARNING STANDARDS FOR CAM - Certificate of Advanced Mastery	TEACHER CHECKS THE BENCHMARK LEVEL STUDENT IS PURSUING
<input checked="" type="checkbox"/> Advanced Critical Reasoning <input type="checkbox"/> Scholarly Interaction <input type="checkbox"/> Continuous Progress for Level and Rate* <input type="checkbox"/> Challenging Resources <input type="checkbox"/> Effecting Change <input type="checkbox"/> Decision Making; Ethical Use of Influence <input type="checkbox"/> Leadership Training/Career <input type="checkbox"/> Realistic Goal Setting <input type="checkbox"/> Regular Interaction with Intellectual Peers <input type="checkbox"/> Social-Emotional Issues; Support; Coping Strategies <input type="checkbox"/> Advanced Academic Planning <input type="checkbox"/> Opportunity for Competition/Failures/Successes <input checked="" type="checkbox"/> Creative Problem Solving with Real Problems/ Audiences <input type="checkbox"/> Pursuit of Advanced Level Research <input type="checkbox"/> Advanced Vocabulary Development	<input checked="" type="checkbox"/> Advanced Critical Thinking in Science <input checked="" type="checkbox"/> Continuous Progress/Level and Rate* in Science <input type="checkbox"/> Challenging Science Resources <input checked="" type="checkbox"/> Creative Problem Solving Strategies in Science <input type="checkbox"/> Science Advanced Vocabulary Development <input type="checkbox"/> Leadership Training/ Career <input type="checkbox"/> Decision Making; Ethical Use of Influence <input type="checkbox"/> Regular Interaction with Talented Science Peer <input type="checkbox"/> Realistic Goal Setting <input type="checkbox"/> Opportunity for Competition/Failures/Successes <input type="checkbox"/> Advanced Academic Planning in Science	<input type="checkbox"/> Advanced Critical Thinking in LA <input type="checkbox"/> Continuous Progress/Level and Rate* in LA <input type="checkbox"/> Challenging LA Resources <input type="checkbox"/> Creative Problem Solving Strategies in LA <input type="checkbox"/> Advanced Vocabulary Development <input type="checkbox"/> Leadership Training/Career <input type="checkbox"/> Decision Making; Ethical Use of Influence <input type="checkbox"/> Regular Interaction with Talented LA Peer <input type="checkbox"/> Realistic Goal Setting <input type="checkbox"/> Opportunity for Competition/ Failures/Successes <input type="checkbox"/> Advanced Academic Planning in LA	<input checked="" type="checkbox"/> Personal Management <input checked="" type="checkbox"/> Problem Solving <input checked="" type="checkbox"/> Communication <input type="checkbox"/> Teamwork <input type="checkbox"/> Employment Foundations <input type="checkbox"/> Career Development	<p>Science:</p> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> CIM <input type="checkbox"/> CAM <p>English/LA:</p> <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> CIM <input type="checkbox"/> CAM
<p>Student _____ Grade _____</p> <p>Teacher _____ School _____</p> <p>Date Initiated _____ Date Completed _____</p> <p>Check TAG Identification category: <input type="checkbox"/> Intellectual <input type="checkbox"/> Academic Math <input type="checkbox"/> Academic LA</p>				