Science A–Z

HEAT ENERGY (3–4)

Correlation of Resources to National Science Standards

Use the chart below to discover how selected Science A–Z resources in the Heat Energy unit support certain Next Generation Science Standards (NGSS). While a single reading resource, science activity, comprehension support, or lesson cannot satisfy an entire Performance Expectation, using these resources together can help students develop the understandings and abilities they will need in order to satisfy each standard listed below. Most standards cited align with the grade level of this Science A–Z unit. For a reverse correlation tool that connects the standards to resources, visit our NGSS correlations page: www.sciencea-z.com/main/NextGenerationScienceStandards.*

Check the Performance Expectations Key below this chart for the complete text of the standards cited for each resource.

Resource Type	Resource Title	Performance Expectations
Unit Nonfiction Book	*Heat Energy* (3 reading levels)	**4-PS3-2; 4-PS3-4; 5-PS1-3; MS-PS1-4; MS-PS3-3; MS-PS3-4**
Interactive Science Lesson	*Thermal Energy Transfer* Part 1: Thermal Energy Transfer	**4-PS3-2; MS-PS3-3**
Interactive Science Lesson	*Thermal Energy Transfer* Part 2: Convection	**4-PS3-2; MS-PS3-3**
Interactive Science Lesson	*Thermal Energy Transfer* Part 3: Radiation	**4-PS3-2; MS-PS3-3**
Interactive Science Lesson	*Thermal Energy Transfer* Part 4: Conduction, Convection, or Radiation?	**4-PS3-2; MS-PS1-4; MS-PS3-3**
Process Activity	*Build a Thermometer*	**4-PS3-2**
Process Activity	*Insulate an Ice Cube*	**3-5-ETS1-1; 3-5-ETS1-2; 3-5-ETS1-3; MS-PS3-3**
Process Activity	*Observe Convection Currents*	**4-PS3-2; MS-PS3-3**
FOCUS Book	*Campfire Science*	**4-PS3-2; 5-PS1-3; 3-5-ETS1-1; 3-5-ETS1-2; MS-PS3-4**
FOCUS Book	*Get Cool, Stay Cool!*	**4-PS3-2; MS-PS3-3**
FOCUS Book	*Get Warm, Stay Warm!*	**4-PS3-4; MS-PS3-3**
FOCUS Book	*Science Friction*	**4-PS3-1; 4-PS3-4; 3-5-ETS1-3; MS-PS3-4**
FOCUS Book	*The Heat of Kilauea*	**3-PS2-2; MS-PS3-4**
Investigation Pack	Topic: Natural Heat Sources I. Files: *Wildfires; Geysers; Sea Vents; Volcanoes* Mystery File: *Body Heat*	**4-PS3-2; 4-ESS3-1; MS-PS3-4**

Continued on next page

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Resource Type	Resource Title	Performance Expectations
Debate	*Marshmallow Roast*	**4-PS3-2; 4-PS3-4**
Science Video	*Gallon of Gas*	**4-ESS3-1**
Science Video	*Yellowstone Geyser* (no audio)	**4-ESS3-1**
Career Files	*Glassblower; Volcanologist; Fire Investigator*	**4-PS3-2**
Quick Read	*Geothermal Power* (3 reading levels)	**4-PS3-4; 4-ESS3-1**
Quick Read	*Heat Sources Used Around the World* (3 reading levels)	**4-ESS3-1**
Quick Read	*Hot Springs and Geysers* (3 reading levels)	**4-ESS3-1**
Quick Read	*Microwave Ovens* (3 reading levels)	**4-PS3-2; 4-PS3-4; MS-PS1-4; MS-PS3-4**
Quick Read	*Sweat* (3 reading levels)	**4-PS3-2**
Quick Read	*Where Matches Come From* (3 reading levels)	**4-PS3-4**
Science Diagram	*Freezing and Boiling Points of Water*	**5-PS1-2; MS-PS1-4**
Science Diagram	*Light Energy Converts to Heat Energy*	**4-PS3-2**

Performance Expectations Key

3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.

4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.

4-PS3-2. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.

4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.

4-ESS3-1. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.

5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.

5-PS1-3. Make observations and measurements to identify materials based on their properties.

3-5-ETS1-1. Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

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3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

MS-PS1-4. Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

MS-PS3-3. Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.

MS-PS3-4. Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.