EPSD Curriculum and HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

GRADE 4

EPSD Unit 5: Transfer of Energy
Third Marking Period

Overview: In this unit of study, fourth-grade students develop an understanding that sound, light, heat, and electrical currents can transfer energy from place to place. Students also obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment. The crosscutting concepts of cause and effect, energy and matter, and the interdependence of science, engineering, and technology, and influence of science, engineering, and technology on society and the natural world are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations and obtaining, evaluating, and communicating information. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 4-PS3-2 and 4-ESS3-1.

Standards: (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-ESS3-1) Obtain and combine

Instructional Days: 15

HMH Science Dimensions Program Resources

Unit 2: Energy
Unit Video (bumper cars); **Unit Overview** p. 65; **Vocabulary** p. 67; **Making Connections** p. 67H; **Unit Project** p. 67I; **Unit Performance Task** p. 136-137; **Unit Review** pp. 138-140

Note: Unit 8, Natural Resources and Hazards (HMH Resources) can also be used to reinforce standards and objectives.

Standard for all Units: Interactive Glossary (D); Leveled Readers (D); Beginning-of-Year Test (D/P); Unit Pretest (D/P); Lesson Quizzes (D/P); Unit Test (D/P)

Note: Refer to the Curriculum Alignment Common Language (CACL) Guide to decipher acronyms.

Lesson 1: What Is Energy? pp. 68-87	**Lesson 2:** How Is Energy Transferred? pp. 88-113	**Lesson 3:** How Do Collisions Show Energy? pp. 114-135
D/P- CYEI (video) Heavy train moving across tracks. p. 69 ENB (prompt) Where did the energy come from to make the heavy train speed along the track? When the train stopped,	D/P- CYEI (video) Jackhammer transferring energy. p. 89 ENB (prompt) What is the difference between the sounds in the photo (refer to eBook or p. 89)? What makes each sound loud or	D/P- CYEI (video) Pool table showing the cue ball hitting the group of balls. p. 115 ENB (prompts) When one ball hits a group of balls, what do you think will

information to describe that energy and fuels are derived from natural resources and their uses affect the environment.		where did the energy go? p. 69 P- LS Cause and Effect (Students choose one energy example from eBook or p. 71 and describe the effect the energy causes.) p. 71 P- AWYK HO Activity Energy Near You (Students find examples of energy in the classroom and group them buy the kind of energy they show) p. 71 P- ENGIT Energy from Algae (Students explain how algae farming can help make air quality better.) p. 73 D/P- Forms of Energy p. 73 D/P- DTM Calculate Energy Units p. 75 P- AWYK HO Activity Testing, Testing (Students design a way to test whether the battery still works.) p. 75	soft? Explain how energy transfer from loud sounds is different from soft sounds. p. 89 D/P- Differences in Degrees p. 91 ENB (prompt) What evidence have you gathered so far to help explain how sound energy is transferred? p. 93 D/P- LS Heat Transfer without Touch (Students complete the chart by writing the cause and effect from each example.) p. 93 P- ENGIT Thermal Imaging p. 94 P- ENB (prompt) What evidence do you (student) have that visible light is made of all colors. p. 97 P- LS Energy Experience (Students use evidence as they recall experiences with different types of energy waves, and	happen to the cue ball? What about the balls that were racked up at the other end of the table? p. 115 D/P- Energy and Things That Move (video)! pp. 116-117 P- AWYK HO Activity Bang a Gong (Students gather materials to experiment with what is seen in the picture on p. 118, slow-moving ball striking gong) p. 118 P- AWYK HO Activity Flour Power (Students will conduct experiment activity on p. 121 and change one thing they saw. Students will repeat experiment and record results. Students will respond to the following questions: How were the results the same, and how were they different? What does this show about the
Objective 1: Students will be capable of describing a natural resource and differentiating between renewable and non-renewable resources. Students will recognize renewable and nonrenewable resources in a given environment. **Objective 2:** Students will work with ice cubes and different colored paper to develop observations that prove energy can be transferred from the paper to the ice cube. **Objective 3:** Students will work with various materials to make observations that energy can be transferred from one object to another. **Objective 4:** Students will be introduced to the complexity of natural resource uses through the example of copper mining and use. **Objective 5:** Students will understand that the more natural resources you extract, the greater the impact on the land.				

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Topics: Transfer of Energy Renewable and Non Renewable Resources Twenty-First Century Themes and Skills include: Environmental Literacy • The Four • Global Awareness **Essential Questions**: How does energy move? From what natural resources are energy and fuels derived? In what ways does the human use of natural resources affect the environment?	D- Batteries and Energy Output P- AWYK HO Activity Light the Bulb p. 76-77 P- LS Forming an Explanation (Students describe the energy transformation that occurs with an everyday task such as listening to the radio and draw a diagram to match their description.) p. 79 P- ENB (prompt) When the bell rings signaling the end of class, what evidence would you say proves that energy has been transferred?) p. 79 D/P- LS Conduct Research to determine how electrical energy can transform and list the types of ways. p. 81 D/P- TIF (enrich) People in Science & Engineering: Mayra Artiles, Car Engineer; Dr. Marcus Lehmann, Ocean Engineer pp. 83-84 D- Vampire Appliances D- Potato Power	respond to the following questions: Which of the energy waves shown on p. 97 have you experienced? What evidence do you have of each type of energy?) p. 97 P- AWYK HO Activity Design and Test a Solar Cooker pp. 99-101 P- ENB (prompt) Use information on p. 102 to explain how a loud sound is different from a soft sound. p. 102 D/P- Explore the roles of speakers in transferring sound. p. 103 P- AWYK HO Activity Make Vibrations p. 103 D/P- DTM Compare the Speed of Sound p. 106 P- AWYK HO Activity Tune In p. 107 D/P- Explore how tuning forks work. p. 107 D/P- TIF (enrich) Careers in Science & Engineering: HVAC Tech pp. 109-110 D- Keep it Cold D- The Paynes and Fast-Traveling Whale Songs	relationship between speed and energy?) pp. 120-121 P- ENB (prompts) What would happen to the flour if the balls were heavier? If the balls were lighter? P- LS Cause and Effect: Explain how weight can affect collisions. p. 120 P- AWYK HO Activity Test It! Stored Energy in a Rubber Band pp. 122-124 P- CER Students work with a partner to critique each other's claims and evidence in Step 7 of the HO Activity. p. 124 P- ENGIT Shocking (Students describe what it would feel like to ride on a bumpy path in a car that did not have springs to absorb energy.) p. 127 P- LS Recall from Experience (Students consider examples they have seen thus far, and identify another object that is able to absorb and store energy, and is useful.) p. 127

	D/P- Lesson Check pp. 85-86 D/P- Lesson Roundup p. 87 D- Lesson Quiz P- DI (ELL/RTI) p. 67G P-Extension p. 67G P- COLLAB p. 67H P- Making Connections p. 67H D- Science Safety HB D- CCC-HB D- ELA-HB D- M- HB D- SEP - HB D- ScienceSarurs Reference HB D- VBP No Gas Needed	D/P- Lesson Check pp. 111-112 D/P- Lesson Roundup p. 113 D- Lesson Quiz P- DI (ELL/RTI) p. 67G P-Extension p. 67G P- COLLAB p. 67H P- Making Connections p. 67H D- Science Safety HB D- CCC-HB D- ELA-HB D- M- HB D-SEP-HB D- ScienceSarurs Reference HB	P- LS Cause and Effect (Students describe what happens to the other balls that are cued up when the cue ball hits them) p. 128 P- ENB (prompt) List examples of collisions that are seen every day. p. 128 P- AWYK HO Activity Rebounce (Using a meter stick and ball, students work with partner to observe the ball as it bounces, and respond to following question: Where does the energy go when the ball collides with the ground?) p. 130 D/P- TIF (enrich) People in Science & Engineering, Amanda Steffy pp. 131-132 D- Bump! D- Collision Game! D/P- Lesson Check pp. 133-134 D/P- Lesson Roundup p. 135 D- Lesson Quiz P- DI (ELL/RTI) p. 67G P-Extension p. 67G P- COLLAB p. 67H

			P- Making Connections p. 67H D- Science Safety HB D- CCC-HB D- ELA-HB D-SEP-HB D- ScienceSarurs Reference HB D- YSI Simulation Crash Course

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Curriculum Alignment Common Language (CACL) Guide K-5		
Acronym	**Word/Phrase**	**Description**
AWYK	Apply What You Know	Hands on opportunities for students to apply learning.
CER	Claims Evidence Reasoning	Students make a claim and gather evidence along the way (during EXPLORATORY activities) to support claim.
CYEI	Can You Explain It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.
CYSI	Can You Solve It	Lesson phenomenon used to ENGAGE students in learning at the beginning of the lesson.
D	Digital	Program resources and features in interactive digital form.
DI (ELL/RTI) **Extension** **COLLAB** **Connections to Science**	Differentiated Instruction (English Language Learner/Response to Intervention) Collaboration Connections to Science	A page that lists all learning activities used to differentiate learning, engage students in collaborative activities and connect learning to other subjects.
DTM	Do the Math	Integrated subject learning.

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ENB	Evidence Notebook (prompt)	Student notebook or journal used to gather evidence during EXPLORATORY learning activities to support their claims.
ENGIT	Engineer It	Integrated subject learning.
HB **CCC-HB** **ELA-HB** **M-HB** **SEP-HB**	Handbooks Crosscutting Concepts English Language Arts Math Science and Engineering Practices	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
HO	Hands-On (Activity)	Student collaboration activities.
LS	Language Smarts	Integrated subject learning.
P	Print	Program resources and features in print form.
TIF	Take It Further (enrich)	Enrichment activities for students in print or digital.
YSI	You Solve It (Simulation)	Open-ended simulation-based learning with multiple answer options.