EPSD Curriculum and HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

GRADE 4

EPSD Unit 2: Earth Processes
First Marking Period

Overview: In this unit of study, students apply their knowledge of natural Earth processes to generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. In order to describe patterns of Earth's features, students analyze and interpret data from maps. The crosscutting concepts of patterns, cause and effect, and the influence of engineering, technology, and science 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, analyzing and interpreting data, and constructing explanations and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit is based on 4-ESS2-2, 4-ESS3-2, 3-5-ETS1-2, and 3-5-ETS1-3.

Standards: (4-ESS2-2) Analyze and interpret data from maps to describe patterns of Earth's features. (4-ESS3-2) Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Instructional Days: 15-20

HMH Science Dimensions Program Resources

Unit 8: Natural Resources and Hazards
Unit Video (Japanese town destroyed by a large and powerful tsunami); **Unit Overview** p. 523; **Vocabulary** p. 525; **Making Connections** p. 525J; **Unit Project** p. 525K; **Unit Performance Task** p. 620-621; **Unit Review** pp. 622-624

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 Nonrenewable Resources Are Used for Energy? pp. 526-547	**Lesson 2:** Engineer It: What Renewable Resources Are Used for Energy? pp. 548-571	**Lesson 3:** Engineer it: How Can People Reduce the Impact of Land-Based Hazards? pp. 572-595	**Lesson 4:** Engineer It: How Can People Reduce the Impact of Water-Based Hazards? pp. 596-619
D/P- CYEI (digital picture) A look at how cars have changed over time. p. 527 P- ENB (prompt) Students identify factors that they	D/P- CYEI (digital picture) A house with solar panels. p. 549 P- ENB (prompt) This home (house with solar panels) has plenty of	D/P- CYEI (video) Earthquake-proof house on a simulator. p. 573 P- ENB (prompt) In what ways can people reduce the	D/P- CYEI (digital picture) Sand bags along a river. p. 597 P- ENB (prompt) How will these actions (sandbags along river) help

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Objective 1: Students will explain that combining different materials is necessary when using rocks, soils and minerals for construction. **Objective 2:** Students will explain how engineers need to consider material properties of rocks, soils and minerals when creating something new. **Objective 3:** Students will identify some of the factors that make buildings earthquake-proof, including cross bracing, large "footprints," and tapered geometry. Students will model an earthquake-proof structure using simple materials. **Objective 4:** Students will model the movement of a normal fault. **Objective 5:** Students will demonstrate how buildings built on loose sediment and sediment saturated with water can be structurally unsound during an earthquake. **Topics:** Earth Processes Twenty-First Century Themes and Skills include: Environmental Literacy • The Four C's • Global Awareness **Essential Questions**: What can maps tell us about the features of the world? In what ways	think car designers consider when designing a car that does not run on gasoline. p. 527 D/P- Resources Around You (Students explore online about resources.) p. 528 D/P- LS Students identify how crude oil, coal, and natural gas different from uranium. p. 529 P- AWKY HO Activity Students conduct research to find about the energy generating plant that supplies electricity to their school and make a poster about their findings. p. 530 P- ENB (prompt) Using the examples in their eBook or on p. 531, students think of kinds of vehicles that they think do not run	electricity day and night. How does it get most of its electricity? p. 549 D/P- Use It Again (Students explore renewable resources online.) pp. 550-551 P- ENB (prompt) Students record their thoughts about whether any of the nonrenewable resources (that they have learned about) may be what's providing electricity to the house they saw at the beginning of the lesson. p. 551 P- LS Students make connections by describing two renewable and two nonrenewable resources where they live. p. 551 D/P- Energy Plants (Students watch video and explore	impact of land-based natural hazards, such as earthquakes? p. 573 D/P- AWYK HO Activity Make Your Own Seismometer p. 574-574 D/P- Cause and Effects of Land-Based Hazards (Students watch video to discover more about causes and effects of natural hazards.) p. 576 D/P- DTM Richter Scale (Students use multiplication equations to understand magnitude on the Richter scale.) p. 577 P- LS Students use examples from the text to explain why an understanding of the causes and effects of land-	reduce the impact of a water-based hazard? What else could reduce the impact of this hazard? p. 597 D/P- DTM Classifying Hurricanes p. 599 D/P- Causes and Effect of Water-Based Hazards (Students watch video to discover more about causes and effects of water-based natural hazards.) p. 600 P- AWYK HO Activity Take Action (Students imagine that their family lives in a region called "Watertown," and the region is being impacted by a drought. Students carry out one activity from a list to show their understanding of

can the impacts of natural Earth processes on humans be reduced?	using one of the nonrenewable sources of energy on p. 531 or in the eBook. p. 531 D/P- DTM Calculate Energy Units pp. 532-533 D/P- LS Students respond to question using summarizing skills: What do the methods of extracting these fuels (on p. 535 or in eBook) all have in common? p. 535 D/P- Where Are They Found? (Students use map reading skills to explore where fossil fuels can be found.) p. 536 P- AWYK HO Activity Mining Challenge (Students model a mining operation) p. 537 P- ENB (prompt) What are some	online about Energy Plants.) p. 552 D/P- ENGIT (Students use inference skills to describe engineering challenges in building turbines that operate in the sea. p. 553 D/P- Cloudy Days, No Wind, Little Water (Students explore online about renewable energy sources.) pp. 554-555 P- ENB (prompt) Students identify whether renewable sources of energy can generate electricity for a house by themselves or are the other sources of energy necessary. p. 555 D/P- DTM Bright Savings (Students use information from a table to	based hazards is important to helping people stay safe.) p. 577 P- ENB (prompt) Students identify three specific facts about natural hazards that would be important to engineers who are designing ways to keep people safe. p. 577 D/P- Earthquake Maps pp. 578-579 P- AWYK HO Activity Disaster Supply Kit (Students identify one type of natural hazards that they brainstorm and research supplies that would be important to include in a disaster supply kit. Students draw a diagram of their supply kit.) p. 581 D/P- ENGIT Reducing Impacts	the impact of a drought and how the effects of the drought can be lessened.) p. 601 P- ENB (prompt) Students identify how information about the causes and effects of water-based hazards can be used to lessen their impacts. p. 601 D/P- Where Are There Droughts? (Students explore online to find out more about the causes and effects of hazards.) pp. 602-603 P- LS Analyze and Evaluate Internet Information (Students conduct research to identify ways that people can apply information about water-based natural hazards to help

	pros and cons of cars that run on gasoline? p. 537 D/P- ENGIT hybrid Cars p. 539 P- LS Students make inferences about how they think car batteries, of cars that run entirely on electric energy, might be recharged with electricity. p. 539 D/P- AWYK HO Activity Catch That Dirt (Students investigate pollution in the air.) pp. 540-542 D/P- TIF (enrich) Careers in Science & Engineering: Types of “ISTs” pp. 543-544 D- What’s Around You? D- On a Mining Mission	infer about what generates the typical yearly cost figures for different bulbs.) pp. 558-559 D/P- AWYK HO Activity Plastics from Plants (Students use corn-based ingredients and turn them into substances that can be worked into different shapes.) p. 560 D/P- LS Cause and Effect (Students choose the best words to complete sentences.) p. 561 D/P- HO Activity Engineer It: Running on Sunshine (Students collaborate with a group to design a solar hot water heater.) pp. 562-566 P- CER After class has compared designs from the HO Activity, have	with Technology (Students study pictures to discover online more about land-based hazard technology.) p. 582 P- HO Activity Make a Plan (Students work in small groups to choose a land-based natural hazard to research and create a safety video about the hazard.) p. 583 P- ENB (prompt) Students identify how seismographs and maps, showing the history of earthquakes, might help them. p. 583 D/P- LS Students choose the correct words to complete each sentence. p. 585 D/P- HO Activity Engineer It: Reduce the Risk (Students work in groups to develop a plan to reduce the impact	them stay safe.) p. 603 D/P- ENGIT Using Technology to Reduce Impacts (Students study pictures online to discover more about how technology can increase our safety from a natural hazard.) p. 606-607 P- LS Students choose a water-based natural hazard that occurs in their state and describe a family emergency plan that would help keep them safe if they got a warning the hazard may occur. p. 607 D/P- ENGIT Improving Levees pp. 608-609 P- ENB (prompt) Students describe a variety of methods that can be used to

	D/P- Lesson Check pp. 545-546 D/P- Lesson Roundup p. 547 D- Lesson Quiz P- DI (ELL/RTI) p. 525I P-Extension p. 525I P- COLLAB p. 525J P- Making Connections p. 525J D- Science Safety HB D- ELA-HB D- M- HB D- SEP-HB D- Crosscutting Concepts - HB D- ScienceSarurs Reference HB D- YSI Simulation Natural Resources and Hazards	the entire class brainstorm an improved design for the cooker.) p. 566 D/P- TIF (enrich) People in Science and Engineering: Elon Musk pp. 567-568 D- Sort It Out D- The Hoover Dam D/P- Lesson Check pp. 569-570 D/P- Lesson Roundup p. 571 D- Lesson Quiz P- DI (ELL/RTI) p. 525I P-Extension p. 525I P- COLLAB p. 525J P- Making Connections p. 525J D- Science Safety HB D- CCC-HB D- ELA-HB D- M- HB D- SEP-HB	of a landslide.) p. 586-590 P- CER Student groups exchange lab reports, read each other's answer to each question and access each other group's evidence and reasoning using a scale of 1 to 5, 1 being the lowest. p. 590 D/P- TIF (enrich) People in Science & Engineering: Dr. Lucy Jones pp. 591-592 D- Hawaii Island Lava Hazard Zone Maps D- Debate About a Volcano Solution D/P- Lesson Check pp. 593-594 D/P- Lesson Roundup p. 595 D- Lesson Quiz	reduce the impact of flooding p. 609 D/P- AWKY HO Activity Engineer It: Is It Safe? (Students collaborate in teams to figure out how to reduce the damage a tsunami might do to a small neighborhood.) pp. 612-614 D/P- TIF (enrich) Hurricanes and Their Effects pp. 615-616 D- Careers in Engineering D- Make It Safer D/P- Lesson Check pp. 617-618 D/P- Lesson Roundup p. 619 D- Lesson Quiz P- DI (ELL/RTI) p. 525I P-Extension p. 525I P- COLLAB p. 525J P- Making Connections p. 525J

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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.