EPSD Curriculum and HMH SCIENCE DIMENSIONS 2018 Alignment TEMPLATE

GRADE 8

EPSD Unit 8: The Electromagnetic Spectrum
Fourth Marking Period

<table>
<tr><td colspan="2">Overview: In this unit of study, students develop and use models, use mathematical thinking, and obtain, evaluate, and communicate information in order to describe and predict characteristic properties and behaviors of waves. Students also apply their understanding of waves as a means of sending digital information. The crosscutting concepts of patterns and structure and function are used as organizing concepts for these disciplinary core ideas. Students develop and use models, use mathematical thinking, and obtain, evaluate, and communicate information. Students are also expected to use these practices to demonstrate understanding of the core ideas.</td><td colspan="4">Science Dimensions Program Resources Module K</td></tr>
<tr><td colspan="2"></td><td colspan="4">Unit 2: Electric and Magnetic Forces
Unit Video (thunderstorm producing a spectacular lightening display); Why it Matters p. 94; Unit Starter p. 95; Vocabulary p. 95I Unit Project p. 95K; Unit Connections p. 168; Unit Review pp. 169-172; Unit Performance Task pp. 173-174</td></tr>
<tr><td colspan="2"></td><td colspan="4">Standard for all Units: (D) Interactive Multilingual Glossary; (D/P) Unit Pretest; (D) Lesson Quizzes; (D/P) Unit Tests

Note: Refer to the Curriculum Alignment Common Language (CACL) Guide to decipher acronyms.</td></tr>
<tr><td colspan="2">Standards: (MS-PS4-1) Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave. (MS-PS4-2) Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials. (MS-PS4-3) Integrate qualitative scientific and</td><td>Instructional Days: 15-20</td><td>Lesson 1: Magnetic Forces pp. 96-111

D/P- WIM Questions p. 94

D/P- CYEI (video) Why do these rings seem to float without touching one another instead of falling? p. 97</td><td>Lesson 2: Electric Forces pp. 112-129

D/P- WIM Questions p. 94

D/P- CYEI (video) What causes the water droplets to change direction and spiral toward the needle? p. 113</td><td>Lesson 3: Fields pp. 130-147

D/P- WIM Questions p. 94

D/P- CYEI (digital pictures) Is a stink field a real field? p. 131

P- ENB (prompt) Gather evidence to help explain</td><td>Lesson 4: Electromagnetism pp. 148-167

D/P- WIM Questions p. 94

D/P- CYEI (video) How can these pieces of metal be picked up and then released without the crane grabbing them from their</td></tr>
</table>

technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.		P- ENB (prompt) Gather evidence to help explain the behavior of the rings. p. 97 D/P- Describing Magnets and the Magnetic Force (Students watch video and observe how magnets affect one another.) p. 98 P- ENB (prompt) How might the ability of magnets to attract or repel other magnets relate to the floating rings? Students record evidence in their ENB. p. 98 D/P- HOL Activity Explore the Behavior of Magnets (Students plan and carry out investigations in order to explore the behavior of magnets and its relationship to	P- ENB (prompt) Gather evidence to help explain the behavior of the water droplets on the ISS. p. 113 D/P- Electric Charge: Observable Electric Charges (Students explore images online to learn more about the different types of electric charge.) p. 114 D/P- The Conservation of Charge: Transferring Charges (Students take a closer online at the images to observe how charges can be transferred by friction between everyday objects.) p. 115 D/P- ENGIT Students determine a solution to the	whether a stink field is a good analogy for other types of fields. p. 131 D/P- Evaluating Evidence of Fields (Students go online to view video about how spiders use force to detect prey on their webs.) p. 132 P- ENB (prompt) Students look at the pictures of people smelling stinky garbage at the beginning of the lesson and use what they have learned about fields and field lines to describe each person's reaction to the garbage they have encountered. p. 133. D/P- Electric Fields (Students go online to view	sides or bottoms? p. 149 P- ENB (prompt) Gather evidence to help explain how the crane can lift and release these metal objects. p. 149 D/P- Charge Movement: Moving Charge (Students watch animation to view negative charges moving towards positively charged regions.) p. 150 D/P- Moving Electric Charge and Magnetic Fields: Moving Charge (Students view the animation of a negative charge moving towards the right and generating a magnetic field.) p. 152
Objectives: Students will: Use mathematical representations to describe and/or support scientific conclusions about how the amplitude of a wave is related to the energy in a wave. Develop and use models to describe the movement of waves in various materials. Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims that digitized signals are a more reliable way to encode and transmit information than analog signals are.					
Topics: Waves • Interactions of Waves • Sound • Light Electromagnetic Spectrum Twenty-First Century Themes and Skills include: • The Four C's • Life and Career Skills • Information and Media literacy.					
Essential Questions: Why do surfers love physicists? How do the light and sound system in the auditorium work? How do cell phones work?					

	magnetic force.) p. 99 D/P- Analyze the Magnetic Force: Part I Distance and the Magnetic Force (Students analyze careful measurements to determine the relationship between the strength of magnetic force and distance.) pp. 100-101 P- DTM Students graph data to determine the relationship between the strength of magnetic force and distance between magnets. p. 101 D/P- Analyze the Magnetic Force: Part 2 Magnet Strength and the Magnetic Force (Students explore the relationship	problem of charge buildup. p. 116 P- ENB (prompt) Water droplets tend to have a neutral charge. How might they still be affected by the charges of other objects? Record evidence. p. 117 D/P- The Electric Force: Electrostatic Levitation (Students watch video to observe how electrostatic force can be used to make an object float.) p. 118 P- ENB (prompt) Students provide thoughts as to whether the water droplets that spiral around the charged needle on the ISS might experience an electric force. Students record	video of the electric fields of experiment.) p. 135 D/P- Model Electric Fields (Students go online to analyze the pattern of the field lines in the model and draw the correct charge to complete the model.) p. 136 D/P- Analyze Magnetic Fields (Students rank the strength of the magnetic field in different spots.) p. 137 D/P- DTM Calculate the Change in Magnetic Fields Due to Distance (Students compare strength of the magnetic force at different distances.) p. 137	P- ENB (prompt) How might a magnetic force that can be turned on or turned off be used? Students record evidence in their ENB. p. 153 D/P- Solenoids: Wire Loops (Students examine the diagrams online to observe how solenoids are made.) p. 154 D/P- ENGIT Explore Uses of Solenoids (Students read text and respond to question OR work in pairs to explain the problem the solenoid solves.). p. 154 D/P- HOL Activity Build an Electromagnet (Students construct an electromagnet and test its strength.) pp. 156-157

	between magnet strength and strength of the magnetic force.) p. 102 D/P- LS Students record observations and write a claim that states how they believe the type of magnet affects the strengths of the magnetic force; students use evidence to support their claim and explain their reasoning. p. 102 p- ENB (prompt) Do the distance and the strength of different magnets seem to affect the behavior of the rings? If so, how can these variables be related to the forces acting on the rings? Record evidence. p. 103	evidence in their ENB. p. 118 D/P- HOL Activity Explore the Electric Force: Part I Variables that Affect the Electric Force (Students ask and answer questions to determine the variables that affect the strength and direction of electric force.) p. 119 D/P- HOL Activity Explore the Electric Force: Part 2 Distance between Charged Objects (Students investigate how distance affects the strength of the electric force.) p. 121 D/P- LS Students record observations and construct a claim of how distance	D/P- LS Analyze Evidence for Fields (Students analyze the evidence and complete the table by filling in the Supports Claim and Reasoning columns.) p. 138 P- ENB (prompt) Think about what affects the strength of a field. Compare the stinky garbage at the beginning of the lesson to magnetic, electric, and gravitational fields. Identify the factors that affect the strength of each field. Are there similar factors that affect the strength of the garbage's stink? Students record evidence in their ENB. p. 139	D/P- ENGIT Students work in pairs to write the problem they are solving and to review what they already know about solenoids and electromagnets; student pairs then identify what they might change about the electromagnet to come up with possible solutions to the problem they have identified. p. 156 D/P- Electric Current and the Magnetic Force: Changing Current (Students watch video to observe how changing the current affects the strength of the magnetic force.) p. 157

	D/P- Magnetic Domains (Students explore diagrams online to discover more about magnetic domains and use drawing tools to sketch how the magnetic domains of two iron nails might appear when they are near each other.) p. 105 P- ENB (prompt) What kind of force did the levitating rings display? What does this say about the magnetic domains of these objects? Students record evidence in their ENB. p. 105 D/P- ENGIT Students read text and respond to questions OR Students work in groups to jigsaw to become experts in one of the steps	between charged objects affects the electric force; students support their claim using evidence from their observations. p. 121 P- ENB (prompt) How might the distance between the needle and the water droplets have affected the movement of the droplets? Record evidence. p. 121 D/P- HOL Activity Explore the Electric Force: Part 3 Magnitude of Electric Charge (Students explore the relationship between the magnitude of electric charge and the strength of electric force.) pp. 122-123 P- DTM Students make a graph of	D/P- Investigate Earth's Electric Field (Students use drawing tools online to draw arrows to complete the model of Earth's electric field on a sunny day.) p. 139 D/P- HOL Activity Model Magnetic Fields (Students plan and carry out an investigation to model magnetic fields; students investigate the cause and effect of different combinations of magnets.) pp. 141-142 P- ENB (prompt) Students explain what a field is and use examples from the investigation. Students identify whether their explanation apply	P- ENB (prompt) The electric current in a magnet can be controlled. How might the ability to control the strength of an electromagnet relate to the crane's ability to pick up and release metal? Record evidence in ENB. p. 157 D/P- Number of Loops (Students watch video to observe how changing the number of loops affects the strength of the magnetic force.) p. 158 D/P- LS Explain the Usefulness of Electromagnets (Students cite text from the lesson that explains how electromagnets differ from

	from the Word Bank. Groups report out to the class discussing and determining which example relates to the step presented. p. 106 D/P- TIF (enrich) Investigate Permanent Magnets pp. 107-108 D- Hands-On Labs; Magnets in Everyday Life; Propose Your Own Path D/P- Lesson Self Check pp. 109-111 D- Lesson Quiz D-Make Your Own Study Guide P- DI (ELL/RTI) p. 95I P- Extension p. 95I P- COLLAB p. 95J	their data to see how the total number of rubs affects the distance between the two balloons. p. 123 P- ENB (prompt) Could the water droplets in the ISS pictures be affected in the same way as this stream of water is being affected? Students record evidence in their ENB. p. 124 D/P- TIF (enrich) Static Electricity pp. 125-126 D- Hands-On Labs; Experimenting with the Charges of Materials; Propose Your Own Path D/P- Lesson Self Check pp. 127-129 D- Lesson Quiz D-Make Your Own Study Guide	to the stink around a pile of garbage; students record evidence in their ENB. p. 142 D/P- ENGIT Engineer Solutions Using Fields (Students watch video to discover more about Ferrofluids and respond to questions in the text.) p. 142 D/P- TIF (enrich) Earth's Magnetic Field pp. 143-144 D- Hands-On Labs; Can Bumblebees See Electric Fields? Propose Your Own Path D/P- Lesson Self Check pp. 145-147 D- Lesson Quiz D-Make Your Own Study Guide	permanent magnets.) p. 158 P- ENB (prompt) Students consider how the electromagnets they have seen are used; students identify if any of them are used in similar ways to a crane that picks up scrap metal. Students record evidence. p. 158 D/P- Magnetic Field and Current: Changing Current (Students explore images online to see how different factors affect the current in a wire.) p. 159 D/P- Electromagnetic Induction: Change and Magnetic Field (Students watch video to observe how the strength

	P- Connections to Other Disciplines p. 95J D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB	P- DI (ELL/RTI) p. 95I P- Extension p. 95I P- COLLAB p. 95J P- Connections to Other Disciplines p. 95J D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB	P- DI (ELL/RTI) p. 95I P- Extension p. 95I P- COLLAB p. 95J P- Connections to Other Disciplines p. 95J D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB D- VL How Can Static Electric Charges Affect Each Other?	of a magnet affects the current.) p. 160 D/P- Number of Loops and Current (Students watch video to observe how the number of loops affects the current.) p. 160 D/P- DTM Analyze Measurements of Current (Students place data in tables and then graph the data to determine the relationship between the number of loops and inducted current.) p. 161 D/P- Inducted Current (Students watch animation to observe how current is generated by movement in a solenoid.) p. 162 D/P- TIF (enrich) Careers in Science:

				MRI Technician pp. 163-164 D- Hands-On Labs; Generators and Energy Resources; Propose Your Own Path D/P- Lesson Self Check pp. 165-167 D- Lesson Quiz D-Make Your Own Study Guide P- DI (ELL/RTI) p. 95I P- Extension p. 95I P- COLLAB p. 95J P- Connections to Other Disciplines p. 95J D-Science Safety HB D- CCC-HB D- ELA-HB D- M-HB D- SEP-HB D-ScienceSaurus Reference HB

				D- YSI Simulation How Can You Calibrate a Cathode Ray Tube?

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Curriculum Alignment Common Language (CACL) Guide 6-8		
Acronym	**Word/Phrase**	**Description**
CER	Claims Evidence Reasoning	Students make a claim and gather evidence along the way (during EXPLORATORY activities) to support claim.
CCC-HB	Crosscutting Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
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 Other Disciplines**	Differentiated Instruction (English Language Learner/Response to Intervention) Collaboration Connections to Other Disciplines	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.
ENB	Evidence Notebook	Student notebook or journal used to gather evidence during EXPLORATORY learning activities to support their claims.
ENGIT	Engineer It	Integrated subject learning.
ELA-HB	English Language Arts Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
HOL	Hands-On Lab	Activities or experiments that enable students to demonstrate scientific procedures and analysis.
LS	Language SmArts	Integrated subject learning.

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M-HB	Math Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
P	Print	Program resources and features in print form.
SEP-HB	Science and Engineer Practices Handbook	Students who need extra support in grasping concepts or to refresh student knowledge of skills.
TIF	Take It Further (enrich)	Enrichment activities for students in digital or print.
VBP	Video Based Project	Real life videos related to science and/or engineering that enable students to demonstrate mastery of performance expectations.
VL	Virtual Lab	Fully interactive simulations in which students perform experiments, collect data and answer questions.
WIM	Why It Matters	Questions related to lessons within each unit that asks students to consider how science affects the world around them.
YSI	You Solve It (Simulation)	Open-ended simulation-based learning with multiple answer options.