

Correlation to the Next Generation Science Standards

Amplify Science

This correlation provides a small number of examples of where each Disciplinary Core Idea (DCI), Science and Engineering Practice (SEP), and Crosscutting Concept (CCC) is addressed in Amplify Science. It is not an exhaustive list.

Kindergarten

K.PS2: Motion and Stability: Forces and Interactions	
Performance Expectation	Amplify Science Units
<p>K.PS2.1 Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying out Investigations • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Pushes and Pulls</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI) • Lesson 2.2 (SEP, DCI) • Lesson 3.2 (DCI, CCC) • Lesson 6.3 (DCI, CCC)
<p>K.PS2.2 Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Pushes and Pulls</p> <ul style="list-style-type: none"> • Lesson 3.4 (SEP, DCI) • Lesson 5.1 (SEP, DCI) • Lesson 6.3 (DCI, CCC)
K.PS3: Energy	
Performance Expectation	Amplify Science Units
<p>K.PS3.1 Make observations to determine the effect of sunlight on Earth’s surface.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying out Investigations • DCI Energy • CCC Cause and Effect 	<p>Sunlight and Weather</p> <ul style="list-style-type: none"> • Lesson 2.2 (SEP, DCI) • Lesson 3.1 (SEP, DCI, CCC) • Lesson 4.1 (SEP, DCI)
<p>K.PS3.2 Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Energy • CCC Cause and Effect 	<p>Sunlight and Weather</p> <ul style="list-style-type: none"> • Lesson 2.2 (DCI, CCC) • Lesson 2.4 (DCI) • Lesson 4.4 (SEP, DCI, CCC) <p>Pushes and Pulls</p>

	<ul style="list-style-type: none"> • Lesson 1.4 (SEP, CCC) • Lesson 2.3 (SEP, DCI, CCC)
--	---

K.LS1: From Molecules to Organisms: Structures and Processes

Performance Expectation	Amplify Science Units
<p>K.LS1.1 Use observations to describe patterns of what plants and animals (including humans) need to survive.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI From Molecules to Organisms: Structures and Processes • CCC Patterns 	<p><i>Needs of Plants and Animals</i></p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP, DCI, CCC) • Lesson 3.2 (SEP, DCI) • Lesson 4.4 (SEP, DCI)

K.ESS2: Earth Systems

Performance Expectation	Amplify Science Units
<p>K.ESS2.1 Use and share observations of local weather conditions to describe patterns over time.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Earth’s Systems • CCC Patterns 	<p><i>Sunlight and Weather</i></p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI) • Lesson 1.4 (SEP, DCI) • Lesson 3.2 (SEP, DCI, CCC) • Lesson 5.1 (DCI)
<p>K.ESS2.2 Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their</p>	<p><i>Needs of Plants and Animals</i></p> <ul style="list-style-type: none"> • Lesson 3.4 (DCI)

<p>needs.</p> <ul style="list-style-type: none"> ● SEP Engaging in Argument from Evidence ● DCI Earth's Systems ● CCC Systems and System Models 	<ul style="list-style-type: none"> ● Lesson 4.3 (SEP, DCI) ● Lesson 4.4 (DCI, CCC)
---	--

<h2 style="text-align: center;">K.ESS3: Earth and Human Activity</h2>	
Performance Expectation	Amplify Science Units
<p>K.ESS3.1 Use a model to represent the relationship between the needs of different plants and animals (including humans) and the places they live.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Earth and Human Activity ● CCC Systems and System Models 	<p><i>Needs of Plants and Animals</i></p> <ul style="list-style-type: none"> ● Lesson 1.5 (DCI) ● Lesson 2.1 (SEP) ● Lesson 2.4 (DCI) ● Lesson 4.4 (DCI, CCC)
<p>K.ESS3.2 Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Earth and Human Activity ● CCC Cause and Effect 	<p><i>Sunlight and Weather</i></p> <ul style="list-style-type: none"> ● Lesson 1.1 (SEP, CCC) ● Lesson 2.4 (CCC) ● Lesson 5.1 (DCI) ● Lesson 5.3 (DCI) <p><i>Pushes and Pulls</i></p> <ul style="list-style-type: none"> ● Lesson 2.1 (SEP, DCI) ● Lesson 2.3 (DCI) ● Lesson 3.2 (CCC)
<p>K.ESS3.3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.</p> <ul style="list-style-type: none"> ● SEP Obtaining, Evaluating, and Communicating Information ● DCI Earth and Human Activity ● CCC Cause and Effect 	<p><i>Needs of Plants and Animals</i></p> <ul style="list-style-type: none"> ● Lesson 2.7 (SEP, CCC) ● Lesson 4.3 (SEP, DCI) ● Lesson 4.4 (SEP, DCI) <p><i>Sunlight and Weather</i></p> <ul style="list-style-type: none"> ● Lesson 4.4 (CCC)

K.ETS1: Engineering Design	
Performance Expectation	Amplify Science Units
<p>K.ETS1.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Engineering Design 	<p>Pushes and Pulls</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, DCI) • Lesson 3.1 (SEP, DCI) • Lesson 5.1 (DCI)
<p>K.ETS1.2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Engineering Design • CCC Structure and Function 	<p>Pushes and Pulls</p> <ul style="list-style-type: none"> • Lesson 2.3 (SEP, DCI, CCC) • Lesson 3.4 (SEP, DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC)
<p>K.ETS1.3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Engineering Design 	<p>Pushes and Pulls</p> <ul style="list-style-type: none"> • Lesson 1.4 (DCI) • Lesson 2.3 (DCI) • Lesson 3.4 (SEP) • Lesson 4.3 (DCI)

Grade 1

1.PS4: Waves and their Applications in Technologies for Information Transfer	
Performance Expectation	Amplify Science Units
<p>1.PS4.1 Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Waves and their Applications in Technologies for Information Transfer • CCC Cause and Effect 	<p>Light and Sound</p> <ul style="list-style-type: none"> • Lesson 4.1 (SEP, DCI, CCC) • Lesson 4.2 (SEP, DCI) • Lesson 4.3 (SEP, DCI, CCC)
<p>1.PS4.2 Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Waves and their Applications in Technologies for Information Transfer • CCC Cause and Effect 	<p>Light and Sound</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI) • Lesson 1.5 (SEP, DCI, CCC) • Lesson 4.1 (CCC)
<p>1.PS4.3 Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Waves and their Applications in Technologies for Information Transfer • CCC Cause and Effect 	<p>Light and Sound</p> <ul style="list-style-type: none"> • Lesson 2.3 (DCI) • Lesson 3.1 (SEP, DCI) • Lesson 3.2 (DCI, CCC)
<p>1.PS4.4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Waves and their Applications in Technologies for Information Transfer 	<p>Light and Sound</p> <ul style="list-style-type: none"> • Lesson 1.1 (CCC) • Lesson 2.4 (SEP) • Lesson 3.4 (SEP) • Lesson 4.5 (DCI)
1.LS1: From Molecules to Organisms: Structure and Processes	
Performance Expectation	Amplify Science Units

<p>1.LS1.1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI From Molecules to Organisms: Structure and Processes • CCC Structure and Function 	<p>Animal and Plant Defenses</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI, CCC) • Lesson 1.5 (DCI, CCC) • Lesson 2.8 (SEP, DCI, CCC)
<p>1.LS1.2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI From Molecules to Organisms: Structure and Processes • CCC Patterns 	<p>Animal and Plant Defenses</p> <ul style="list-style-type: none"> • Lesson 3.2 (SEP, DCI) • Lesson 3.3 (SEP, DCI, CCC) • Lesson 3.4 (DCI)
<p>1.LS3: Heredity: Inheritance and Variation of Traits</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>1.LS3.1 Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Heredity: Inheritance and Variation of Traits • CCC Patterns 	<p>Animal and Plant Defenses</p> <ul style="list-style-type: none"> • Lesson 1.4 (CCC) • Lesson 1.5 (SEP) • Lesson 3.1 (DCI) • Lesson 3.3 (DCI, CCC)
<p>1.ESS1: Earth’s Place in the Universe</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>1.ESS1.1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Earth’s Place in the Universe • CCC Patterns 	<p>Spinning Earth</p> <ul style="list-style-type: none"> • Lesson 3.3 (SEP, DCI) • Lesson 4.2 (SEP, DCI, CCC) • Lesson 5.3 (SEP, DCI, CCC)
<p>1.ESS1.2 Make observations at different times of year to relate the amount of daylight to the time of year.</p>	<p>Spinning Earth</p> <ul style="list-style-type: none"> • Lesson 4.2 (SEP, CCC)

<ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI Earth’s Place in the Universe ● CCC Patterns 	<ul style="list-style-type: none"> ● Lesson 5.1 (DCI,CCC) ● Lesson 5.2 (SEP, DCI, CCC)
<p>1.ETS1: Engineering Design</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>1.ETS1.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Engineering Design 	<p>Light and Sound</p> <ul style="list-style-type: none"> ● Lesson 1.2 (SEP) ● Lesson 1.5 (DCI) ● Lesson 2.1 (DCI)
<p>1.ETS1.2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Engineering Design ● CCC Structure and Function 	<p>Animal and Plant Defenses</p> <ul style="list-style-type: none"> ● Lesson 2.8 (SEP, DCI, CCC) ● Lesson 4.2 (SEP, DCI, CCC) <p>Light and Sound</p> <ul style="list-style-type: none"> ● Lesson 3.4 (SEP, DCI) ● Lesson 4.6 (DCI)
<p>1.ETS1.3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Engineering Design 	<p>Light and Sound</p> <ul style="list-style-type: none"> ● Lesson 2.4 (SEP, DCI) ● Lesson 3.5 (SEP, DCI) ● Lesson 4.4 (SEP, DCI)

Grade 2

2.PS1: Matter and Its Interactions	
Performance Expectation	Amplify Science Units
<p>2.PS1.1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Matter and Its Interactions • CCC Patterns 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.2 (DCI) • Lesson 1.3 (SEP) • Lesson 2.2 (SEP, DCI)
<p>2.PS1.2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Matter and Its Interactions • CCC Cause and Effect 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.2 (DCI) • Lesson 1.6 (SEP, DCI) • Lesson 2.3 (CCC)
<p>2.PS1.3 Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Matter and Its Interactions • CCC Energy and Matter 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.7 (DCI, CCC) • Lesson 2.1 (DCI, CCC) • Lesson 3.2 (DCI, CCC)
<p>2.PS1.4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Matter and Its Interactions • CCC Cause and Effect 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 2.1 (DCI) • Lesson 2.2 (SEP, DCI, CCC) • Lesson 2.4 (SEP, DCI)
2.LS2: Ecosystems: Interactions, Energy, and Dynamics	
Performance Expectation	Amplify Science Units

<p>2.LS2.1 Plan and conduct an investigation to determine if plants need sunlight and water to grow.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI Ecosystems: Interactions, Energy, and Dynamics ● CCC Cause and Effect 	<p><i>Plant and Animal Relationships</i></p> <ul style="list-style-type: none"> ● Lesson 1.6 (DCI, CCC) ● Lesson 1.7 (DCI) ● Lesson 4.2 (SEP)
<p>2.LS2.2 Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Ecosystems: Interactions, Energy, and Dynamics ● CCC Structure and Function 	<p><i>Plant and Animal Relationships</i></p> <ul style="list-style-type: none"> ● Lesson 3.2 (SEP, DCI) ● Lesson 3.3 (SEP, DCI) ● Lesson 3.5 (SEP, DCI) ● Lesson 4.2 (SEP, CCC)
<p>2.LS4: Biological Evolution: Unity and Diversity</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>2.LS4.1 Make observations of plants and animals to compare the diversity of life in different habitats.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI Biological Evolution: Unity and Diversity 	<p><i>Plant and Animal Relationships</i></p> <ul style="list-style-type: none"> ● Lesson 1.3 (DCI) ● Lesson 1.4 (SEP, DCI) ● Lesson 3.1 (DCI)
<p>2.ESS1: Earth’s Place in the Universe</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>2.ESS1.1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Earth’s Place in the Universe ● CCC Stability and Change 	<p><i>Changing Landforms</i></p> <ul style="list-style-type: none"> ● Lesson 3.4 (DCI, CCC) ● Lesson 3.5 (SEP, DCI) ● Lesson 4.1 (DCI, CCC)

2.ESS2: Earth's Systems	
Performance Expectation	Amplify Science Units
<p>2.ESS2.1 Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Earth's Systems <ul style="list-style-type: none"> ○ Earth Materials and Systems (ESS2.A) ○ Optimizing the Design Solution (ETS1.C) ● CCC Stability and Change 	<p>Changing Landforms</p> <ul style="list-style-type: none"> ● Lesson 1.6 (SEP, CCC) ● Lesson 2.5 (DCI-ESS2.A, CCC) ● Lesson 3.4 (DCI-ESS2.A, CCC) <p>Properties of Materials</p> <ul style="list-style-type: none"> ● Lesson 1.9 (SEP, DCI-ETS1.C) ● Lesson 4.1 (SEP, DCI-ETS1.C)
<p>2.ESS2.2 Develop a model to represent the shapes and kinds of land and bodies of water in an area.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Earth's Systems ● CCC Patterns 	<p>Changing Landforms</p> <ul style="list-style-type: none"> ● Lesson 1.4 (CCC) ● Lesson 3.1 (SEP, DCI) ● Lesson 3.4 (DCI) <p>Note: Upon Detroit Public Schools' selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
<p>2.ESS2.3 Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p> <ul style="list-style-type: none"> ● SEP Obtaining, Evaluating, and Communicating Information ● DCI Earth's Systems ● CCC Patterns 	<p>Changing Landforms</p> <ul style="list-style-type: none"> ● Lesson 1.5 (CCC) ● Lesson 2.3 (SEP, DCI) ● Lesson 3.3 (SEP, DCI) <p>Note: Upon Detroit Public Schools' selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
2.ETS1: Engineering Design	

Performance Expectation	Amplify Science Units
<p>2.ETS1.1 Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Engineering Design 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI) • Lesson 3.1 (SEP, DCI) <p>Changing Landforms</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI) • Lesson 2.2 (SEP, DCI)
<p>2.ETS1.2 Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Engineering Design • CCC Structure and Function 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI, CCC) • Lesson 2.1 (SEP, DCI) • Lesson 4.1 (DCI)
<p>2.ETS1.3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Engineering Design 	<p>Properties of Materials</p> <ul style="list-style-type: none"> • Lesson 1.6 (SEP, DCI) • Lesson 2.2 (DCI) • Lesson 3.1 (SEP, DCI)

Grade 3

3.PS2: Motion and Stability: Forces and Interactions	
Performance Expectation	Amplify Science Units
<p>3.PS2.1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Balancing Forces</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI) • Lesson 4.2 (DCI) • Lesson 5.1 (SEP, CCC)
<p>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.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Motion and Stability: Forces and Interactions • CCC Patterns 	<p>Balancing Forces</p> <ul style="list-style-type: none"> • Lesson 2.3 (SEP, DCI, CCC) • Lesson 5.1 (SEP, DCI, CCC) • Lesson 5.3 (DCI, CCC) <p>Weather and Climate</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP) • Lesson 3.5 (CCC) <p>Inheritance and Traits</p> <ul style="list-style-type: none"> • Lesson 1.3 (CCC) • Lesson 3.3 (SEP)
<p>3.PS2.3 Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Balancing Forces</p> <ul style="list-style-type: none"> • Lesson 2.3 (DCI, CCC) • Lesson 2.4 (SEP, DCI, CCC) • Lesson 3.1 (SEP, DCI, CCC) • Lesson 5.3 (DCI, CCC) <p>Inheritance and Traits</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP) • Lesson 3.4 (CCC)
<p>3.PS2.4 Define a simple design problem that can be solved by applying</p>	<p>Balancing Forces</p>

<p>scientific ideas about magnets.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Motion and Stability: Forces and Interactions 	<ul style="list-style-type: none"> ● Lesson 2.3 (DCI) ● Lesson 5.3 (DCI) ● Lesson 5.5 (SEP)
<p>3.LS1: From Molecules to Organisms: Structures and Processes</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>3.LS1.1 Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI From Molecules to Organisms: Structures and Processes ● CCC Patterns 	<p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> ● Lesson 1.1 (DCI) ● Lesson 1.3 (CCC) ● Lesson 2.2 (SEP, DCI)
<p>3.LS2: Ecosystems: Interactions, Energy, and Dynamics</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>3.LS2.1 Construct an argument that some animals form groups that help members survive.</p> <ul style="list-style-type: none"> ● SEP Engaging in Argument from Evidence ● DCI Ecosystems: Interactions, Energy, and Dynamics ● CCC Cause and Effect 	<p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> ● Lesson 1.1 (DCI) ● Lesson 3.2 (DCI) ● Lesson 3.1 (DCI) ● Lesson 3.4 (CCC)
<p>3.LS3: Heredity: Inheritance and Variation of Traits</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>3.LS3.1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Heredity: Inheritance and Variation of Traits ● CCC Patterns 	<p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> ● Lesson 1.5 (DCI, CCC) ● Lesson 2.3 (DCI) ● Lesson 2.5 (SEP, DCI)

<p>3.LS3.2 Use evidence to support the explanation that traits can be influenced by the environment.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Heredity: Inheritance and Variation of Traits • CCC Cause and Effect 	<p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> • Lesson 2.6 (SEP, DCI) • Lesson 3.4 (DCI, CCC) • Lesson 3.6 (SEP, DCI)
---	--

<p>3.LS4: Biological Evolution: Unity and Diversity</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>3.LS4.1 Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Biological Evolution: Unity and Diversity • CCC Scale, Proportion, and Quantity 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 2.2 (DCI) • Lesson 2.5 (SEP) • Lesson 3.3 (CCC)
<p>3.LS4.2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Biological Evolution: Unity and Diversity • CCC Cause and Effect 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 2.1 (DCI) • Lesson 2.6 (SEP, DCI) • Lesson 3.3 (CCC) • Lesson 3.4 (SEP) <p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> • Lesson 2.6 (SEP) • Lesson 3.4 (CCC)
<p>3.LS4.3 Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Biological Evolution: Unity and Diversity • CCC Cause and Effect 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 1.2 (DCI) • Lesson 1.4 (SEP, DCI) • Lesson 4.5 (SEP, DCI, CCC) <p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> • Lesson 3.4 (CCC)

	<p>Weather and Climate</p> <ul style="list-style-type: none"> • Lesson 2.5 (SEP)
<p>3.LS4.4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Biological Evolution: Unity and Diversity • CCC Systems and System Models 	<p>Environments and Survival</p> <ul style="list-style-type: none"> • Lesson 3.1 (DCI, CCC) • Lesson 3.3 (DCI) • Lesson 4.2 (SEP)

3.ESS2: Earth’s Systems

Performance Expectation	Amplify Science Units
<p>3.ESS2.1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Earth's Systems • CCC Patterns 	<p>Weather and Climate</p> <ul style="list-style-type: none"> • Lesson 3.2 (SEP, DCI) • Lesson 3.3 (SEP, DCI, CCC) • Lesson 4.2 (DCI)
<p>3.ESS2.2 Obtain and combine information to describe climates in different regions of the world.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI Earth's Systems • CCC Patterns 	<p>Weather and Climate</p> <ul style="list-style-type: none"> • Lesson 3.2 (DCI, CCC) • Lesson 3.3 (DCI, CCC) • Lesson 3.5 (SEP, DCI, CCC)

3.ESS3: Earth and Human Activity

Performance Expectation	Amplify Science Units
<p>3.ESS3.1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Earth and Human Activity 	<p>Weather and Climate</p> <ul style="list-style-type: none"> • Lesson 1.6 (SEP, CCC) • Lesson 4.2 (DCI, CCC) • Lesson 4.3 (DCI, CCC)

<ul style="list-style-type: none"> • CCC Cause and Effect 	<ul style="list-style-type: none"> • Lesson 4.4 (SEP, DCI) <p><i>Inheritance and Traits</i></p> <ul style="list-style-type: none"> • Lesson 3.4 (CCC)
---	---

3.ETS1: Engineering Design	
Performance Expectation	Amplify Science Units
<p>3.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.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Engineering Design 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 2.7 (SEP) • Lesson 4.1 (SEP, DCI) • Lesson 4.5 (DCI) <p><i>Weather and Climate</i></p> <ul style="list-style-type: none"> • Lesson 4.3 (SEP, DCI)
<p>3.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.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Engineering Design 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 4.1 (DCI) • Lesson 4.2 (SEP, DCI) • Lesson 4.3 (SEP, DCI) <p><i>Weather and Climate</i></p> <ul style="list-style-type: none"> • Lesson 4.3 (SEP, DCI)
<p>3.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.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Engineering Design 	<p><i>Environments and Survival</i></p> <ul style="list-style-type: none"> • Lesson 2.3 (SEP) • Lesson 4.1 (DCI) • Lesson 4.3 (SEP, DCI) <p><i>Weather and Climate</i></p> <ul style="list-style-type: none"> • Lesson 4.3 (DCI)

Grade 4

4.PS3: Energy	
Performance Expectation	Amplify Science Units
<p>4.PS3.1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Energy ● CCC Energy and Matter 	<p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 2.2 (SEP, DCI, CCC) ● Lesson 3.4 (SEP, DCI, CCC) ● Lesson 4.2 (SEP, DCI, CCC) <p>Vision and Light</p> <ul style="list-style-type: none"> ● Lesson 2.5 (SEP) ● Lesson 3.5 (SEP) <p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> ● Lesson 2.4 (DCI)
<p>4.PS3.2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI Energy ● CCC Energy and Matter 	<p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 1.5 (DCI) ● Lesson 2.4 (SEP) ● Lesson 4.2 (DCI, CCC) <p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> ● Lesson 1.4 (DCI) ● Lesson 2.4 (DCI)
<p>4.PS3.3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Energy ● CCC Energy and Matter 	<p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> ● Lesson 2.4 (DCI, CCC) ● Lesson 2.6 (DCI) <p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 1.3 (SEP) ● Lesson 4.2 (DCI, CCC)
<p>4.PS3.4 Apply scientific ideas to design, test, and refine a device that</p>	<p>Energy Conversions</p>

<p>converts energy from one form to another.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Energy ● CCC Energy and Matter 	<ul style="list-style-type: none"> ● Lesson 2.1 (DCI) ● Lesson 3.4 (SEP) ● Lesson 4.2 (DCI, CCC)
--	--

4.PS4: Waves and their Applications in Technologies for Information Transfer

Performance Expectation	Amplify Science Units
<p>4.PS4.1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Waves and their Applications in Technologies for Information Transfer ● CCC Patterns 	<p><i>Waves, Energy, and Information</i></p> <ul style="list-style-type: none"> ● Lesson 1.5 (SEP) ● Lesson 3.1 (DCI) ● Lesson 3.6 (CCC)
<p>4.PS4.2 Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Waves and their Applications in Technologies for Information Transfer ● CCC Cause and Effect 	<p><i>Vision and Light</i></p> <ul style="list-style-type: none"> ● Lesson 2.1 (CCC) ● Lesson 2.3 (DCI) ● Lesson 2.5 (SEP)
<p>4.PS4.3 Generate and compare multiple solutions that use patterns to transfer information.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Waves and their Applications in Technologies for Information Transfer ● CCC Patterns 	<p><i>Energy Conversions</i></p> <ul style="list-style-type: none"> ● Lesson 3.2 (CCC) ● Lesson 3.4 (SEP, DCI) <p><i>Waves, Energy, and Information</i></p> <ul style="list-style-type: none"> ● Lesson 3.3 (SEP, DCI, CCC) ● Lesson 4.1 (DCI, CCC)

4.LS1: From Molecules to Organisms: Structures and Processes

Performance Expectation	Amplify Science Units
<p>4.LS1.1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI From Molecules to Organisms: Structures and Processes • CCC Systems and System Models 	<p>Earth's Features</p> <ul style="list-style-type: none"> • Lesson 1.6 (SEP) • Lesson 2.6 (SEP) <p>Energy Conversions</p> <ul style="list-style-type: none"> • Lesson 1.2 (CCC) • Lesson 2.1 (CCC) <p>Vision and Light</p> <ul style="list-style-type: none"> • Lesson 1.3 (SEP, DCI) • Lesson 2.4 (SEP) • Lesson 3.1 (DCI, CCC)
<p>4.LS1.2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI From Molecules to Organisms: Structures and Processes • CCC Systems and System Models 	<p>Energy Conversions</p> <ul style="list-style-type: none"> • Lesson 1.3 (CCC) • Lesson 3.2 (CCC) <p>Vision and Light</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, DCI) • Lesson 3.1 (DCI, CCC) • Lesson 3.3 (SEP, DCI)
<p>4.ESS1: Earth's Place in the Universe</p>	
Performance Expectation	Amplify Science Units
<p>4.ESS1.1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Earth's Place in the Universe • CCC Patterns 	<p>Earth's Features</p> <ul style="list-style-type: none"> • Lesson 1.6 (SEP, DCI) • Lesson 2.6 (SEP, DCI) • Lesson 3.2 (DCI, CCC) <p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> • Lesson 3.6 (SEP, CCC)

	<ul style="list-style-type: none"> ● Lesson 4.4 (SEP, CCC) <p>Note: Upon Detroit Public Schools’ selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
--	---

4.ESS2: Earth’s Systems	
Performance Expectation	Amplify Science Units
<p>4.ESS2.1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI Earth’s Systems ● CCC Cause and Effect 	<p>Earth’s Features</p> <ul style="list-style-type: none"> ● Lesson 2.2 (DCI) ● Lesson 4.2 (SEP, DCI, CCC) ● Lesson 4.4 (SEP, DCI, CCC)
<p>4.ESS2.2 Analyze and interpret data from maps to describe patterns of Earth’s features.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Earth’s Systems ● CCC Patterns 	<p>Earth’s Features</p> <ul style="list-style-type: none"> ● Lesson 1.4 (SEP, DCI, CCC) ● Lesson 4.2 (SEP, DCI) ● Lesson 4.5 (SEP, DCI, CCC) <p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> ● Lesson 1.2 (CCC) ● Lesson 2.6 (CCC)

4.ESS3: Earth and Human Activity	
Performance Expectation	Amplify Science Units
<p>4.ESS3.1 Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.</p>	<p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 3.1 (SEP, DCI) ● Lesson 3.3 (SEP, CCC)

<ul style="list-style-type: none"> ● SEP Obtaining, Evaluating, and Communicating Information ● DCI Earth and Human Activity ● CCC Cause and Effect 	<ul style="list-style-type: none"> ● Lesson 4.5 (SEP, DCI)
<p>4.ESS3.2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes and climate change have on humans.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Earth and Human Activity ● CCC Cause and Effect 	<p>Waves, Energy, and Information</p> <ul style="list-style-type: none"> ● Lesson 1.3 (DCI) <p>Vision and Light</p> <ul style="list-style-type: none"> ● Lesson 2.1 (CCC) <p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 2.2 (SEP, CCC) ● Lesson 3.3 (DCI, CCC) ● Lesson 3.6 (SEP) ● Lesson 4.5 (DCI) <p>Note: Upon Detroit Public Schools’ selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>

<h2>4.ETS1: Engineering Design</h2>	
Performance Expectation	Amplify Science Units
<p>4.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.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Engineering Design 	<p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 3.4 (SEP) ● Lesson 4.3 (DCI) ● Lesson 4.5 (DCI)
<p>4.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.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions 	<p>Energy Conversions</p> <ul style="list-style-type: none"> ● Lesson 3.3 (DCI) ● Lesson 3.4 (SEP, DCI) ● Lesson 4.5 (SEP, DCI)

<ul style="list-style-type: none"> • DCI Engineering Design 	
<p>4.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.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Engineering Design 	<p>Energy Conversions</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP) • Lesson 3.3 (DCI) • Lesson 3.4 (DCI) • Lesson 3.5 (DCI) <p>Vision and Light</p> <ul style="list-style-type: none"> • Lesson 5.1 (SEP) • Lesson 5.2 (SEP)

Grade 5

5.PS1: Matter and its Interactions	
Performance Expectation	Amplify Science Units
<p>5.PS1.1 Develop a model to describe that matter is made of particles too small to be seen.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Matter and its Interactions • CCC Scale, Proportion, and Quantity 	<p>Modeling Matter</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI, CCC) • Lesson 1.6 (SEP, DCI) • Lesson 2.2 (SEP, DCI)
<p>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.</p> <ul style="list-style-type: none"> • SEP Using Mathematics and Computational Thinking • DCI Matter and its Interactions • CCC Scale, Proportion, and Quantity 	<p>The Earth System</p> <ul style="list-style-type: none"> • Lesson 1.1 (CCC) • Lesson 2.5 (DCI) • Lesson 3.2 (SEP, CCC) • Lesson 5.3 (DCI) <p>Modeling Matter</p> <ul style="list-style-type: none"> • Lesson 1.3 (CCC) • Lesson 2.4 (DCI)

<p>5.PS1.3 Make observations and measurements to identify materials based on their properties.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Matter and its Interactions • CCC Scale, Proportion, and Quantity 	<p>The Earth System</p> <ul style="list-style-type: none"> • Lesson 1.1 (CCC) • Lesson 5.1 (SEP, DCI) • Lesson 5.2 (SEP, DCI) <p>Modeling Matter</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI) • Lesson 1.8 (DCI) • Lesson 3.2 (DCI, CCC)
<p>5.PS1.4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Matter and its Interactions • CCC Cause and Effect 	<p>The Earth System</p> <ul style="list-style-type: none"> • Lesson 5.2 (DCI) • Lesson 5.4 (SEP, DCI, CCC) <p>Modeling Matter</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI) • Lesson 2.3 (DCI, CCC) • Lesson 3.4 (SEP, DCI)
<p>5.PS2: Motion and Stability: Forces and Interaction</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>5.PS2.1 Support an argument that the gravitational force exerted by Earth on objects is directed down.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Motion and Stability: Forces and Interaction • CCC Cause and Effect 	<p>Ecosystem Restoration</p> <ul style="list-style-type: none"> • Lesson 1.8 (SEP) • Lesson 3.6 (SEP, CCC) <p>Patterns of Earth and Sky</p> <ul style="list-style-type: none"> • Lesson 2.1 (CCC) • Lesson 2.4 (DCI, CCC) • Lesson 3.6 (DCI, CCC)
<p>5.PS3: Energy</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>

<p>5.PS3.1 Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Energy • CCC Energy and Matter 	<p>Ecosystem Restoration</p> <ul style="list-style-type: none"> • Lesson 2.2 (DCI, CCC) • Lesson 2.3 (DCI, CCC) • Lesson 2.5 (SEP, DCI, CCC)
<p>5.LS1: From Molecules to Organisms: Structures and Processes</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>5.LS1.1 Support an argument that plants get the materials they need for growth chiefly from air and water.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI From Molecules to Organisms: Structures and Processes • CCC Energy and Matter 	<p>Ecosystem Restoration</p> <ul style="list-style-type: none"> • Lesson 2.2 (DCI, CCC) • Lesson 2.3 (DCI) • Lesson 2.7 (SEP, DCI)
<p>5.LS2: Ecosystems: Interactions, Energy, and Dynamics</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>5.LS2.1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Ecosystems: Interactions, Energy, and Dynamics • CCC Systems and System Models 	<p>Ecosystem Restoration</p> <ul style="list-style-type: none"> • Lesson 1.7 (SEP, DCI) • Lesson 3.2 (DCI) • Lesson 3.4 (DCI, CCC)
<p>5.ESS1: Earth's Place in the Universe</p>	
<p>Performance Expectation</p>	<p>Amplify Science Units</p>
<p>5.ESS1.1 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.</p>	<p>Patterns of Earth and Sky</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI, CCC) • Lesson 1.6 (SEP, DCI)

<ul style="list-style-type: none"> ● SEP Engaging in Argument from Evidence ● DCI Earth’s Place in the Universe ● CCC Scale, Proportion, and Quantity 	<ul style="list-style-type: none"> ● Lesson 1.5 (DCI)
<p>5.ESS1.2 Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Earth’s Place in the Universe ● CCC Patterns 	<p>Patterns of Earth and Sky</p> <ul style="list-style-type: none"> ● Lesson 1.4 (SEP, DCI, CCC) ● Lesson 2.2 (SEP, DCI, CCC) ● Lesson 2.3 (SEP, DCI, CCC) <p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 2.3 (SEP) ● Lesson 3.2 (SEP)

<h2 style="text-align: center;">5.ESS2: Earth’s Systems</h2>	
Performance Expectation	Amplify Science Units
<p>5.ESS2.1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI Earth’s Systems ● CCC Systems and System Models 	<p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 1.3 (SEP, DCI) ● Lesson 3.3 (SEP, DCI) ● Lesson 4.4 (DCI, CCC) <p>Note: Upon Detroit Public Schools’ selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
<p>5.ESS2.2 Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.</p> <ul style="list-style-type: none"> ● SEP Using Mathematics and Computational Thinking ● DCI Earth’s Systems ● CCC Scale, Proportion, and Quantity 	<p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 1.1 (SEP, DCI, CCC) ● Lesson 3.2 (SEP, CCC) <p>Ecosystem Restoration</p> <ul style="list-style-type: none"> ● Lesson 1.3 (CCC) ● Lesson 2.1 (SEP, CCC)

	<p>Note: Upon Detroit Public Schools’ selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
--	--

5.ESS3: Earth and Human Activity	
Performance Expectation	Amplify Science Units
<p>5.ESS3.1 Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.</p> <ul style="list-style-type: none"> ● SEP Obtaining, Evaluating, and Communicating Information ● DCI Earth and Human Activity ● CCC Systems and System Models 	<p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 1.2 (SEP, DCI) ● Lesson 4.4 (CCC) <p>Ecosystem Restoration</p> <ul style="list-style-type: none"> ● Lesson 1.3 (SEP, CCC) ● Lesson 2.5 (SEP, DCI, CCC) ● Lesson 3.5 (SEP, DCI, CCC)

5.ETS1: Engineering Design	
Performance Expectation	Amplify Science Units
<p>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.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Engineering Design 	<p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 2.7 (SEP, DCI) ● Lesson 2.8 (SEP, DCI) ● Lesson 3.4 (DCI)
<p>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.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Engineering Design 	<p>The Earth System</p> <ul style="list-style-type: none"> ● Lesson 2.7 (SEP, DCI) ● Lesson 3.4 (SEP, DCI) ● Lesson 4.5 (SEP, DCI)

<p>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.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Engineering Design 	<p>The Earth System</p> <ul style="list-style-type: none"> • Lesson 2.8 (DCI) • Lesson 3.4 (SEP, DCI) • Lesson 4.5 (SEP, DCI)
---	--

Grades 6-8

<p>MS-PS1: Matter and its Interactions</p>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>
<p>MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Structure and Properties of Matter • CCC Scale, Proportion, and Quantity 	<p>Chemical Reactions</p> <ul style="list-style-type: none"> • Lesson 1.6 (DCI, CCC) • Lesson 2.3 (SEP, DCI, CCC) <p>Phase Change</p> <ul style="list-style-type: none"> • Lesson 1.5 (SEP, DCI, CCC) • Lesson 1.6 (SEP, DCI, CCC)
<p>MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Structure and Properties of Matter • CCC Patterns 	<p>Chemical Reactions</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, DCI, CCC) • Lesson 2.2 (DCI, CCC) • Lesson 4.3 (DCI, CCC)
<p>MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI Chemical Reactions • CCC Structure and Function 	<p>Chemical Reactions</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, DCI) • Lesson 2.2 (SEP, DCI) • Lesson 4.3 (SEP, DCI, CCC)

<p>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.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ Structure and Properties of Matter (PS1.A) ○ Definitions of Energy (PS3.A) • CCC Cause and Effect 	<p>Phase Change</p> <ul style="list-style-type: none"> • Lesson 1.6 (DCI-PS1.A) • Lesson 2.1 (SEP, DCI-PS1.A, CCC) • Lesson 2.2 (SEP, DCI-PS3.A) <p>Thermal Energy</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP, DCI-PS3.A) • Lesson 3.3 (SEP, DCI-PS3.A) <p>Force and Motion</p> <ul style="list-style-type: none"> • Lesson 1.3 (SEP, CCC) • Lesson 1.6 (SEP, CCC)
<p>MS-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Chemical Reactions • CCC Energy and Matter 	<p>Chemical Reactions</p> <ul style="list-style-type: none"> • Lesson 3.4 (SEP, DCI, CCC) • Lesson 4.2 (SEP, DCI, CCC) • Lesson 4.3 (DCI, CCC)
<p>MS-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI <ul style="list-style-type: none"> ○ Chemical Reactions (PS1.B) ○ Developing Possible Solutions (ETS1.B) ○ Optimizing the Design Solution (ETS1.C) • CCC Energy and Matter 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (SEP, DCI-ETS1.B, DCI-ETS1.C, CCC) • Day 7 (DCI-ETS1.C, CCC) <p>Chemical Reactions</p> <ul style="list-style-type: none"> • Lesson 2.5 (SEP, DCI-PS1.B, CCC)
<p>MS-PS2: Motion and Stability: Forces and Interaction</p>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>
<p>MS-PS2-1 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.</p>	<p>Force and Motion</p> <ul style="list-style-type: none"> • Lesson 4.3 (SEP, DCI)

<ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Forces and Motion • CCC Systems and System Models 	<ul style="list-style-type: none"> • Lesson 4.4 (SEP, DCI) <p>Magnetic Fields</p> <ul style="list-style-type: none"> • Lesson 2.4 (CCC) • Lesson 3.2 (SEP, CCC)
<p>MS-PS2-2 Plan an investigation to provide evidence that the change in an object’s motion depends on the sum of the forces on the object and the mass of the object.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Forces and Motion • CCC Stability and Change 	<p>Force and Motion</p> <ul style="list-style-type: none"> • Lesson 1.6 (DCI, CCC) • Lesson 2.1 (SEP, DCI) • Lesson 2.3 (DCI)
<p>MS-PS2-3 Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Magnetic Fields</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP, DCI, CCC) • Lesson 4.3 (DCI, CCC)
<p>MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Motion and Stability: Forces and Interactions • CCC Systems and System Models 	<p>Magnetic Fields</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI, CCC) • Lesson 3.2 (DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC)
<p>MS-PS2-5 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Motion and Stability: Forces and Interactions • CCC Cause and Effect 	<p>Magnetic Fields</p> <ul style="list-style-type: none"> • Lesson 1.5 (SEP, DCI) • Lesson 2.1 (DCI) • Lesson 3.2 (SEP, DCI, CCC)
<p>MS-PS3: Energy</p>	

Performance Expectation	Correlations to Core Science Units
<p>MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Definitions of Energy ● CCC Scale, Proportion, and Quantity 	<p>Force and Motion</p> <ul style="list-style-type: none"> ● Lesson 2.1 (SEP, CCC) ● Lesson 3.3 (SEP, DCI, CCC) ● Lesson 4.3 (SEP, DCI, CCC)
<p>MS-PS3-2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI <ul style="list-style-type: none"> ○ Definitions of Energy (PS3.A) ○ Relationship Between Energy and Forces (PS3.C) ● CCC Systems and System Models 	<p>Magnetic Fields</p> <ul style="list-style-type: none"> ● Lesson 2.4 (SEP, DCI-PS3.A, DCI-PS3.C, CCC) ● Lesson 3.3 (SEP, DCI-PS3.A, DCI-PS3.C, CCC) ● Lesson 4.3 (DCI-PS3.A, DCI-PS3.C, CCC)
<p>MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI <ul style="list-style-type: none"> ○ Definitions of Energy (PS3.A) ○ Conservation of Energy and Energy Transfer (PS3.B) ○ Developing Possible Solutions (ETS1.B) ● CCC Energy and Matter 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> ● Day 4 (DCI-PS3.A, DCI-ETS1.B, CCC) <p>Thermal Energy</p> <ul style="list-style-type: none"> ● Lesson 3.3 (SEP, DCI-PS3.A, DCI-PS3.B, CCC) ● Lesson 4.3 (SEP, DCI-PS3.A, DCI-PS3.B, CCC)
<p>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.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI <ul style="list-style-type: none"> ○ Definitions of Energy (PS3.A) ○ Conservation of Energy and Energy Transfer (PS3.B) ● CCC Scale, Proportion, and Quantity 	<p>Thermal Energy</p> <ul style="list-style-type: none"> ● Lesson 3.3 (SEP, DCI-PS3.A, DCI-PS3.B, CCC) ● Lesson 3.4 (DCI-PS3.A, DCI-PS3.B, CCC) ● Lesson 4.3 (DCI-PS3.A, DCI-PS3.B, CCC)

<p>MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Conservation of Energy and Energy Transfer • CCC Energy and Matter 	<p><i>Harnessing Human Energy</i></p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, DCI, CCC) <p><i>Magnetic Fields</i></p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI, CCC)
<p>MS-PS4: Waves and Their Applications in Technologies for Information Transfer</p>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>
<p>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.</p> <ul style="list-style-type: none"> • SEP Using Mathematics and Computational Thinking • DCI Wave Properties • CCC Patterns 	<p><i>Light Waves</i></p> <ul style="list-style-type: none"> • Lesson 1.2 (CCC) • Lesson 2.3 (SEP, DCI) • Lesson 3.1 (DCI)
<p>MS-PS4-2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ Wave Properties (PS4.A) ○ Electromagnetic Radiation (PS4.B) • CCC Structure and Function 	<p><i>Light Waves</i></p> <ul style="list-style-type: none"> • Lesson 2.3 (SEP, DCI-PS4.A, DCI-PS4.B) • Lesson 2.4 (SEP, DCI-PS4.A) • Lesson 3.3 (SEP, DCI-PS4.B, CCC)
<p>MS-PS4-3 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI Information Technologies and Instrumentation • CCC Structure and Function 	<p><i>Light Waves</i></p> <ul style="list-style-type: none"> • Lesson 3.1 (DCI) • Lesson 3.3 (SEP, CCC)
<p>MS-LS1: From Molecules to Organisms: Structures and Processes</p>	

Performance Expectation	Correlations to Core Science Units
<p>MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.</p> <ul style="list-style-type: none"> • SEP Planning and Carrying Out Investigations • DCI Structure and Function • CCC Scale, Proportion, and Quantity 	<p>Metabolism</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI, CCC) • Lesson 3.2 (SEP, DCI)
<p>MS-LS1-2 Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Structure and Function • CCC Structure and Function 	<p>Metabolism</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI, CCC) • Lesson 3.3 (SEP, DCI) <p>Traits and Reproduction</p> <ul style="list-style-type: none"> • Lesson 2.2 (SEP, DCI, CCC)
<p>MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Structure and Function • CCC Systems and System Models 	<p>Metabolism</p> <ul style="list-style-type: none"> • Lesson 2.1 (DCI, CCC) • Lesson 2.6 (DCI) • Lesson 4.2 (SEP)
<p>MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Growth and Development of Organisms • CCC Cause and Effect 	<p>Traits and Reproduction</p> <ul style="list-style-type: none"> • Lesson 3.1 (DCI, CCC) • Lesson 3.2 (SEP, DCI, CCC) <p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 4.3 (SEP, CCC)
<p>MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Growth and Development of Organisms • CCC Cause and Effect 	<p>Traits and Reproduction</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, CCC) • Lesson 3.3 (DCI, CCC) • Lesson 4.1 (DCI, CCC) <p>Natural Selection</p>

	<ul style="list-style-type: none"> • Lesson 3.2 (SEP, CCC) • Lesson 3.3 (SEP, CCC) • Lesson 4.3 (SEP, CCC)
<p>MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI <ul style="list-style-type: none"> ○ Organization for Matter and Energy Flow in Organisms (LS1.C) ○ Energy in Chemical Processes and Everyday Life (PS3.D) • CCC Energy and Matter 	<p>Matter and Energy in Ecosystems</p> <ul style="list-style-type: none"> • Lesson 1.5 (SEP, DCI-LS1.C, DCI-PS3.D) • Lesson 1.6 (SEP, DCI-LS1.C) • Lesson 3.4 (SEP, DCI-LS1.C, DCI-PS3.D, CCC)
<p>MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ Organization for Matter and Energy Flow in Organisms (LS1.C) ○ Energy in Chemical Processes and Everyday Life (PS3.D) • CCC Energy and Matter 	<p>Matter and Energy in Ecosystems</p> <ul style="list-style-type: none"> • Lesson 2.2 (SEP, DCI-PS3.D, CCC) • Lesson 2.3 (SEP, DCI-PS3.D) <p>Metabolism</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI-LS1.C, DCI-PS3.D) • Lesson 3.3 (SEP, DCI-LS1.C, DCI-PS3.D, CCC)
<p>MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI Information Processes • CCC Cause and Effect 	<p>Metabolism</p> <ul style="list-style-type: none"> • Lesson 2.6 (SEP) • Lesson 3.3 (SEP, DCI) <p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (SEP, CCC) <p>Traits and Reproduction</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, CCC)
<p>MS-LS2: Ecosystems: Interactions, Energy, and Dynamics</p>	

Performance Expectation	Correlations to Core Science Units
<p>MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Interdependent Relationships in Ecosystems • CCC Cause and Effect 	<p>Populations and Resources</p> <ul style="list-style-type: none"> • Lesson 2.3 (SEP, DCI, CCC) • Lesson 3.3 (SEP, DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC)
<p>MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Interdependent Relationships in Ecosystems • CCC Patterns 	<p>Populations and Resources</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI) • Lesson 2.7 (DCI) • Lesson 3.3 (SEP, DCI)
<p>MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Cycle of Matter and Energy Transfer in Ecosystems • CCC Energy and Matter 	<p>Matter and Energy in Ecosystems</p> <ul style="list-style-type: none"> • Lesson 3.4 (SEP, DCI, CCC) <p>Populations and Resources</p> <ul style="list-style-type: none"> • Lesson 1.2 (SEP) • Lesson 2.2 (CCC) • Lesson 2.3 (SEP, DCI, CCC)
<p>MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI Ecosystem Dynamics, Functioning, and Resilience • CCC Stability and Change 	<p>Matter and Energy in Ecosystems</p> <ul style="list-style-type: none"> • Lesson 4.2 (SEP, DCI) • Lesson 4.3 (SEP, DCI) <p>Populations and Resources</p> <ul style="list-style-type: none"> • Lesson 3.4 (SEP, DCI, CCC) • Lesson 4.1 (SEP, DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC)
<p>MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI 	<p>Populations and Resources</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI-LS2.C, DCI-LS4.D, CCC) • Lesson 4.1 (SEP, DCI-LS2.C, CCC) • Lesson 4.3 (SEP, DCI-LS2.C, CCC)

<ul style="list-style-type: none"> ○ Ecosystem Dynamics, Functioning, and Resilience (LS2.C) ○ Biodiversity and Humans (LS4.D) ○ Developing Possible Solutions (ETS1.B) ● CCC Stability and Change 	<p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> ● Day 5 (DCI-ETS1.B) ● Day 8 (SEP)
---	---

MS-LS3: Heredity: Inheritance and Variation of Traits

Performance Expectation	Correlations to Core Science Units
<p>MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI <ul style="list-style-type: none"> ○ Inheritance of Traits (LS3.A) ○ Variation of Traits (LS3.B) ● CCC Structure and Function 	<p>Traits and Reproduction</p> <ul style="list-style-type: none"> ● Lesson 1.3 (SEP, DCI-LS3.A, CCC) ● Lesson 2.4 (SEP, DCI-LS3.A, CCC) ● Lesson 4.3 (DCI-LS3.A, DCI-LS3.B, CCC)
<p>MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI <ul style="list-style-type: none"> ○ Growth and Development of Organisms (LS1.B) ○ Inheritance of Traits (LS3.A) ○ Variation of Traits (LS3.B) ● CCC Cause and Effect 	<p>Traits and Reproduction</p> <ul style="list-style-type: none"> ● Lesson 3.3 (SEP, DCI-LS1.B, DCI-LS3.A, DCI-LS3.B, CCC) ● Lesson 4.3 (DCI-LS1.B, DCI-LS3.A, DCI-LS3.B, CCC)

MS-LS4: Biological Evolution: Unity and Diversity

Performance Expectation	Correlations to Core Science Units
<p>MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms</p>	<p>Evolutionary History</p> <ul style="list-style-type: none"> ● Lesson 2.4 (SEP, DCI)

<p>throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Evidence of Common Ancestry and Diversity 	<ul style="list-style-type: none"> • Lesson 2.5 (SEP, DCI) • Lesson 3.3 (SEP, DCI)
<p>MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Evidence of Common Ancestry • CCC Patterns 	<p>Evolutionary History</p> <ul style="list-style-type: none"> • Lesson 3.2 (SEP, DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC) <p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 1.4 (CCC) • Lesson 3.3 (SEP, CCC)
<p>MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Evidence of Common Ancestry and Diversity • CCC Patterns 	<p>Evolutionary History</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP, DCI, CCC) • Lesson 3.1 (DCI, CCC) • Lesson 4.3 (DCI, CCC) <p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP, CCC) • Lesson 3.3 (SEP, CCC)
<p>MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI Natural Selection • CCC Cause and Effect 	<p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI, CCC) • Lesson 4.3 (SEP, DCI, CCC)
<p>MS-LS4-5 Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.</p> <ul style="list-style-type: none"> • SEP Obtaining, Evaluating, and Communicating Information • DCI Natural Selection • CCC Cause and Effect 	<p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 3.2 (DCI, CCC) <p>Traits and Reproduction</p> <ul style="list-style-type: none"> • Lesson 2.1 (SEP, CCC) • Lesson 3.5 (SEP, CCC) • Lesson 3.6 (SEP, DCI, CCC)

<p>MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p> <ul style="list-style-type: none"> • SEP Using Mathematics and Computational Thinking • DCI Adaptation • CCC Cause and Effect 	<p>Natural Selection</p> <ul style="list-style-type: none"> • Lesson 1.4 (SEP, DCI, CCC) • Lesson 2.4 (DCI, CCC) • Lesson 4.3 (DCI, CCC)
<p>MS-ESS1: Earth’s Place in the Universe</p>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>
<p>MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ The Universe and Its Stars (ESS1.A) ○ Earth and the Solar System (ESS1.B) • CCC Patterns 	<p>Earth, Moon, and Sun</p> <ul style="list-style-type: none"> • Lesson 1.3 (SEP, DCI-ESS1.A) • Lesson 2.4 (SEP, CCC) • Lesson 3.1 (SEP, DCI-ESS1.B)
<p>MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ The Universe and Stars (ESS1.A) ○ Earth and the Solar System (ESS1.B) • CCC Systems and System Models 	<p>Earth, Moon, and Sun</p> <ul style="list-style-type: none"> • Lesson 2.4 (DCI-ESS1.A) • Lesson 3.1 (SEP, CCC) <p>Geology on Mars</p> <ul style="list-style-type: none"> • Lesson 1.3 (DCI-ESS1.B, CCC) • Lesson 2.2 (SEP)
<p>MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI Earth and the Solar System • CCC Scale, Proportion, and Quantity 	<p>Earth, Moon, and Sun</p> <ul style="list-style-type: none"> • Lesson 2.4 (SEP, DCI, CCC) <p>Geology on Mars</p> <ul style="list-style-type: none"> • Lesson 1.1 (SEP, DCI) • Lesson 1.3 (CCC)

<p>MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth’s 4.6-billion-year-old history.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI The History of Planet Earth • CCC Scale, Proportion, and Quantity 	<p>Plate Motion</p> <ul style="list-style-type: none"> • Lesson 3.1 (SEP, CCC) • Lesson 3.2 (DCI, CCC) • Lesson 4.2 (SEP, DCI, CCC)
<p>MS-ESS2: Earth’s Systems</p>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>
<p>MS-ESS2-1 Develop a model to describe the cycling of Earth’s materials and the flow of energy that drives this process.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI Earth’s Materials and Systems • CCC Stability and Change 	<p>Rock Transformations</p> <ul style="list-style-type: none"> • Lesson 2.2 (DCI, CCC) • Lesson 3.4 (SEP, DCI) • Lesson 4.3 (DCI) <p>Earth’s Changing Climate</p> <ul style="list-style-type: none"> • Lesson 1.3 (SEP, DCI, CCC) • Lesson 2.3 (SEP, DCI, CCC)
<p>MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth’s surface at varying time and spatial scales.</p> <ul style="list-style-type: none"> • SEP Constructing Explanations and Designing Solutions • DCI <ul style="list-style-type: none"> ○ Earth’s Materials and Systems (ESS2.A) ○ The Roles of Water in Earth’s Surface Processes (ESS2.C) • CCC Scale, Proportion, and Quantity 	<p>Rock Transformations</p> <ul style="list-style-type: none"> • Lesson 1.4 (DCI-ESS2.A, CCC) • Lesson 2.1 (DCI-ESS2.A, DCI-ESS2.C) • Lesson 3.4 (SEP, DCI-ESS2.A) <p>Plate Motion</p> <ul style="list-style-type: none"> • Lesson 4.1 (SEP, DCI-ESS2.A, CCC) • Lesson 4.2 (SEP, CCC)
<p>MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data 	<p>Plate Motion</p> <ul style="list-style-type: none"> • Lesson 2.5 (SEP, DCI-ESS1.C, DCI-ESS2.B, CCC) • Lesson 3.3 (SEP, DCI-ESS2.B, CCC) • Lesson 4.3 (DCI-ESS2.B, DCI-ESS1.C, CCC)

<ul style="list-style-type: none"> ● DCI <ul style="list-style-type: none"> ○ The History of Planet Earth (ESS1.C) ○ Plate Tectonics and Large-Scale System Interactions (ESS2.B) ● CCC Patterns 	
<p>MS-ESS2-4 Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI The Roles of Water in Earth's Surface Processes ● CCC Energy and Matter 	<p>Weather Patterns</p> <ul style="list-style-type: none"> ● Lesson 1.2 (DCI, CCC) ● Lesson 2.1 (SEP, DCI, CCC) ● Lesson 2.3 (DCI, CCC)
<p>MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.</p> <ul style="list-style-type: none"> ● SEP Planning and Carrying Out Investigations ● DCI <ul style="list-style-type: none"> ○ The Roles of Water in Earth's Surface Processes (ESS2.C) ○ Weather and Climate (ESS2.D) ● CCC Cause and Effect 	<p>Weather Patterns</p> <ul style="list-style-type: none"> ● Lesson 1.5 (SEP, DCI-ESS2.C, CCC) ● Lesson 2.3 (SEP, DCI-ESS2.C, CCC) ● Lesson 3.3 (DCI-ESS2.C, DCI-ESS2.D, CCC) <p>Note: Upon Detroit Public Schools' selection of Amplify Science, Amplify and the Lawrence Hall of Science will create custom content that addresses the Michigan-specific version of this PE. This content would be made available to Detroit teachers during the 2024–2025 school year.</p>
<p>MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.</p> <ul style="list-style-type: none"> ● SEP Developing and Using Models ● DCI <ul style="list-style-type: none"> ○ The Roles of Water in Earth's Surface Processes (ESS2.C) ○ Weather and Climate (ESS2.D) ● CCC Systems and System Models 	<p>Ocean, Atmosphere, and Climate</p> <ul style="list-style-type: none"> ● Lesson 1.4 (SEP, DCI-ESS2.D) ● Lesson 3.2 (SEP, DCI-ESS2.C) <p>Earth's Changing Climate</p> <ul style="list-style-type: none"> ● Lesson 2.3 (SEP, DCI-ESS2.D, CCC) ● Lesson 2.7 (SEP, DCI-ESS2.D, CCC)
<h2>MS-ESS3: Earth and Human Activity</h2>	
<p>Performance Expectation</p>	<p>Correlations to Core Science Units</p>

<p>MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth’s mineral, energy, and groundwater resources are the result of past and current geoscience processes.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Natural Resources ● CCC Cause and Effect 	<p>Rock Transformations</p> <ul style="list-style-type: none"> ● Lesson 2.3 (DCI, CCC) ● Lesson 3.2 (CCC) ● Lesson 3.4 (SEP, CCC)
<p>MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.</p> <ul style="list-style-type: none"> ● SEP Analyzing and Interpreting Data ● DCI Natural Hazards ● CCC Patterns 	<p>Plate Motion</p> <ul style="list-style-type: none"> ● Lesson 1.3 (SEP, CCC) ● Lesson 1.4 (SEP, CCC) <p>Plate Motion Engineering Internship</p> <ul style="list-style-type: none"> ● Day 3 (SEP, DCI, CCC) ● Day 9 (DCI, CCC)
<p>MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.</p> <ul style="list-style-type: none"> ● SEP Constructing Explanations and Designing Solutions ● DCI Human Impacts on Earth Systems ● CCC Cause and Effect 	<p>Earth’s Changing Climate</p> <ul style="list-style-type: none"> ● Lesson 1.2 (CCC) ● Lesson 1.3 (DCI, CCC) ● Lesson 3.3 (SEP, DCI, CCC)
<p>MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth’s systems.</p> <ul style="list-style-type: none"> ● SEP Engaging in Argument from Evidence ● DCI Human Impacts on Earth Systems ● CCC Cause and Effect 	<p>Earth’s Changing Climate</p> <ul style="list-style-type: none"> ● Lesson 3.1 (DCI, CCC) ● Lesson 3.3 (DCI, CCC) ● Lesson 4.3 (SEP, CCC)
<p>MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.</p> <ul style="list-style-type: none"> ● SEP Asking Questions and Defining Problems ● DCI Global Climate Change ● CCC Stability and Change 	<p>Earth’s Changing Climate</p> <ul style="list-style-type: none"> ● Lesson 3.1 (DCI) ● Lesson 3.3 (DCI, CCC) ● Lesson 4.3 (SEP, DCI, CCC)
<p>MS-ETS1: Engineering Design</p>	

Performance Expectation	Correlations to Core Science Units
<p>MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.</p> <ul style="list-style-type: none"> • SEP Asking Questions and Defining Problems • DCI Defining and Delimiting Engineering Problems 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI) <p>Force and Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI) <p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI) <p>Natural Selection Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI) <p>Earth’s Changing Climate Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI) <p>Plate Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 1 (SEP, DCI) • Day 2 (SEP, DCI)
<p>MS-ETS1-2 Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.</p> <ul style="list-style-type: none"> • SEP Engaging in Argument from Evidence • DCI <ul style="list-style-type: none"> ○ Developing Possible Solutions (ETS1.B) 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> • Day 6 (DCI-ETS1.B) • Day 8 (SEP, DCI-ETS1.C) <p>Force and Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (DCI) • Day 7 (SEP) <p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> • Day 6 (DCI-ETS1.B)

	<ul style="list-style-type: none"> • Day 9 (SEP) <p>Natural Selection Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (DCI-ETS1.B) • Day 8 (SEP, DCI-ETS1.C) <p>Earth’s Changing Climate Engineering Internship</p> <ul style="list-style-type: none"> • Day 8 (SEP, DCI) <p>Plate Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 6 (DCI-ETS1.B) • Day 8 (SEP)
<p>MS-ETS1-3 Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.</p> <ul style="list-style-type: none"> • SEP Analyzing and Interpreting Data • DCI <ul style="list-style-type: none"> ○ Developing Possible Solutions (ETS1.B) ○ Optimizing the Design Solutions (ETS1.C) 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (SEP, DCI-ETS1.B) • Day 5 (SEP, DCI-ETS1.C) <p>Force and Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (SEP, DCI-ETS1.C) • Day 6 (SEP, DCI-ETS1.B) <p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (SEP, DCI-ETS1.B) • Day 6 (SEP, DCI-ETS1.C) <p>Natural Selection Engineering Internship</p> <ul style="list-style-type: none"> • Day 7 (SEP, DCI-ETS1.B) • Day 9 (DCI-ETS1.C) <p>Earth’s Changing Climate Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (SEP) • Day 6 (DCI-ETS1.C) • Day 8 (DCI-ETS1.B) <p>Plate Motion Engineering Internship</p>

	<ul style="list-style-type: none"> • Day 4 (SEP, DCI-ETS1.B) • Day 6 (SEP, DCI-ETS1.B)
<p>MS-ETS1-4 Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.</p> <ul style="list-style-type: none"> • SEP Developing and Using Models • DCI <ul style="list-style-type: none"> ○ Developing Possible Solutions (ETS1.B) ○ Optimizing the Design Solutions (ETS1.C) 	<p>Phase Change Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (SEP, DCI-ETS1.B) • Day 6 (DCI-ETS1.C) <p>Force and Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 3 (SEP) • Day 4 (DCI-ETS1.B, DCI-ETS1.C) <p>Metabolism Engineering Internship</p> <ul style="list-style-type: none"> • Day 5 (SEP, DCI-ETS1.B) • Day 6 (DCI-ETS1.C) <p>Natural Selection Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (SEP, DCI-ETS1.B) • Day 6 (DCI-ETS1.C) <p>Earth's Changing Climate Engineering Internship</p> <ul style="list-style-type: none"> • Day 4 (SEP) • Day 6 (DCI-ETS1.C) • Day 8 (DCI-ETS1.B) <p>Plate Motion Engineering Internship</p> <ul style="list-style-type: none"> • Day 2 (SEP, DCI-ETS1.B) • Day 5 (SEP, DCI-ETS1.C)