AmplifyScience

Kindergarten	**Amplify Science Citations**
Earth and Space Science	
ESS2. Earth's Systems	
K-ESS2-1. Use and share quantitative observations of local weather conditions to describe patterns over time.	***Sunlight and Weather*** unit: ● Lesson 3.2 ○ **Lesson Brief,** Overview ○ **Activity 1,** Instructional Guide (steps 5–6) ○ **Activity 2,** Instructional Guide (steps 1–8) ○ **Activity 3,** Instructional Guide (steps 4–8) and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.4 ○ **Activity 1,** Instructional Guide (steps 6–10) ○ **Activity 2,** Instructional Guide (steps 1–6) ○ **Lesson Brief,** Digital Resources, Playground Weather Calendars and Playground Weather Graphs (Completed)"
K-ESS2-2. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment.	***Needs of Plants and Animals*** unit: ● Lesson 4.3 ○ **Activity 1,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2**, Instructional Guide (steps 3–5) ○ **Activity 3,** Instructional Guide (steps 2, 4–5) ● Lesson 3.4 ○ **Activity 3,** Instructional Guide (steps 4–5) ○ **Student book,** *Above and Below*, pages 9, 11 ● Lesson 4.2 ○ **Activity 3**, Instructional Guide, (step 7) and Teacher Support tab ("Background, Science Note: About Meeting Needs While Protecting Land, Water, Air, and Other Living Things") ○ **Activity 1,** Instructional Guide (steps 6–8) and Teacher Support tab ("Instructional Suggestion, Going Further:

	Acting Out and Discussing the Effect of Human Activities on Monarch Habitats") ○ **Student book,** *Investigating Monarchs*, pages 12–19 ● Lesson 4.4 ○ **Activity 1,** Instructional Guide (steps 2–4, 6) ○ **Lesson Brief,** Digital Resources, "Assessment Guide," Rubrics 1 and 2 ● Lesson 1.3, **Activity 3,** Instructional Guide (steps 5–7) and On-the-Fly Assessment (hummingbird icon) ***Pushes and Pulls*** unit: ● Lesson 2.2, **Activity 2,** Instructional Guide (steps 2–8) and Teacher Support tab ("Background, Science Practices: About Engaging in Argument from Evidence" and "Rationale, Pedagogical Goals: Engaging in Argument from Evidence During Rugball")
ESS3. Earth and Human Activity	
K-ESS3-2. Obtain and use information about weather forecasting to prepare for, and respond to, different types of local weather.	***Sunlight and Weather*** unit*:* ● Lesson 5.1 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Student book,** *Tornado! Predicting Severe Weather* ● Lesson 5.3 ○ **Activity 1,** Instructional Guide ○ **Student book,** *Tornado! Predicting Severe Weather* ● Lesson 5.5 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3,** Instructional Guide ○ **Lesson Brief,** Digital Resources, "Severe Weather Preparation Poster" ● Lesson 5.4 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide (steps 3–8) ○ **Activity 3,** Instructional Guide (steps 4–6) and Possible Responses tab ○ **Activity 4,** Instructional Guide

K-ESS3-3. Communicate solutions to reduce the amount of natural resources an individual uses.*	***Needs of Plants and Animals*** unit: ● Lesson 4.2 ○ **Activity 3,** Instructional Guide (step 7) and Teacher Support tab ("Background, "Science Note: About Meeting Needs While Protecting Land, Water, Air, and Other Living Things") ○ **Activity 1,** Instructional Guide (steps 6–8) and Teacher Support tab ("Instructional Suggestion, Going Further: Acting Out and Discussing the Effect of Human Activities on Monarch Habitats") ○ **Student book,** *Investigating Monarchs*, pages 12–19 ● Lesson 4.3 ○ **Activity 1,** Instructional Guide (steps 5–8) and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2,** Instructional Guide (steps 3–5) ○ **Activity 3,** Instructional Guide (steps 4–5) ● Lesson 4.4 ○ **Activity 1,** Instructional Guide (steps 2–4) ○ **Lesson Brief,** Digital Resources, "Assessment Guide," Rubric 1
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
K-LS1-1. Observe and communicate that animals (including humans) and plants need food, water, and air to survive. Animals get food from plants or other animals. Plants make their own food and need light to live and grow.	[Animals eating plants] ***Needs of Plants and Animals*** unit: ● Lesson 1.4, ○ **Activity 3,** Instructional Guide (steps 3–11) ○ **Activity 4,** Instructional Guide ● **Printable Resources,** Print Materials (8.5" x 11"), Animals Eating Station Cards, pages 21–30 [Animals eating animals] ***Needs of Plants and Animals*** unit: ● Lesson 1.4, **Activity 4,** Instructional Guide (steps 4–7) [Plants needing water and light]

	Needs of Plants and Animals unit: ● Lesson 2.3, **Activity 2,** Instructional Guide (steps 4–7) ● Lesson 2.6, **Activity 1,** Instructional Guide (steps 5–9) and On-the-Fly Assessment (hummingbird icon) ● Chapter 3, Ch. Overview ● Lesson 3.1 ○ **Activity 2,** Instructional Guide (steps 3–8) ○ **Activity 3,** Instructional Guide and Possible Responses tab ● Lesson 3.2, **Activity 1,** Instructional Guide (steps 8–9) ● Lesson 3.3, **Activity 4,** Instructional Guide (steps 5–10) and On-the-Fly Assessment (hummingbird icon) [Plant and animal needs] ***Needs of Plants and Animals*** unit: ● Lesson 4.4 ○ **Activity 1,** Instructional Guide (steps 2–6) ○ **Lesson Brief,** Digital Resources, "Assessment Guide," Rubric 1
K-LS1-2(MA). Recognize that all plants and animals grow and change over time.	***Needs of Plants and Animals*** unit: ● Lesson 2.1 ○ **Activity 1,** Instructional Guide ○ **Student book,** *Handbook of Plants* ○ **Activity 2,** Instructional Guide ○ **Investigation Notebook**, page 6 ● Lesson 2.2 ○ **Video, Instructional Guide** ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide
Physical Science	
PS1. Matter and Its Interactions	
K-PS1-1(MA). Investigate and communicate the idea that different kinds of materials can be solid or liquid depending on temperature.	[Solids and liquids] ***Properties of Materials*** unit (grade 2): ● Lesson 2.1 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 1–4) ○ **Student book**, *Can You Change It Back?*

	● Lesson 2.2 ○ **Activity 3**, Instructional Guide and Sorting Tool: 2.2 Before and After ○ **Activity 4,** Instructional Guide (steps 1–4), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 1.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 4–7) ○ **Student book**, *What If Rain Boots Were Made of Paper?* ● Lesson 1.3, **Activity 1,** Instructional Guide ● Lesson 1.5 ○ **Activity 3,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 12 ● Lesson 1.9, **Activity 4,** Instructional Guide (steps 3–7), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 4.3, **Activity 2**, Instructional Guide and Teacher Support tab ("Background, Science Note: About Describing and Classifying Matter by its Observable Properties"), and Sorting Tool: 4.3 Ingredient Properties 1–2
PS2. Motion and Stability: Forces and interactions	
K-PS2-1. Compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.	***Pushes and Pulls*** unit: ● Lesson 6.3 ○ **Activity 1,** Instructional Guide ○ **Lesson Brief,** Digital Resources, "Assessment Guide" [Different strengths] ***Pushes and Pulls*** unit: ● Lesson 2.2 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 4,** Instructional Guide

	○ **Printable Resources,** Print Materials (8.5" x 11"), Force Cards, pages 8–19 ○ **Student book,** *Forces in Ball Games* ● Lesson 2.3, **Activity 1,** Instructional Guide, Critical Juncture Assessment (hummingbird icon) [Different directions] ***Pushes and Pulls*** unit: ● Lesson 3.1 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ● Lesson 3.2 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Building with Forces* ● Lesson 3.3 ○ **Lesson Brief,** Lesson Overview, ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide and Critical Juncture Assessment (hummingbird icon) [Starting, stopping, and changing the motion] ***Pushes and Pulls*** unit: ● Lesson 1.2, ○ **Activity 1,** Instructional Guide (steps 7–13) ○ Lesson 1.2 ○ **Activity 4,** Instructional Guide ○ **Student book,** *Talking About Forces* ● Lesson 2.2 ○ **Activity 4,** Teacher Support tab ("Instructional Suggestion, Going Further: Forces and Speed") ○ **Lesson Brief**, Digital Resources, "Chapter 2 Home Investigation: Making a Forces Kit copymaster"

	● Lesson 3.3 ○ **Activity 3,** Teacher Support tab ("Instructional Suggestion, Going Further: Forces and Speed" and "Assessment, Assessment Opportunity: Assessing Student Understanding of Force and Speed") ○ **Lesson Brief,** Digital Resources, "Chapter 3 Home Investigation 1: More Practice with a Forces Kit copymaster" ● Lesson 4.2 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Student book** *Forces in Ball Games* [touching or colliding objects] ***Pushes and Pulls*** unit: ● Lesson 1.3 ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ● Lesson 1.4, **Activity 3**, Instructional Guide (step 6) and Teacher Support tab ("Rationale, Literacy Note: *Touch* Versus *Collide*") ● Lesson 4.1 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ● Lesson 4.2 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide ○ **Student book,** *Forces in Ball Games* ● Lesson 4.3 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide (steps 3–7) and Critical Juncture Assessment ● Lesson 2.1, **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon)
PS3. Energy	

K-PS3-1. Make observations to determine that sunlight warms materials on Earth's surface.	***Sunlight and Weather*** unit: ● Lesson 2.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide ● Lesson 2.3, **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide (steps 5–9) and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2,** Instructional Guide and Critical Juncture Assessment (hummingbird icon) ○ **Activity 4,** Instructional Guide (steps 1–9) ● Lesson 2.1 ○ **Lesson Brief,** Lesson Overview ○ **Activity 2,** Instructional Guide ○ **Activity 4,** Instructional Guide
K-PS3-2. Use tools and materials to design and build a model of a structure that will reduce the warming effect of sunlight on an area.*	***Sunlight and Weather*** unit: ● Lesson 4.4, **Activity 1,** Teacher Support tab ("Instructional Suggestion, Providing More Experience: Designing Shade Structures") ● Lesson 4.4 ○ **Activity 1,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ● Lesson 2.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide ● Lesson 2.3, **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4 ○ **Lesson Brief,** Lesson Overview ○ **Activity 1,** Instructional Guide (steps 5–9) and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2,** Instructional Guide and Critical Juncture Assessment

	○ **Activity 4,** Instructional Guide (steps 1–9)
Engineering Design	
N/A	N/A

Grade 1	**Amplify Science Citations**
Earth Science	
ESS1. Earth's Place in the Universe	
1-ESS1-1. Use observations of the Sun, Moon, and stars to describe that each appears to rise in one part of the sky, appears to move across the sky, and appears to set.	***Spinning Earth*** unit: ● Lesson 5.3 ○ **Activity 1**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ○ **Student book,** *What Spins?*, pages 18–23 [Sun] ***Spinning Earth*** unit: ● Lesson 3.3 ○ **Lesson Brief**, Digital "Resources, Sky Mural (Completed)" ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ○ **Activity 5**, Instructional Guide ○ **Investigation Notebook**, pages 16–17 ● Lesson 3.4, **Activity 1**, Instructional Guide ● Lesson 4.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ○ **Activity 5**, Instructional Guide ○ **Investigation Notebook**, pages 19–20 ● Lesson 4.2 ○ **Activity 1** Instructional Guide ○ **Activity 4**, Instructional Guide ○ **Investigation Notebook**, page 21

	● Lesson 3.1, **Activity: Observing the Sunset**, Instructional Guide and Sunset video [Moon] ***Spinning Earth*** unit: ● Lesson 3.5 ○ **Activity 3**, Instructional Guide (steps 5–10) ○ **Student book**, *Patterns of Earth and Space*, pages 22–25 ● Lesson 3.1 ○ **Activity 3**, Instructional Guide (step 6) and Teacher Support tab (“Instructional Suggestion, Providing More Experience: Home Investigation”) ○ **Lesson Brief**, Digital Resources, “Optional: Chapter 3 Home Investigation: Nighttime Sky Observations copymaster” [Stars] ***Spinning Earth*** unit: ● **Student book**, *Patterns of Earth and Space*, pages 26–31 ● Lesson 2.2, **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.6 ○ **Activity 1**, Instructional Guide (steps 4–10) ○ **Activity 2**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ● Lesson 4.4 ○ **Activity 4**, Instructional Guide ○ **Activity 5**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.1 ○ **Activity 3**, Instructional Guide (step 6) and Teacher Support tab (“Instructional Suggestion, Providing More Experience: Home Investigation”) ○ **Lesson Brief**, Digital Resources, “Optional: Chapter 3 Home Investigation: Nighttime Sky Observations copymaster”

1-ESS1-2. Analyze provided data to identify relationships among seasonal patterns of change, including relative sunrise and sunset time changes, seasonal temperature and rainfall or snowfall patterns, and seasonal changes to the environment. Clarification Statement: Examples of seasonal changes to the environment can include foliage changes, bird migration, and differences in amount of insect activity.	***Spinning Earth*** unit: ● Lesson 5.2 ○ **Activity 1**, Instructional Guide (steps 3–9) ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (step 3) ○ **Student book**, *Patterns of Earth and Space,* pages 14–17 ● Lesson 5.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide, Possible Responses tab, and Teacher Support tab (“Assessment, Assessment Opportunity: Observing, Describing, and Predicting Seasonal Patterns of Sunrise and Sunset”) ○ **Activity 4**, Instructional Guide ○ **Investigation Notebook**, page 22 ○ **Student book**, *A Walk Through the Seasons* Massachusetts Grade 1 Companion Lesson, "Seasonal Changes" (see Amplify Science Massachusetts site)
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
1-LS1-1. Use evidence to explain that (a) different animals use their body parts and senses in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air, and (b) plants have roots, stems, leaves, flowers, and fruits that are used to take in water, air, and other nutrients, and produce food for the plant. Descriptions are not expected to include mechanisms such as the process of photosynthesis.	***Animal and Plant Defenses* unit*:*** ● Lesson 1.2 ○ **Activity 1**, Instructional Guide and Teacher Support tab (“Background, About the Book: *Tortoise Parts*”) ○ **Student book**, *Tortoise Parts* ● Lesson 1.3 o **Lesson Brief** ▪ Lesson Overview ▪ Digital Resources, “Video: Sea Turtle Breathing” and “Video: Elephants Drinking” ○ **Activity 1**, Instructional Guide and Teacher Support tab (“Rationale, Pedagogical Goals: Structure-Function and Explanation Language Frames”) ○ **Activity: Observing Animal and Plant Structures**, Instructional Guide and Teacher Support tab (“Instructional Suggestion, Going Further: Other Plant Structures”)

	○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide, On-the-Fly Assessment (hummingbird icon), and Teacher Support tab ("Background, Crosscutting Concept: Structure and Function Across This Unit") ○ **Student books**, *Spikes, Spines, and Shells* and *Tortoise Parts* ● Lesson 1.5 ○ **Activity: Gathering Evidence About Sea Turtle Structures**, Instructional Guide, Video: Sea Turtle Breathing, Video: Sea Turtle Eating, and Video: Sea Turtle and Sharks ○ **Activity 1**, Instructional Guide (steps 3–6) and Critical Juncture Assessment (hummingbird icon) ○ **Activity 2**, Instructional Guide ● Lesson 2.1 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Whose Lunch Is This?* ○ **Activity: Observing Animals Eating,** Instructional Guide (steps 6–11) ● Lesson 2.2 ○ **Activity 4**, Instructional Guide (step 8) ● Lesson 2.7, **Activity 1**, Instructional Guide (steps 4–12) and Critical Juncture Assessment (hummingbird icon)
1-LS1-2. Obtain information to compare ways in which the behavior of different animal parents and their offspring help the offspring to survive. Clarification Statement: • Examples of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).	***Animal and Plant Defenses*** unit: ● Lesson 3.2 ○ **Activity 1**, Instructional Guide ○ **Activity 3,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● **Student book,** *Parents and Offspring* ● Lesson 3.3 ○ **Activity: Video of Parent and Offspring Defenses**, Instructional Guide (step 5) and Iguana and Hawk video ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5" x 11"), Parent and Offspring Cards ● Lesson 3.4

	○ **Lesson Brief,** Lesson Overview ○ **Activity 1**, Instructional Guide (steps 3–10) ○ **Student book,** *Parents and Offspring* ○ **Activity 2**, Instructional Guide ○ **Activity: Videos of Young Offspring**, Instructional Guide Young Fish Offspring video, Young Sea Turtles video, and Plant Offspring video ● Lesson 3.5, **Activity: Videos of Offspring Signals**, Instructional Guide, Bird Signaling video, and Wolf Signaling video ***Spinning Earth*** unit: ● Lesson 5.3 ○ **Activity 1**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ○ **Student book,** *What Spins?*, pages 18–23
LS3. Heredity: Inheritance and Variation of Traits	
1-LS3-1. Use information from observations (first-hand and from media) to identify similarities and differences among individual plants or animals of the same kind. Clarification Statements: · Examples of observations could include that leaves from the same kind of plant are the same shape but can differ in size. · Inheritance, animals that undergo metamorphosis, or hybrids are not expected.	***Animal and Plant Defenses*** unit: ● Lesson 3.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Printable Resources**, Print Materials (8.5" x 11"), Parent and Offspring Cards, pages 36–39 ● Lesson 3.2 ○ **Activity 1**, Instructional Guide ○ **Student book,** *Parents and Offspring* ● Lesson 3.3 ○ **Activity: Video of Parent and Offspring Defenses**, Instructional Guide (steps 5–6, 9–10) and Iguana and Hawk video ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide, Possible Responses tab and Critical Juncture Assessment (hummingbird icon) ***Environments and Survival*** unit (grade 3): ● Lesson 2.4, **Activity 2**, Instructional Guide ● Lesson 2.6, **Activity 3**, Instructional Guide and Critical Juncture Assessment (hummingbird icon)

	● Lesson 2.4 ○ **Activity 3**, Instructional Guide ○ **Student book**, *Biomimicry Handbook*, pages 7–9, 18 ● Lesson 2.5, **Activity 1**, Instructional Guide (steps 3–11), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 2.5 Traits and Survival A-B ● Lesson 2.1 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Teacher Support tab (“Instructional Suggestion, Going Further: Bird Adaptive Traits for Finding Mates”) ○ **Student book**, *Environment News* ***Inheritance and Traits*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide (steps 1–7) ○ **Student book**, *How the Sparrow Learned Its Song* ● Lesson 3.6 ○ **Activity 3**, Instructional Guide (steps 2–3) ○ **Lesson Brief**, Digital Resources, “Assessment Guide” ● Lesson 3.5 ○ **Activity 1**, Instructional Guide, Possible Responses tab**,** and Modeling Tool: 3.5 Environment and Traits ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.1 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide (steps 1–2) ● **Printable Resources**, Print Materials (8.5” x 11”), Flamingo Family Data Cards, pages 19–21 ● Lesson 3.3, **Activity 2**, Instructional Guide
Physical Science	

PS4. Waves and Their Applications in Technologies for Information Transfer	
1-PS4-1. Demonstrate that vibrating materials can make sound and that sound can make materials vibrate. Clarification Statements: Examples of vibrating materials that make sound could include tuning forks, a stretched string or rubber band, and a drum head. Examples of how sound can make materials vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork.	***Light and Sound*** unit: ● Lesson 4.1 ○ **Activity 3**, Instructional Guide (steps 1–12) ○ **Investigation Notebook**, page 24 ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 4,** Instructional Guide ○ **Student book**, *What Vibrates?* ○ **Investigation Notebook**, page 25 ● Lesson 4.4 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ● Lesson 4.3 ○ **Activity 1**, Instructional Guide (steps 4–11, 13) and Teacher Support tab ("Instructional Suggestion, and Going Further: Sound Can Cause Vibrations") ○ **Activity 3**, Instructional Guide and Teacher Support tab ("Background, Literacy Note: Using Explanation Language Frames to Write") ○ **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "*I Hear a Sound. What Vibrates?* Mini-Book copymaster"
1-PS4-3. Conduct an investigation to determine the effect of placing materials that allow light to pass through them, allow only some light through them, block all the light, or redirect light when put in the path of a beam of light. Clarification: • Effects can include some or all light passing through, creation of a shadow, and redirecting light. • Quantitative measures are not expected.	***Light and Sound*** unit: ● Lesson 3.1 ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Investigation Notebook**, page 16 ○ **Activity 3**, Instructional Guide ● Lesson 3.2 ○ **Activity 1**, Instructional Guide

	○ **Activity 4**, Instructional Guide ○ **Student book**, *Let's Test!*, pages 6–11 ● Lesson 3.3 ○ **Activity 3**, Instructional Guide ○ **Student book**, *Engineering with Light and Sound*, pages 13–21 ● Lesson 3.4 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide ● Lesson 3.5, **Activity 2**, Instructional Guide ● Lesson 2.3, **Activity 2**, Instructional Guide (steps 3–4, 6), On-the-Fly Assessment (hummingbird icon), and Teacher Support tab ("Instructional Suggestion, Going Further: Mirrors and Additional Blocking and Reflection Activities") ● Lesson 4.1 ○ **Activity 3**, Instructional Guide (steps 1–12) ○ **Investigation Notebook**, page 24 ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
1-PS4-4. Use tools and materials to design and build a device that uses light or sound to send a signal over a distance.* Clarification: • Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats. • Technological details for how communication devices work are not expected.	***Light and Sound*** unit: ● Lesson 4.5 ● **Activity 3**, Instructional Guide (step 10) and Teacher Support tab ("Instructional Suggestion, Going Further: Using Light and Sound to Communicate Over Long Distances") ● **Student book**, *Engineering with* ***Light and Sound***, pages 8, 10, 23, 27, 29 ● **Activity 4**, Teacher Support tab ("Assessment, Assessment Opportunity: Students' Understanding of Communicating Over Long Distances") ● Lesson 1.1 ○ **Lesson Brief**, Digital Resources, "Puppet Scene Design Goals chart" ○ **Activity 2,** Instructional Guide ● Lesson 2.4 ○ **Activity 1**, Instructional Guide (steps 2–7) ○ **Activity 2**, Instructional Guide ● Lesson 3.4

	○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ● Lesson 3.5, **Activity 2**, Instructional Guide ● Lesson 4.1, **Lesson Brief**, Digital Resources, "Sound Sources Design Goals chart" ● Lesson 4.4 ○ **Activity 2**, Instructional Guide (steps 5–6) ○ **Activity 3**, Instructional Guide ○ **Investigation Notebook**, page 26 ● Lesson 4.6 ○ **Activity 1**, Instructional Guide (step 8) ○ **Lesson Brief**, Digital Resources, "Assessment Guide," Rubric 3
Engineering Design	
1.K-2-ETS1-1. Ask questions, make observations, and gather information about a situation people want to change that can be solved by developing or improving an object or tool.*	***Light and Sound*** unit: ● Lesson 1.1, **Activity 1**, Instructional Guide (steps 4–5) and Teacher Support tab ("Rationale, Pedagogical Goals: Engaging First Graders in Posing Questions") ● Lesson 4.1, **Activity 3**, Instructional Guide (steps 13–14) ● Lesson 1.2 ○ **Activity 1**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Can You See in the Dark?* ● Lesson 2.2 ○ **Activity 1**, Instructional Guide ○ **Student book**, *What Makes This Shadow?* ● Lesson 3.2 ○ **Activity 1**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Let's Test!* ● Lesson 4.3 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *What Vibrates?* ● Lesson 4.1, **Activity 1**, Instructional Guide ● Lesson 1.1

	○ **Activity 3**, Instructional Guide ○ **Student book**, *Engineering with Light and Sound* ○ **Activity 2**, Instructional Guide ● Lesson 4.2, **Activity 2**, Instructional Guide (step 1) ● Lesson 1.5, **Activity 3**, Instructional Guide (step 1) ● Lesson 2.5, **Activity 1**, Instructional Guide ● Lesson 3.5, **Activity 1**, Instructional Guide (step 10) ● Lesson 3.6, **Activity 3**, Instructional Guide [where light comes from] ***Light and Sound*** unit: ● Lesson 1.2, **Activity 3**, Instructional Guide [what makes a surface bright] ***Light and Sound*** unit: ● Lesson 1.5, **Activity 1**, Instructional Guide [what makes a surface dark] ***Light and Sound*** unit: ● Lesson 2.1 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide ○ **Activity 4**, Instructional Guide ● Lesson 4.6 ○ **Activity 1**, Instructional Guide (step 8) ○ **Lesson Brief**, Digital Resources, "Assessment Guide," Rubric 3
1.K-2-ETS1-2. Generate multiple solutions to a design problem and make a drawing (plan) to represent one or more of the solutions.*	***Animal and Plant Defenses*** unit: ● Lesson 2.8 ○ **Activity 2,** Instructional Guide and Teacher Support tab ("Background, Science and Engineering Practices: Models and Prototypes," "Rationale, Science Practices: Using Evidence to Develop Models to Represent an Object," and "Background, Pedagogical Goals: Developing Models") ○ **Investigation Notebook**, pages 8–9

	○ **Activity 3**, Instructional Guide ● Lesson 4.2, **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.4 ○ **Activity 1**, Instructional Guide (steps 6–7) ○ **Lesson Brief**, Digital Resources, "Assessment Guide," Rubric 3 ● Lesson 4.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Frog Models* ***Light and Sound*** unit: ● Lesson 3.4 ○ **Activity 2,** Instructional Guide ○ **Investigation Notebook**, pages 18–19

Grade 2	**Amplify Science Citations**
Earth Science	
ESS2. Earth's Systems	
2-ESS2-1. Investigate and compare the effectiveness of multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*	***Changing Landforms*** unit: ● Lesson 1.3, **Activity 1,** Instructional Guide (steps 3–4) and Teacher Support tab ("Background, Crosscutting Concepts: What Is Meant by Stability and Change?" and "Background, Crosscutting Concepts: Stability and Change Across the Unit") ● Lesson 2.2 ○ **Activity 2,** Instructional Guide (steps 3–9) and Possible Responses tab ○ **Activity 3,** Instructional Guide (steps 1–3) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.3 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Student book**, *What's Stronger? How Water Causes Erosion*

	● Lesson 2.5, **Activity 3,** Instructional Guide (steps 2–7) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.5, **Student book**, *Handbook of Land and Water* ● Lesson 2.6 ○ **Activity 2,** Instructional Guide and Possible Responses tab ○ **Activity 3,** Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.4, **Activity 2,** Instructional Guide, Possible Responses tab, Critical Juncture Assessment, and Modeling Tool: 3.4 Changes Over Time ● Lesson 4.2 ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Activity 3**, Instructional Guide ● Lesson 4.4, **Activity 2,** Instructional Guide, Possible Responses tab, Critical Juncture Assessment (hummingbird icon), and Modeling Tool: 4.4 Loose Material or Rock
2-ESS2-2. Map the shapes and types of landforms and bodies of water in an area.	***Changing Landforms*** unit: ● Lesson 3.4 ○ **Activity 1,** Instructional Guide (steps 4–13) ○ **Printable Resources**, Print Materials (8.5" x 11"), Island Map Cards, pages 18–20 ● Lesson 3.1 ○ **Activity 2,** Instructional Guide ○ **Student book**, *Handbook of Land and Water* ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 3–5), Possible Responses tab, Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Uses for Maps"), and Modeling Tool: 3.1 Beach Map, 3.1 Mountain Map, and 3.1 Island Map ● Lesson 3.2 ○ **Activity 1,** Instructional Guide and Possible Responses tab ○ **Activity 2,** Instructional Guide (steps 10–11) and Possible Responses tab

2-ESS2-3. Use examples obtained from informational sources to explain that water is found in the ocean, rivers and streams, lakes and ponds, and may be solid or liquid.	[Bodies of water] ***Changing Landforms*** unit: ● Lesson 3.3 ○ **Activity 1,** Instructional Guide (step 12) and Teacher Support tab ("Instructional Suggestion, Going Further: Reading About Changes to Bodies of Water") ○ **Student book,** *Handbook of Land and Water*, pages 23–26, 31–38 ○ **Student book,** *Landform Postcards*, pages 4, 10–14, 16–17, 20, 23 ● Lesson 2.3 ○ **Activity 1,** Instructional Guide (steps 4–8) and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Forms and Bodies of Water") ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ○ **Student book**, *What's Stronger? How Water Causes Erosion*, pages 8–13, 18–19 [Water as a solid and liquid] ***Changing Landforms*** unit: ● Lesson 2.3 ○ **Activity 1,** Instructional Guide (steps 4–8) and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Forms and Bodies of Water") ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ○ **Student book,** *What's Stronger? How Water Causes Erosion* ● Lesson 2.4, **Activity 1,** Instructional Guide (steps 5–6) and Possible Responses tab
2-ESS2-4(MA). Observe how blowing wind and flowing water can move Earth materials from one place to another and change the shape of a landform.	***Changing Landforms*** unit: ● Lesson 2.2

	○ **Activity 2,** Instructional Guide (steps 3–9) and Possible Responses tab ○ **Activity 3**, Instructional Guide (steps 1–3) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.3 ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ○ **Student book**, *What's Stronger? How Water Causes Erosion* ● Lesson 4.2 ○ **Activity 2,** Instructional Guide and Possible Responses tab ○ **Activity 3,** Instructional Guide ● Lesson 2.5 ○ **Activity 3,** Instructional Guide (steps 2–7) and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Handbook of Land and Water*, pages 13–14, 17, 21, 29–30, 37, 41–42, 45 ● Lesson 2.6 ○ **Activity 2,** Instructional Guide and Possible Responses tab ○ **Activity 3**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon)
Life Science	
LS2. Ecosystems: Interactions, Energy, and Dynamics	
2-LS2-3(MA). Develop and use models to compare how plants and animals depend on their surroundings and other living things to meet their needs in the places they live.	***Plant and Animal Relationships*** unit: ● Lesson 1.4 ○ **Activity 4,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 10 ○ **Student book**, *Handbook of Habitats* ● Lesson 1.1 ○ **Activity 2,** Instructional Guide (steps 1, 4–6) ○ **Student book**, *Handbook of Habitats* ● Lesson 1.3 ○ **Activity 2,** Instructional Guide ○ **Investigation Notebook**, page 7 ● Lesson 1.6

	○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, pages 15–19 ● Lesson 3.1 ○ **Activity 3,** Instructional Guide (steps 1–5), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Habitat Scientist* ● Lesson 4.2, **Activity 4,** Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, pages 66–69 ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
LS4. Biological Evolution: Unity and Diversity	
2-LS4-1. Use texts, media, or local environments to observe and compare (a) different kinds of living things in an area, and (b) differences in the kinds of living things living in different types of areas.	***Plant and Animal Relationships*** unit: ● Lesson 1.5 ○ **Activity 3,** Instructional Guide ○ **Student book**, *Handbook of Habitats* ● Lesson 2.4, **Activity 1,** Instructional Guide, Possible Responses tab, and Modeling Tool: 2.4 Plant Growth, City Park ● Lesson 3.5, **Activity 3,** Instructional Guide ● **Student book,** *Handbook of Habitats* ● Lesson 1.4 ○ **Activity 4,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 10 ○ **Student book**, *Handbook of Habitats* ● Lesson 1.1 ○ **Activity 2,** Instructional Guide (steps 1, 4–6) ○ **Student book**, *Handbook of Habitats* ● Lesson 1.3 ○ **Activity 2,** Instructional Guide

	○ **Investigation Notebook**, page 7 ● Lesson 1.6 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, pages 15–19 ● Lesson 3.1 ○ **Activity 3,** Instructional Guide (steps 1–5), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Habitat Scientist* ● Lesson 4.2, **Activity 4,** Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, pages 66–69 ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
Physical Science	
PS1. Matter and Its Interactions	
2-PS1-1. Describe and classify different kinds of materials by observable properties of color, flexibility, hardness, texture, and absorbency.	[Solids and liquids] ***Properties of Materials*** unit: ● Lesson 2.1 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 1–4) ○ **Student book**, *Can You Change It Back?* ● Lesson 2.2 ○ **Activity 3**, Instructional Guide and Sorting Tool: 2.2 Before and After ○ **Activity 4,** Instructional Guide (steps 1–4), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) [Properties of matter]

	Properties of Materials unit: ● Lesson 1.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 4–7) ○ **Student book**, *What If Rain Boots Were Made of Paper?* ● Lesson 1.3, **Activity 1,** Instructional Guide ● Lesson 1.5 ○ **Activity 3,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 12 ● Lesson 1.9, **Activity 4,** Instructional Guide (steps 3–7), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 4.3, **Activity 2**, Instructional Guide, Teacher Support tab ("Background, Science Note: About Describing and Classifying Matter by its Observable Properties"), and Sorting Tool: 4.3 Ingredient Properties 1–2 ● Lesson 1.3, **Activity 3,** Instructional Guide (steps 13–14) and Teacher Support tab ("Background, Crosscutting Concept: What Is Meant by Patterns?" and "Background, Crosscutting Concept: Patterns Across This Unit") ● Lesson 2.2, **Activity 2,** Instructional Guide (steps 4–8)
2-PS1-2. Test different materials and analyze the data obtained to determine which materials have the properties that are best suited for an intended purpose.*	***Properties of Materials*** unit: ● Lesson 1.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 4–7) ○ **Student book,** *What If Rain Boots Were Made of Paper?* ● Lesson 1.3, **Activity 2,** Instructional Guide (steps 5–7) ● Lesson 1.6 ○ **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3,** Instructional Guide, Teacher Support tab ("Rationale, Science Practices: Debriefing Test Results") and Graphing Tool: 1.6 Sticky Test Results ● Lesson 2.3 ○ **Activity 1,** Instructional Guide (steps 5–9) and Graphing Tool: 2.3 Cornstarch Test Results

	○ **Activity 3,** Instructional Guide and Teacher Support tab ("Background, Crosscutting Concept: Cause and Effect Across This Unit" and "Background, Science Note: About Cause and Effect") ○ **Activity 4,** Instructional Guide and Possible Responses tab ○ **Activity 5,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3, **Activity 2,** Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Graphing Tool: 3.3 Strength Test Results ● Lesson 4.1 ○ **Activity 1,** Instructional Guide ○ **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon)
2-PS1-3. Analyze a variety of evidence to conclude that when a chunk of material is cut or broken into pieces, each piece is still the same material and, however small each piece is, has weight. Show that the material properties of a small set of pieces do not change when the pieces are used to build larger objects.	[Properties and purposes] ***Properties of Materials*** unit: ● Lesson 1.2 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 4–7) ○ **Student book**, *What If Rain Boots Were Made of Paper?* ● Lesson 1.3, **Activity 2,** Instructional Guide (steps 5–7) ● Lesson 1.8, **Activity 4,** Instructional Guide (steps 6–8) and Possible Responses tab ● Lesson 4.1, **Activity 2,** Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon) [Pieces make up objects] ***Properties of Materials*** unit: ● Lesson 2.1 ○ **Activity 4,** Instructional Guide (step 5) and Teacher Support tab ("Background, Science Note: Smaller Objects Can Be Combined to Make Bigger Objects," "Assessment, Assessment Opportunity: Student Understanding of Building Objects from Small Sets of Pieces," and

	"Instructional Suggestion, Going Further: Designing with Small Objects") ○ **Student book**, *Can You Change It Back?*, pages 22–23 ● Lesson 1.7, **Activity 3,** Teacher Support tab ("Background, Crosscutting Concept: Energy and Matter Across This Unit") ● Lesson 1.9, **Activity 1,** Teacher Support tab ("Instructional Suggestion, Providing More Experience: Using Manipulatives to Make Combinations of Five") ● Lesson 3.2, **Activity 4,** Teacher Support tab ("Instructional Suggestion, Providing More Experience: Model Making Different Mixtures with Color Blocks") ● Lesson 4.3, **Activity 4,** Teacher Support tab ("Instructional Suggestion, Providing More Experience: Model Making Different Mixtures with Color Blocks") Massachusetts Grade 2 Companion Lesson, "Properties and Weight" (see Amplify Science Massachusetts site)
2-PS1-4. Construct an argument with evidence that some changes to materials caused by heating or cooling can be reversed and some cannot.	***Properties of Materials*** unit: ● Lesson 1.8, **Activity 4,** Instructional Guide (steps 6–10), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1 ○ **Activity 3,** Instructional Guide ○ **Activity 4,** Instructional Guide (steps 1–4) ○ **Student book,** *Can You Change It Back?* ● Lesson 2.2 ○ **Activity 2,** Instructional Guide (steps 2–7) and Possible Responses tab ○ **Activity 4,** Instructional Guide (steps 1–6), Possible Responses tab, Critical Juncture Assessment (hummingbird icon), and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Home Investigation") ○ **Lesson Brief,** Digital Resources, "Optional Chapter 2 Home Investigation: Heating and Cooling copymaster" ● Lesson 2.3 ○ **Activity 3,** Instructional Guide and Teacher Support tab ("Background, Crosscutting Concept: Cause and Effect

	Across This Unit" and "Background, Science Note: About Cause and Effect") ○ **Activity 4,** Instructional Guide and Possible Responses tab ○ **Activity 5** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Handbook of Interesting Ingredients*, odd-numbered pages ● Lesson 2.4, **Activity 4,** Instructional Guide (steps 1–4), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.4, **Activity 3,** Instructional Guide (steps 11–12), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.4 ○ **Activity 2,** Instructional Guide (steps 3–7) ○ **Lesson Brief,** Digital Resources, "Assessment Guide"
PS3. Energy	
2-PS3-1(MA). Design and conduct an experiment to show the effects of friction on the relative temperature and speed of objects that rub against each other.	Amplify Science, which was designed specifically for the NGSS, does not currently address this standard.
Engineering Design	
2.K-2-ETS1-3. Analyze data from tests of two objects designed to solve the same design problem to compare the strengths and weaknesses of how each object performs.*	***Properties of Materials*** unit: ● Lesson 1.6 ○ **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3,** Instructional Guide, Teacher Support tab ("Rationale, Science Practices: Debriefing Test Results"), and Graphing Tool: 1.6 Sticky Test Results ● Lesson 1.9, **Activity 4**, Instructional Guide ● Lesson 2.2, **Activity 2**, Instructional Guide ● Lesson 3.1 ○ **Activity 2,** Instructional Guide ○ **Activity 3,** Instructional Guide ○ **Student book**, *Jess Makes Hair Gel* ● Lesson 3.2 ○ **Activity 2,** Instructional Guide and Possible Responses tab ○ **Activity 3,** Instructional Guide ● Lesson 3.3

	○ **Activity 1,** Instructional Guide (steps 3–7) ○ **Activity 2,** Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Graphing Tool: 3.3 Strength Test Results ● Lesson 3.5, **Activity 2,** Instructional Guide ● Lesson 4.1 ○ **Activity 1,** Instructional Guide (steps 3–7) and Possible Responses tab ○ **Activity 2,** Instructional Guide and On-the-Fly Assessment (hummingbird icon)

Grade 3	**Amplify Science Citations**
Earth and Space Sciences	
ESS2. Earth's Systems	
3-ESS2-1. Use graphs and tables of local weather data to describe and predict typical weather during a particular season in an area.	***Weather and Climate*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Anchorage, Queenstown, and Saint Petersburg Graphs copymaster" ○ **Activity 3**, Instructional Guide ● Lesson 4.2 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Dangerous Weather Ahead* ● Lesson 3.7 ○ **Activity 3**, Instructional Guide (steps 3–7) ○ **Lesson Brief,** Digital Resources, "End-of-Unit Writing: Arguing About Future Island Weather Version A copymaster" and "Assessment Guide" ● Lesson 2.3 ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Investigation Notebook,** page 28 ● Lesson 3.3, **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.6, **Activity 1**, Instructional Guide (steps 3–5) and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.4 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Sky Notebook*
3-ESS2-2. Obtain and summarize information about the climate of different regions of the world to illustrate that typical weather conditions over a year vary by region.	***Weather and Climate*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Anchorage, Queenstown, and Saint Petersburg Graphs copymaster" ● Lesson 3.3, **Activity 1**, Instructional Guide

	● Lesson 3.5 ○ **Activity 3**, Instructional Guide (steps 1–3), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ○ **Investigation Notebook,** page 50 ● Lesson 3.5 ○ **Activity 1**, Instructional Guide (steps 3–10) and Possible Responses tab ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Investigation Notebook,** pages 48–49 ○ **Student book,** *World Weather Handbook* ● Lesson 3.3 ○ **Activity 3**, Instructional Guide ○ **Student book**, *World Weather Handbook*, pages 10, 38–39 ● Lesson 3.6, **Activity 1**, Instructional Guide (steps 3–5) and On-the-Fly Assessment (hummingbird icon)
ESS3. Earth and Human Activity	
3-ESS3-1. Evaluate the merit of a design solution that reduces the damage caused by weather.*	***Weather and Climate*** unit: ● Lesson 4.4 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.2 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Dangerous Weather Ahead* ● Lesson 4.3 ○ **Activity 1**, Instructional Guide (steps 1–3) ○ **Activity 3**, Instructional Guide (steps 8–9) ● Lesson 4.1, **Activity 2**, Instructional Guide (steps 3-8), Possible Responses tab, and Modeling Tool: 4.1 Natural Hazard Patterns
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
3-LS1-1. Use simple graphical representations to show that different types of organisms have unique and diverse life cycles.	***Inheritance and Traits*** unit: ● Lesson 1.1

Describe that all organisms have birth, growth, reproduction, and death in common but there are a variety of ways in which these happen.	○ **Activity 4**, Instructional Guide ○ **Student book**, *Handbook of Traits* ● Lesson 2.1, **Activity 2**, Instructional Guide (steps 3–4) ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 9–10) and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Reproduction and Life Cycles")
LS3. Heredity: Inheritance and Variation of Traits	
3-LS3-1. Provide evidence, including through the analysis of data, that plants and animals have traits inherited from parents and that variation of these traits exist in a group of similar organisms.	***Inheritance and Traits*** unit: ● Lesson 2.5, **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5" x 11"), Wolf Family, Bison Valley Pack, and Elk Mountain Pack Data Cards, pages 24–29, 32–34 ● Lesson 2.6 ○ **Activity 1**, Instructional Guide (steps 5–11) ○ **Activity 2**, Instructional Guide (steps 2–4) and Possible Responses tab ○ **Activity 3**, Instructional Guide (steps 7–8) and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.3 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *The Code* ● Lesson 2.4 ○ **Activity 1**, Instructional Guide (steps 5–8) ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and Possible Responses tab ● Lesson 1.2 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Blue Whales and Buttercups* ● Lesson 1.5 ○ **Activity 1,** Instructional Guide (steps 4–15) and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook,** page 12 ● Lesson 1.3, **Activity 2**, Instructional Guide, Possible Responses tab, and Teacher Support tab ("Instructional Suggestion, Providing More Support: Patterns")

	● **Printable Resources**, Print Materials (8.5" x 11"), Elk Mountain Pack Data Cards, pages 32–34, and Bird Cards, pages 52–54
3-LS3-2. Distinguish between inherited characteristics and those characteristics that result from a direct interaction with the environment. Give examples of characteristics of living organisms that are influenced by both inheritance and the environment.	***Inheritance and Traits*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide (steps 1–7) ○ **Student book**, *How the Sparrow Learned Its Song* ● Lesson 3.6 ○ **Activity 3**, Instructional Guide (steps 2–3) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.5 ○ **Activity 1**, Instructional Guide, Possible Responses tab**,** and Modeling Tool: 3.5 Environment and Traits ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.1 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide (steps 1–2) ● **Printable Resources**, Print Materials (8.5" x 11"), Flamingo Family Data Cards, pages 19–21 ● Lesson 3.3, **Activity 2**, Instructional Guide
LS4. Biological Evolution: Unity and Diversity	
3-LS4-1. Use fossils to describe types of organisms and their environments that existed long ago and compare those to living organisms and their environments. Recognize that most kinds of plants and animals that once lived on Earth are no longer found anywhere.	***Environments and Survival*** unit: ● Lesson 2.3, **Activity 1**, Instructional Guide and Possible Responses tab ● Lesson 2.2 ○ **Activity 2** Instructional Guide ○ **Student book,** *Mystery Mouths,* pages 6, 14, 18 ○ **Activity 3**, Instructional Guide (steps 5, 9) and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of Fossils and Extinction" and "Instructional Suggestion, Going Further: Using Fossils as Evidence for Past Environments") ○ **Lesson Brief**, Digital Resources, "Fossil Skulls: Clues into Past Environments copymaster"

	○ **Student book**, *Biomimicry Handbook*, pages 34–35 Massachusetts Grade 3 Companion Lesson, "Extinct Insects" (see Amplify Science Massachusetts site)
3-LS4-2. Use evidence to construct an explanation for how the variations in characteristics among individuals within the same species may provide advantages to these individuals in their survival and reproduction.	***Environments and Survival*** unit: ● Lesson 2.4, **Activity 2**, Instructional Guide ● Lesson 2.6, **Activity 3**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.4 ○ **Activity 3**, Instructional Guide ○ **Student book**, *Biomimicry Handbook*, pages 7–9, 18 ● Lesson 2.5, **Activity 1**, Instructional Guide (steps 3–11), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 2.5 Traits and Survival A-B ● Lesson 2.1 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Teacher Support tab (“Instructional Suggestion, Going Further: Bird Adaptive Traits for Finding Mates”) ○ **Student book**, *Environment News*
3-LS4-3. Construct an argument with evidence that in a particular environment some organisms can survive well, some survive less well, and some cannot survive.	***Environments and Survival*** unit: ● Lesson 1.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 7–11), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook,** pages 4–5 ● **Printable Resources**, Print Materials (8.5” x 11”), Needs for Survival Environment Cards, Needs for Survival Organism Cards, pages 12–17 ● Lesson 1.4 ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Activity 4**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon)

	● Lesson 2.5, **Activity 1**, Instructional Guide (steps 3–11), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool, 2.5 Traits and Survival A-B ● Lesson 2.1 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide
3-LS4-4. Analyze and interpret given data about changes in a habitat and describe how the changes may affect the ability of organisms that live in that habitat to survive and reproduce.	***Environments and Survival*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Student book,** *Environment News* ● Lesson 3.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ Lesson 3.4 ○ **Activity 3**, Instructional Guide (steps 1, 4–5) ○ **Lesson Brief**, Digital Resources, “Assessment Guide”
3-LS4-5(MA). Provide evidence to support a claim that the survival of a population is dependent upon reproduction.	***Inheritance and Traits*** unit: ● Lesson 1.1 ○ **Activity 4**, Instructional Guide (steps 6–7) ○ **Student book**, *Handbook of Traits* ● Lesson 2.1, **Activity 2**, Instructional Guide (steps 3–4) ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 9–10) and Teacher Support tab (“Assessment, Assessment Opportunity: Student Understanding of Reproduction and Life Cycles”) ***Environments and Survival*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Student book,** *Environment News* ● Lesson 3.1 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ● Lesson 3.4

	○ **Activity 3**, Instructional Guide (steps 1, 4–5) ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
Physical Science	
PS2. Motion and Stability: Forces and Interactions	
3-PS2-1. Provide evidence to explain the effect of multiple forces, including friction, on an object. Include balanced forces that do not change the motion of the object and unbalanced forces that do change the motion of the object.	***Balancing Forces*** unit: ● Lesson 5.1 ○ **Activity 3**, Instructional Guide ○ **Investigation Notebook,** pages 57–59 ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 5.3, **Activity: Introducing Electromagnets**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Investigate the Strength of Electromagnets") ● Lesson 5.5 ○ **Activity 1**, Instructional Guide (steps 4–6) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.4, **Activity 1**, Instructional Guide (steps 2–8), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 3.4 Force Types A-G ● Lesson 4.2 ○ **Activity 2**, Instructional Guide and Teacher Support tab ("Background, Science Note: About Balanced Forces") ○ **Student book**, *Handbook of Forces*, pages 18–23 ● Lesson 5.2 ○ **Activity 1**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2**, Instructional Guide ○ **Student book**, *Hoverboard* ● Lesson 1.3 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 4–7) ○ **Student book**, *Forces All Around* ● Lesson 3.3, **Activity 1**, Instructional Guide (step 11) and Teacher Support tab ("Background, Crosscutting Concepts: What is Meant by Cause and Effect?" and "Background, Crosscutting Concepts: Cause and Effect Across the Unit") ● Lesson 1.4

	○ **Activity 4**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.4 ○ **Activity 3**, Instructional Guide (steps 2–5) and Critical Juncture Assessment ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 5.5 ○ **Activity 1**, Instructional Guide (steps 2–6) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 2.2, **Activity 1**, Instructional Guide (steps 3–10) and Possible Responses tab ● Lesson 1.3, **Activity 3**, Instructional Guide (step 10) ● Lesson 1.4, **Activity 1**, Teacher Support tab ("Instructional Suggestion, Going Further: Investigating How Forces Can Cause Changes in Speed and Direction") ● Lesson 2.4 ○ **Activity 1**, Instructional Guide (step 8) ○ **Activity 2**, Instructional Guide ○ **Student book**, *What My Sister Taught Me About Magnets*, pages 6–8 ● Lesson 4.4, **Activity 1**, Instructional Guide (steps 5–9), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 4.4 Floating Paper Clip ● Lesson 5.1 ○ **Activity 2**, Instructional Guide (steps 2–6) ○ **Investigation Notebook**, page 57 Massachusetts Grade 3 Companion Lesson, "Friction" (see Amplify Science Massachusetts site)
3-PS2-3. Conduct an investigation to determine the nature of the forces between two magnets based on their orientations and distance relative to each other.	***Balancing Forces*** unit: ● Lesson 5.1 ○ **Activity 3**, Instructional Guide ○ **Investigation Notebook,** pages 57–59 ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 2.4 ○ **Activity 2**, Instructional Guide ○ **Activity 3,** Instructional Guide (step 3)

	○ **Student book**, *What My Sister Taught Me About Magnets* ● Lesson 2.3 ○ **Activity 1**, Instructional Guide ○ **Activity 4**, Instructional Guide (steps 2–4), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1 ○ **Activity 1**, Instructional Guide (steps 5–8) ○ **Activity 2**, Instructional Guide (steps 3–9), Possible Responses tab, and On-the Fly Assessment (hummingbird icon) ● Lesson 5.3 ○ **Activity: Introducing Electromagnets**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Investigate the Strength of Electromagnets ○ **Activity 1**, Instructional Guide (steps 5–8) and Teacher Support tab ("Instructional Suggestion, Going Further: Exploring Electric Forces" ○ **Student book**, *Handbook of Forces*, pages 16–17
3-PS2-4. Define a simple design problem that can be solved by using interactions between magnets.*	***Balancing Forces*** unit: ● Lesson 5.5 ○ **Activity 3**, Instructional Guide (steps 2–6) ○ **Investigation Notebook,** page 73 ● Lesson 5.1 ○ **Activity 3**, Instructional Guide ○ **Investigation Notebook,** pages 57–59 ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 2.4 ○ **Activity 2**, Instructional Guide ○ **Activity 3,** Instructional Guide (step 3) ○ **Student book,** *What My Sister Taught Me About Magnets* ● Lesson 2.3 ○ **Activity 1**, Instructional Guide ○ **Activity 4**, Instructional Guide (steps 2–3), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 5.3

	○ **Activity: Introducing Electromagnets**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Investigate the Strength of Electromagnets") ○ **Student book**, *Handbook of Forces*, pages 16–17 ○ **Activity 1**, Instructional Guide (steps 5–8) and Teacher Support tab ("Instructional Suggestion, Going Further: Exploring Electric Forces")
ETS1. Technology and Engineering	
3.3-5-ETS1-1. Define a simple design problem that reflects a need or a want. Include criteria for success and constraints on materials, time, or cost that a potential solution must meet.*	***Environments and Survival*** unit: ● Lesson 2.7 ○ **Activity 2**, Instructional Guide, ○ **Activity 3**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook,** pages 37–38 [SEP] ***Balancing Forces*** unit: ● Lesson 5.5 ○ **Activity 3**, Instructional Guide (steps 2–6) ○ **Investigation Notebook,** page 73 ***Environments and Survival*** unit: ● Lesson 4.5 ○ **Activity 1**, Instructional Guide (steps 6–9) ○ **Activity 2**, Instructional Guide ● Lesson 4.2, **Activity 2**, Instructional Guide (step 3) ● Lesson 4.1 ○ **Activity 2**, Instructional Guide (steps 3–6) ○ **Activity 3**, Teacher Support tab ("Background, Engineering Note: Difference Between Criteria and Constraints") ○ **Student book**, *Cockroach Robots* ***Weather and Climate*** unit: ● Lesson 4.3

	○ **Activity 1**, Instructional Guide (steps 3–6) ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 3–6)
3.3-5-ETS1-2. Generate several possible solutions to a given design problem. Compare each solution based on how well each is likely to meet the criteria and constraints of the design problem.*	***Environments and Survival*** unit: ● Lesson 4.5 ○ **Activity 1**, Instructional Guide (steps 6–9) ○ **Activity 2**, Instructional Guide ● Lesson 4.2, **Activity 2**, Instructional Guide (step 3) ***Weather and Climate*** unit: ● Lesson 4.3 ○ **Activity 1**, Instructional Guide (steps 3–6) ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 3–6) ***Environments and Survival*** unit: ● Lesson 4.1 ○ **Activity 2**, Instructional Guide (steps 3–6) ○ **Activity 3**, Teacher Support tab (“Background, Engineering Note: Difference Between Criteria and Constraints”) ○ **Student book**, *Cockroach Robots*
3.3-5-ETS1-4(MA). Gather information using various informational resources on possible solutions to a design problem. Present different representations of a design solution.*	***Environments and Survival*** unit: ● Lesson 4.2 ○ **Activity 1**, Instructional Guide (steps 1–5) ○ **Investigation Notebook,** pages 62–63 ○ **Activity 2**, Instructional Guide (steps 4–5) ● Lesson 4.3 ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook,** pages 66–68 ● Lesson 4.4 ○ **Activity 4**, Instructional Guide ○ **Lesson Brief**, Digital Resources, “Assessment Guide” ● Lesson 4.1 ○ **Activity 2**, Instructional Guide (steps 3–6) ○ **Student book**, *Cockroach Robots*, pages 12–14

	Weather and Climate unit: ● Lesson 4.3, **Activity 3**, Instructional Guide (steps 3–6)

Grade 4	**Amplify Science Citations**
Earth and Space Sciences	
ESS1. Earth's Place in the Universe	
4-ESS1-1. Use evidence from a given landscape that includes simple landforms and rock layers to support a claim about the role of erosion or deposition in the formation of the landscape over long periods of time.	***Earth's Features*** unit: ● Unit Guide, Overview ● Lesson 4.1 ○ **Activity 3**, Instructional Guide ○ **Student book,** *Rocky Wonders* ● Lesson 2.2, **Activity 3**, Instructional Guide (steps 1–9), Possible Responses tab, Teacher Support tab ("Instructional Suggestion, Going Further: How Organisms Affect their Environments," "Assessment, Assessment Opportunity: Assessing Student Understanding That Living Things Affect Environments," and "Background, Science Note: About Calcium Carbonate and Limestone"), and simulation (Mode 2) ● Lesson 4.5 ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.2 ○ **Activity 3**, Instructional Guide and simulation ○ **Investigation Notebook**, page 73 ● Lesson 4.3 ○ **Activity 3**, Instructional Guide (steps 3–11) ○ **Investigation Notebook**, page 76 ● Lesson 4.4 ○ **Activity 1**, Instructional Guide (step 7) and Teacher Support tab ("Instructional Suggestion, Going Further: Erosion by Gravity") ○ **Activity 2**, Instructional Guide

	○ **Investigation Notebook**, page 78
ESS2. Earth's Systems	
4-ESS2-1. Make observations and collect data to provide evidence that rocks, soils, and sediments are broken into smaller pieces through mechanical weathering and moved around through erosion.	***Earth's Features*** unit: ● Lesson 2.2, **Activity 3**, Teacher Support tab ("Instructional Suggestion, Going Further: How Organisms Affect Their Environments") ● Lesson 4.1 ○ **Activity 3**, Instructional Guide ○ **Student book,** *Rocky Wonders* ● Lesson 4.5 ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.2 ○ **Activity 3**, Instructional Guide and simulation ○ **Investigation Notebook**, page 73 [Observe the Erosion Model] ***Earth's Features*** unit: ● Lesson 4.3 ○ **Activity 3**, Instructional Guide (steps 3–11) ○ **Investigation Notebook**, page 76 ● Lesson 4.4 ○ **Activity 1**, Instructional Guide (step 7) and Teacher Support tab ("Instructional Suggestion, Going Further: Erosion by Gravity") ○ **Activity 2**, Instructional Guide ○ **Investigation Notebook**, page 78
4-ESS2-2. Analyze and interpret maps of Earth's mountain ranges, deep ocean trenches, volcanoes, and earthquake epicenters to describe patterns of these features and their locations relative to boundaries between continents and oceans.	***Earth's Features*** unit: ● Lesson 4.5 ○ **Lesson Brief**, Digital Resources, "Patterns on a World Map copymaster" and "Dynamic Planet Map" ○ **Activity 4**, Instructional Guide, Possible Responses tab, and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of Patterns in Earth's Features unit") ● Lesson 4.1 ○ **Activity 2**, Instructional Guide (step 2)

	○ **Activity 4,** Instructional Guide (steps 1–2) ● Lesson 1.4, **Activity 1**, Instructional Guide (steps 2–3)
ESS3. Earth and Human Activity	
4-ESS3-1. Obtain information to describe that energy and fuels humans use are derived from natural resources and that some energy and fuel sources are renewable and some are not.	***Energy Conversions*** unit: ● Lesson 3.1 ○ **Activity 4**, Instructional Guide ○ **Student book**, *It's All Energy*, pages 26–41 ● Lesson 3.3, **Activity 1**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ● Lesson 4.5, **Activity 2**, Instructional Guide
4-ESS3-2. Evaluate different solutions to reduce the impacts of a natural event such as an earthquake, blizzard, or flood on humans.*	***Waves, Energy, and Information*** unit: ● Lesson 1.3 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Warning: Tsunami!* ● Lesson 1.3, **Activity 3**, Instructional Guide (step 7) and Teacher Support tab ("Instructional Suggestion, Going Further: Discussing Earthquake Waves and Warning Systems" and "Assessment, Assessment Opportunity: Assessing Student Understanding of Responses to Natural Hazards") ***Earth's Features*** unit: ● Lesson 4.3 ○ **Activity 3,** Instructional Guide (steps 1–2, 8) ○ **Student book,** *Rocky Wonders*, pages 8, 12, 17, 21
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
4-LS1-1. Construct an argument that animals and plants have internal and external structures that support their survival, growth, behavior, and reproduction.	***Vision and Light*** unit: ● Lesson 4.1, ○ **Activity 2,** Instructional Guide (steps 3–8) ○ **Activity 3,** Instructional Guide (steps 1–2) ○ **Student book**, *Seeing Like a Shrimp and Smelling Like a Snake* ● Lesson 1.2, **Activity 3,** Instructional Guide (steps 8–14) and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3

	○ **Activity 2,** Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and simulation ○ **Activity 3,** Instructional Guide (steps 1–3) ● Lesson 1.4 ○ **Activity: Observing Animals and Plants,** Instructional Guide (steps 2–12) and Teacher Support tab ("Instructional Suggestion, Going Further: Observing Plant Structures and Discussing Function" and "Background, Science Note: Plants' Internal Structures") ○ **Activity 1,** Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.1 ○ **Activity 1,** Instructional Guide (steps 4–8), Possible Responses tab, and simulation ○ **Activity 2,** Instructional Guide ● Lesson 3.5 ○ **Activity 4,** Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ○ **Student book**, *Handbook of Animal Eyes* ● Lesson 4.2, **Activity 3,** Instructional Guide
Physical Science	
PS3. Energy	
4-PS3-1. Use evidence to construct an explanation relating the speed of an object to the energy of that object.	***Energy Conversions*** unit: ● Lesson 3.4 ○ **Activity 2**, Instructional Guide (steps 1–3) and Teacher Support tab ("Instructional Suggestion, Going Further: Revisiting the *Energy Conversions* unit simulation" and "Assessment, Assessment Opportunity: Assessing Student Understanding of Speed in Relation to Energy") ○ **Activity 3**, Instructional Guide, (step 1) ○ **Student book**, *It's All Energy*, page 9 ● Lesson 4.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *It's All Energy*, pages 42–45

	Waves, Energy and Information unit: ● Lesson 2.4, **Activity 3,** Teacher Support tab ("Instructional Suggestion, Going Further: Using Balls to Represent Collisions") ***Vision and Light*** unit: ● Lesson 2.5 ○ **Activity 3**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.5 ○ **Activity 4**, Instructional Guide and Critical Juncture Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.6 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ***Earth's Features*** unit: ● Lesson 1.6, **Activity 3**, Instructional Guide ● Lesson 2.6 ○ **Activity 3**, Instructional Guide (steps 1–6) and Critical Juncture Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.5 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 4.5 ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
4-PS3-2. Make observations to show that energy can be transferred from place to place by sound, light, heat, and electric currents.	***Energy Conversions*** unit: ● Lesson 4.2 ○ **Activity 2**, Instructional Guide, On-the-Fly Assessment (hummingbird icon), Teacher Support tab ("Instructional Suggestion, Going Further: Exploring Energy Transfer") ○ **Student book**, *It's All Energy*, pages 6–7, 12, 17–18, 20, 42–45

	● Lesson 1.5, **Activity 3**, Instructional Guide (steps 6–12) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4, **Activity 2**, Instructional Guide, Possible Responses tab, and simulation ***Waves, Energy, and Information*** unit: ● Lesson 1.4, **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4 ○ **Activity 3**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Going Further: Using Balls to Represent Collisions") ○ **Activity 4**, Instructional Guide ● Lesson 2.6, **Activity 3**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ***Vision and Light*** unit: ● Lesson 5.1, **Lesson Brief**, Digital Resources, "Smell Investigation copymaster," "Hearing Investigation copymaster," and "Touch Investigation copymaster" ● Lesson 5.2 ○ **Activity 2**, Instructional Guide (steps 5–7) ○ **Lesson Brief**, Digital Resources, "Assessment Guide"
4-PS3-3. Ask questions and predict outcomes about the changes in energy that occur when objects collide.	***Waves, Energy, and Information*** unit: ● Lesson 2.6 ○ **Activity 1**, Instructional Guide (steps 3–10) and simulation ○ **Activity 3**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 1.4, **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4 ○ **Activity 3**, Instructional Guide, and Teacher Support tab ("Instructional Suggestion, Going Further: Using Balls to Represent Collisions") ○ **Activity 4**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Science Note: Energy Transfer through Contact Forces")

	Energy Conversions unit: ● Lesson 4.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *It's All Energy*, pages 6–7, 42–45 ● Lesson 1.5, **Activity 3**, Instructional Guide (steps 6–12) and On-the-Fly Assessment (hummingbird icon) ***Vision and Light*** unit: ● Lesson 5.1 ○ **Activity 4**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Smell Investigation copymaster," "Hearing Investigation copymaster," and "Touch Investigation copymaster" ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon)
4-PS3-4. Apply scientific principles of energy and motion to test and refine a device that converts kinetic energy to electrical energy or uses stored energy to cause motion or produce light or sound.*	***Energy Conversions*** unit: ● Lesson 4.2, **Activity 2**, Instructional Guide (steps 8–13), and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1 ○ **Activity 2**, Instructional Guide (steps 8–12), On-the-Fly Assessment (hummingbird icon), and simulation ○ **Activity 3**, Instructional Guide (steps 3–8) ● Lesson 3.2 ○ **Activity 1**, Instructional Guide ○ **Student book**, *It's All Energy*, pages 17–18, 20 ● Lesson 3.2, **Activity 2**, Instructional Guide, On-the-Fly Assessment (hummingbird icon), and Sorting Tool: 3.2 Energy Converters
PS4. Waves and Their Applications in Technologies for Information Transfer	
4-PS4-1. Develop a model of a simple mechanical wave (including sound) to communicate that waves (a) are regular	***Energy Conversions*** unit: ● Lesson 1.5

patterns of motion along which energy travels and (b) can cause objects to move.	○ **Activity 3**, Instructional Guide (steps 6–12) and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *It's All Energy*, pages 6–7, 45 ● Lesson 2.1 ○ **Activity 2**, Instructional Guide (steps 8–13) ○ **Investigation Notebook**, page 23 ***Waves, Energy, and Information*** unit: ● Lesson 2.6, **Activity 3**, Instructional Guide, Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.4 ○ **Activity 3**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Going Further: Using Balls to Represent Collisions") ○ **Activity 4**, Instructional Guide ● Lesson 2.5, **Activity 1**, Instructional Guide
4-PS4-2. Develop a model to describe that light must reflect off an object and enter the eye for the object to be seen.	***Vision and Light*** unit: ● Lesson 2.3 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 1–5) ○ **Student book**, *I See What You Mean* ● Lesson 2.5, **Activity 3**, Instructional Guide (steps 2–5) and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.1, **Activity 4**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ***Waves, Energy, and Information*** unit: ● Lesson 2.5, **Activity 1**, Instructional Guide and Teacher Support tab ("Background, Pedagogical Goals: Developing Models")
4-PS4-3. Develop and compare multiple ways to transfer information through encoding, sending, receiving, and decoding a pattern.*	***Waves, Energy, and Information*** unit: ● Lesson 4.3 ○ **Activity 2**, Instructional Guide (steps 2–5), On-the-Fly Assessment (hummingbird icon), and Code Communicator Tool ○ **Activity 3**, Instructional Guide ● Lesson 4.1 ○ **Activity 3**, Instructional Guide

	○ **Student book**, *Patterns in Communication*, page 42 ● Lesson 4.4 ○ **Activity 1**, Instructional Guide and Code Communicator Tool ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 3.3, **Activity 3**, Instructional Guide, Possible Responses tab, and Sorting Tool: 3.3 Volume and 3.3 Pitch ● Lesson 3.6, **Activity 1**, Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and simulation ***Energy Conversions*** unit: ● Lesson 3.4 ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 53 ● Lesson 3.5 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide, ○ **Investigation Notebook**, page 55 ● Lesson 4.3 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, pages 77–79 ● Lesson 3.2, **Activity 2**, Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Sorting Tool: 3.2 Energy Converters
ETS1. Technology and Engineering	
4.3-5-ETS1-3. Plan and carry out tests of one or more design features of a given model or prototype in which variables are controlled and failure points are considered to identify which features need to be improved. Apply the results of tests to redesign a model or prototype.*	***Vision and Light*** unit: ● Lesson 5.1 ○ **Activity 4**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Smell Investigation copymaster," "Hearing Investigation copymaster," and "Touch Investigation copymaster" ● Lesson 5.2

	○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ***Energy Conversions*** unit: ● Lesson 3.3 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide ○ **Student book**, *Sunlight and Showers* ● Lesson 3.4 ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Investigation Notebook**, page 53 ● Lesson 3.5 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide ○ **Investigation Notebook**, page 55 ○ Lesson 4.4, **Activity 3**, Instructional Guide (steps 1–8), Possible Response, and simulation
4.3-5-ETS1-5(MA). Evaluate relevant design features that must be considered in building a model or prototype of a solution to a given design problem.*	***Vision and Light*** unit: ● Lesson 2.1, **Activity 4**, Instructional Guide (steps 3–7), Possible Responses tab, and simulation ● Lesson 3.1, **Activity 1**, Instructional Guide (steps 4–8), Possible Responses tab, and simulation ● Lesson 3.3, **Activity 2**, Instructional Guide (steps 1–7), Possible Responses tab, and simulation ***Waves, Energy, and Information*** unit: ● Lesson 3.3, **Activity 4**, Instructional Guide (steps 1–6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.5, **Activity 1**, Instructional Guide

Grade 5	**Amplify Science Citations**
Earth and Space Sciences	
ESS1. Earth's Place in the Universe	
5-ESS1-1. Use observations, first-hand and from various media, to argue that the Sun is a star that appears larger and brighter than other stars because it is closer to Earth.	***Patterns of Earth and Sky*** unit: ● Lesson 1.3 ○ **Activity 2**, Instructional Guide ○ **Student book,** *How Big Is Big? How Far Is Far?*, pages 10–23 ● Lesson 1.4 ○ **Activity 1**, Instructional Guide (steps 6–13) ○ **Activity 2**, Instructional Guide, Possible Responses tab, and simulation ● Lesson 1.5, **Activity 3**, Instructional Guide ● Lesson 1.6 ○ **Activity 1**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 2**, Instructional Guide (steps 4–6) ○ **Activity: Reflecting on Brightness**, Instructional Guide (steps 5–6) ○ **Student book,** *Handbook of Stars and Constellations*, page 6
5-ESS1-2. Use a model to communicate Earth's relationship to the Sun, Moon, and other stars that explain (a) why people on Earth experience day and night, (b) patterns in daily changes in length and direction of shadows over a day, and (c) changes in the apparent position of the Sun, Moon, and stars at different times during a day, over a month, and over a year.	[Day and night] ***Patterns of Earth and Sky*** unit: ● Lesson 2.2 ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Activity 3**, Instructional Guide, Possible Responses tab, and simulation [Length and direction of shadows] ***Patterns of Earth and Sky*** unit: ● Lesson 2.3 ○ **Activity: Spinning Earth**, Teacher Support tab ("Instructional Suggestion, Going Further: Investigating How Shadows Change")

	○ **Lesson Brief**, Digital Resources, "Extension: Investigating Shadows copymaster" [Different positions of the sun, moon, and stars] ***Patterns of Earth and Sky*** unit: ● Lesson 3.3 ○ **Activity 2**, Instructional Guide (steps 6–8) ○ **Activity 3**, Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and simulation ○ **Activity 4**, Instructional Guide ○ **Activity 5**, Instructional Guide ● Lesson 3.6 ○ **Activity 2**, Instructional Guide (steps 2–6) ○ **Lesson Brief**, Digital Resources, "End-of-Unit Writing: Explaining the Artifact Version A copymaster," Sections 2 –3, and "Assessment Guide" ● Lesson 3.2**, Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.5, **Activity 3**, Instructional Guide ● Lesson 3.1 ○ **Activity 4**, Teacher Support tab ("Instructional Suggestion, Going Further: Investigating the Sun Throughout the Year") ○ **Lesson Brief**, Digital Resources, "Extension: Investigating the Sun Throughout the Year copymaster"
ESS2. Earth's Systems	
5-ESS2-1. Use a model to describe the cycling of water through a watershed through evaporation, precipitation, absorption, surface runoff, and condensation.	***The Earth System*** unit: ● Lesson 2.3, **Activity 4**, Instructional Guide (steps 1–4), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 2.3 Condensation ● Lesson 3.3, **Activity 2**, Instructional Guide (steps 1–4), Possible Responses tab, and Modeling Tool: 3.3 Raindrop Formation ● Lesson 4.2, **Activity 2**, Instructional Guide, Possible Responses tab, and Modeling Tool: 4.2 Rain Shadow ● Lesson 4.4 ○ **Activity 3**, Instructional Guide

	○ **Lesson Brief**, Digital Resources, "Labeling Earth System Interactions copymaster"
5-ESS2-2. Describe and graph the relative amounts of salt water in the ocean; fresh water in lakes, rivers, and groundwater; and fresh water frozen in glaciers and polar ice caps to provide evidence about the availability of fresh water in Earth's biosphere.	***The Earth System*** unit: ● Lesson 1.1 ○ **Activity 4**, Instructional Guide (steps 6–15) and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of the Distribution of Water on Earth" and "Instructional Suggestion, Student Thinking: Scale, Proportion, and Quantity") ○ **Student book,** *Water Encyclopedia*, pages 30–31 ● Lesson 3.2, **Activity 3**, Instructional Guide (steps 1–5), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool, 3.2 Condensation Data ● Lesson 4.2, **Activity 1**, Teacher Support tab ("Instructional Suggestion, Going Further: Mathematical Thinking") and simulation ***Ecosystem Restoration*** unit: ● Lesson 2.1 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Teacher Support tab ("Instructional Suggestion, Going Further: Graphing Plant Heights" and "Assessment, Assessment Opportunity: Assessing Student Understanding of the Uses of Measurement") ○ **Investigation Notebook,** pages 32–33 ● Lesson 1.3, ○ **Activity 1**, Teacher Support tab ("Instructional Suggestion, Science Practice: Linear Measurement in the Metric System" and "Instructional Suggestion, Going Further: Mathematical Thinking and Scale Tool") ***Modeling Matter*** unit: ● Lesson 1.3 ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Made of Matter*
ESS3. Earth and Human Activity	

	Ecosystem Restoration unit: ● **Unit Guide**, Unit Overview, What's in This Unit? ● Lesson 2.5 ○ **Activity 3**, Instructional Guide (steps 3–9) ○ **Student book**, *Restoration Case Studies* ● Lesson 3.5 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of Human Impacts on Earth's Systems") ○ **Student book**, *Restoration Case Studies* ● Lesson 2.6 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Why Do Scientists Argue?*, green (even) pages ● Lesson 1.2, **Activity 1**, Instructional Guide (steps 4–11) ● Lesson 1.8 ○ **Activity 4,** Instructional Guide ○ **Lesson Brief**, Digital Resources, "Rain Forest Restoration Plan 1 Action Steps chart" ● Lesson 2.7, **Activity 4**, Instructional Guide and Possible Responses tab ● Lesson 3.6, **Activity 3**, Instructional Guide and Possible Responses tab ***The Earth System*** unit: ● Lesson 1.2 ○ **Activity 3**, Instructional Guide ○ **Activity 4**, Instructional Guide and Possible Responses tab ○ **Student book**, *Water Shortages, Water Solutions* and *Water Encyclopedia*, pages 30–31, 9–10, 40
5-ESS3-1. Obtain and combine information about ways communities reduce human impact on the Earth's resources and environment by changing an agricultural, industrial, or community practice or process.	***Patterns of Earth and Sky*** unit: ● Lesson 1.3, **Activity 3**, Instructional Guide (step 4) and Teacher Support tab ("Instructional Suggestion, Going Further: Discussing Human Impacts on Outer Space")

5-ESS3-2(MA). Test a simple system designed to filter particulates out of water and propose one change to the design to improve it.*	***The Earth System*** unit: ● Lesson 2.7 ○ **Activity 1**, Instructional Guide (steps 6–9) ○ **Activity 2**, Instructional Guide (steps 2–6) ● Lesson 2.8 ○ **Activity 3**, Instructional Guide (steps 2–6) and Teacher Support tab (“Background, Engineering Note: Constraints in the Design Process” and “Assessment, Assessment Opportunity: Assessing Student Performance of Defining Problems”) ○ **Student book,** *Engineering Clean Water*, pages 8–15 ● Lesson 3.4 ○ **Activity 1**, Instructional Guide (steps 4–8) ○ **Activity 2**, Instructional Guide ○ **Investigation Notebook,** page 59 ● Lesson 4.5 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide ○ **Investigation Notebook,** page 83 Massachusetts Grade 5 Companion Lesson, "Water Filters" (see Amplify Science Massachusetts site)
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
5-LS1-1. Ask testable questions about the process by which plants use air, water, and energy from sunlight to produce sugars and plant materials needed for growth and reproduction.	***Ecosystem Restoration*** unit: ● Lesson 2.7, **Activity 3**, Instructional Guide (steps 5–6), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.3 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide ○ **Activity 4**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5” x 11”), Leaves and Roots Game Board, and Leaves and Roots Game Cards, pages 22–28

	● Lesson 2.1, **Activity 3**, Instructional Guide, Possible Responses tab, and simulation ● Lesson 2.2 ○ **Activity 1**, Instructional Guide ○ **Student book,** *Energy Makes It All Go*, page 8 ● Lesson 1.7 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide (steps 4–5) and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5" x 11"), Organism Name Cards: Set 1, pages 12–17 ● Lesson 3.3 ○ **Activity 1**, Instructional Guide ○ **Activity 4**, Instructional Guide (steps 1–3) and Teacher Support tab ("Instructional Suggestion, Providing More Support: Drawing Conclusions About Matter and Energy, and simulation")
LS2. Ecosystems: Interactions, Energy, and Dynamics	
5-LS2-1. Develop a model to describe the movement of matter among producers, consumers, decomposers, and the air, water, and soil in the environment to (a) show that plants produce sugars and plant materials, (b) show that animals can eat plants and/or other animals for food, and (c) show that some organisms, including fungi and bacteria, break down dead organisms and recycle some materials back to the air and soil.	[What makes an ecosystem healthy or unhealthy] ***Ecosystem Restoration*** unit: ● Lesson 1.8, **Activity 3**, Instructional Guide (steps 6–8) and Possible Responses tab ● Lesson 3.6, **Activity 2**, Instructional Guide (steps 4–5), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 1.6 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Modeling Tool: 1.6 Healthy Ecosystem Model ○ **Activity 3**, Instructional Guide (steps 2–3), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–4), Possible Responses tab, and Modeling Tool: 2.3 Plant Needs Model ● Lesson 3.7, **Activity 1**, Instructional Guide, Possible Responses tab, and Modeling Tool: 3.7 No Decomposers Model ● Lesson 2.5

	○ **Activity 3**, Instructional Guide ○ **Student book**, *Restoration Case Studies* ● Lesson 3.5 ○ **Activity 2**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Going Further: Balance and Interdependence of Ecosystems: Impacts of Invasive Species") ○ **Student book**, *Restoration Case Studies*, pages 11, 31, and 47 [Role of plants] ***Ecosystem Restoration*** unit: ● Lesson 1.7 ○ **Activity 2**, Instructional Guide, ○ **Activity 3**, Instructional Guide (steps 3–7) and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5" x 11"), Organism Name Cards: Set 1, pages 12–17 [Role of decomposers] ***Ecosystem Restoration*** unit: ● Lesson 3.2 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Walk in the Woods*, pages 6–10 ● Lesson 3.3, **Activity 4**, Instructional Guide and simulation ● Lesson 3.4, **Activity 2**, Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and simulation
5-LS2-2(MA). Compare at least two designs for a composter to determine which is most likely to encourage decomposition of materials.*	Massachusetts Grade 5 Companion Lesson, "Composters" (see Amplify Science Massachusetts site)
Physical Science	
PS1. Matter and Its Interactions	

5-PS1-1. Use a particle model of matter to explain common phenomena involving gases, and phase changes between gas and liquid and between liquid and solid.	[Matter can be subdivided into particles] ***Modeling Matter*** unit: ● Lesson 1.3 ○ **Activity 1**, Teacher Support tab ("Rationale, Pedagogical Goals: Particles vs. Molecules") ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book**, *Made of Matter* ● Lesson 1.8 ○ **Activity 1**, Instructional Guide ○ **Student book**, *Break It Down: How Scientists Separate Mixtures*, pages 5–6, 11, 18–19, 23 ● Lesson 2.3 ○ **Activity 2**, Instructional Guide ○ **Student book**, *Solving Dissolving*, pages 5–8, 12–13 ● Lesson 2.2, **Activity 4**, Instructional Guide, Possible Responses tab, and simulation ● Lesson 3.7 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief,** Digital Resources, "Assessment Guide" [Gases are made of matter particles] ***Ecosystem Restoration*** unit: ● Lesson 2.1, **Activity 4**, Instructional Guide ***The Earth System*** unit: ● Lesson 2.2, **Activity 2**, Instructional Guide (step 1) and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Gathering Evidence that Air is Something") ● Lesson 2.3 ○ **Activity 1**, Instructional Guide (steps 4–8) ○ **Activity 2**, Instructional Guide ○ **Activity 3,** Instructional Guide, Possible Responses tab, and simulation ○ **Student book**, *Water Encyclopedia*, pages 28–29

	Phase Change unit (grades 6-8)*:* ● Lesson 1.6 , **Activity 4,** Instructional Guide (steps 1–9), Student View, Possible Responses tab, Modeling Tool activity: Methane Lake Freezing, Modeling Tool activity: Methane Lake Evaporating, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 2,** screen 2 of 2, Instructional Guide (step 13) ● Lesson 4.4 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument” ***Thermal Energy*** unit (grades 6-8)*:* ● Lesson, 1.4 ○ **Activity 3,** Instructional Guide (steps 1–10), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, “Modeling Tool: Differences in Temperature copymaster” ● Lesson 2.3, **Activity 5,** Teacher Support tab (“Rationale, Pedagogical Goals: Discussing the Everyday and Scientific Meanings of Heat”) ● Lesson 3.3 ○ **Activity: Setting Up the Thermal Energy and Size Demo,** Instructional Guide (steps 1–10) ○ **Activity 2,** Instructional Guide (steps 1–11), Student View, Possible Responses tab, and simulation ○ **Activity 4,** screen 2 of 2, Student View, Possible Responses tab, and “Dumpling Dilemma: Oil or Water?” article ○ **Lesson Brief,** Digital Resources, “Planning and Conducting Investigations of Thermal Energy Transfer copymaster” and “Rubrics for Assessing Students’ Investigations of Thermal Energy Transfer”
5-PS1-2. Measure and graph the weights (masses) of substances before and after a reaction or phase change to provide evidence that regardless of the type of change that occurs when heating,	***The Earth System*** unit: ● Lesson 2.5 ○ **Activity 3**, Instructional Guide

cooling, or combining substances, the total weight (mass) of matter is conserved.	○ **Activity 4**, Instructional Guide, Possible Responses tab, and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of Conservation of Matter") ○ **Student book,** *Drinking Cleopatra's Tears* ● Lesson 5.3, **Activity 3**, Instructional Guide, Possible Responses tab, Teacher Support tab ("Instructional Suggestion, What One Teacher Did: Support Discussion with Images from the Sim"), On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 5.3 Baking Soda and Vinegar and 5.3 Hot Yellow Gas ● Lesson 3.2 ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Activity 3**, Instructional Guide, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 3.2 Condensation Data ● Lesson 1.1 ○ **Activity 4**, Instructional Guide (steps 6–15) and Teacher Support tab ("Instructional Suggestion, Student Thinking: Scale, Proportion, and Quantity") ○ **Student book** *Water Encyclopedia*, pages 30–31 ***Modeling Matter*** unit: ● Lesson 2.4 ○ **Activity 2,** Instructional Guide (step 9) ○ **Student book,** *Food Scientist's Handbook***,** pages 34, 36–37, 39–44 ● Lesson 1.3 ○ **Activity 1**, Teacher Support tab ("Rationale, Pedagogical Goals: Particles vs. Molecules") ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Made of Matter*
5-PS1-3. Make observations and measurements of substances to describe characteristic properties of each, including color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility.	***Modeling Matter*** unit: ● Lesson 1.2 ○ **Activity 2**, Instructional Guide and On-the-Fly Assessment (hummingbird icon)

	○ **Activity 3**, Instructional Guide ● Lesson 1.8 ○ **Activity 1**, Instructional Guide ○ **Student book,** *Break It Down: How Scientists Separate Mixtures*, pages 17–21 ● Lesson 1.3 ○ **Activity 1**, Teacher Support tab (“Rationale, Pedagogical Goals: Particles vs. Molecules”) ○ **Activity 3**, Instructional Guide and On-the-Fly Assessment (hummingbird icon) ○ **Student book,** *Made of Matter* ***The Earth System*** unit: ● Lesson 5.1 ○ **Activity 2**, Instructional Guide (steps 4–7) ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Activity 4**, Instructional Guide ● Lesson 5.2 ○ **Activity 1**, Instructional Guide (steps 2–6) ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Activity 3**, Instructional Guide and Possible Responses tab ○ **Student book,** *Chemical Reactions Everywhere* ● Lesson 1.1 ○ **Activity 4**, Instructional Guide (steps 6–15) and Teacher Support tab (“Instructional Suggestion, Student Thinking: Scale, Proportion, and Quantity”) ○ **Student book,** *Water Encyclopedia*, pages 30–31 ***Ecosystem Restoration*** unit: ● Lesson 2.1 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and Teacher Support tab (“Assessment Opportunity: Assessing Student Understanding of the Uses of Measurement”)

	○ **Investigation Notebook,** pages 32–33 ***Patterns of Earth and Sky*** unit: ● Lesson 4.2, **Activity 3**, Instructional Guide (steps 1–4) ● Lesson 4.3 ○ **Activity 1**, Instructional Guide and simulation ○ **Activity 3**, Instructional Guide (step 4) ○ **Investigation Notebook,** pages 68–69, 76 ○ **Lesson Brief**, Digital Resources, “Assessment Guide Massachusetts Grade 5 Companion Lesson, "Properties of Materials" (see Amplify Science Massachusetts site)
5-PS1-4. Conduct an experiment to determine whether the mixing of two or more substances results in new substances with new properties (a chemical reaction) or not (a mixture).	***The Earth System*** unit: ● Lesson 5.4 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and Teacher Support tab (“Assessment, Assessment Opportunity: Assessing Student Understanding of Cause and Effect in Explaining Change”) ○ **Investigation Notebook,** pages 106–107 ● Lesson 5.2 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide ○ **Activity 4**, Instructional Guide ○ **Student book,** *Chemical Reactions Everywhere* ● Lesson 5.5 ○ **Activity 3**, Instructional Guide ○ **Lesson Brief**, Digital Resources, “Assessment Guide” ● Lesson 5.3 ○ **Activity 1**, Instructional Guide, Possible Responses tab, and Teacher Support tab (“Instructional Suggestion, Providing More Experience: Connecting to Other Models”) ○ **Investigation Notebook,** pages 101–102 ● Lesson 2.3, **Activity 1**, Teacher Support tab (“Rationale, Pedagogical Goals: Particles vs. Molecules”)

	Patterns of Earth and Sky unit: ● Lesson 2.2, **Activity 4**, Instructional Guide (steps 2–3) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 2**, Instructional Guide and Teacher Support tab ("Background, Crosscutting Concept: What Is Meant by Cause and Effect" and "Background, Crosscutting Concept: Cause and Effect Across Chapter 2") ***Modeling Matter*** unit: ● Lesson 3.4 ○ **Lesson Brief,** Overview ○ **Activity 2**, Instructional Guide and Possible Responses tab ○ **Activity 4**, Instructional Guide (step 3)
PS2. Motion and Stability: Forces and Interactions	
5-PS2-1. Support an argument with evidence that the gravitational force exerted by Earth on objects is directed toward Earth's center.	***Patterns of Earth and Sky*** unit: ● Lesson 2.4 ○ **Activity 1**, Instructional Guide (steps 4–6) ○ **Investigation Notebook,** page 33 and 34 ○ **Activity: Observing The Way Things Fall**, Instructional Guide and The Way Things Fall video ○ **Activity 2**, Instructional Guide ○ **Student book,** *Which Way Is Up?* ○ **Activity 3**, Instructional Guide ● Lesson 3.6 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "End-of-Unit Writing: Explaining the Artifact Version A copymaster," Section 4, and "Assessment Guide" ● Lesson 2.5, **Activity 1**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 2**, Instructional Guide and Teacher Support tab ("Background, Crosscutting Concept: What Is Meant by Cause and Effect" and "Background, Crosscutting Concept: Cause and Effect Across Chapter 2")

	Ecosystem Restoration unit: ● Lesson 1.8, **Activity 3**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.7, **Activity 3**, Instructional Guide (steps 5–6), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.6, **Activity 2**, Instructional Guide (steps 4–5), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 3.7 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide," Rubric 1 ***The Earth System*** unit: ● Lesson 5.4 ○ **Activity 2**, Instructional Guide ○ **Activity 3**, Instructional Guide and Teacher Support tab ("Assessment, Assessment Opportunity: Assessing Student Understanding of Cause and Effect in Explaining Change") ○ **Investigation Notebook,** pages 106–107
5-PS3-1. Use a model to describe that the food animals digest (a) contains energy that was once energy from the Sun, and (b) provides energy and nutrients for life processes, including body repair, growth, motion, body warmth, and reproduction.	[Energy in an ecosystem comes from the sun] ***Ecosystem Restoration*** unit: ● Lesson 2.4 ○ **Activity 2**, Instructional Guide, Possible Responses tab, and simulation ○ **Investigation Notebook,** page 42 ● Lesson 2.2 ○ **Activity 1**, Teacher Support tab ("Background, Crosscutting Concept: Energy and Matter Across Chapter 2" and "Instructional Suggestion, Crosscutting Concepts: Making Connections Across Science Topics") ○ **Activity 2**, Instructional Guide ○ **Student book,** *Energy Makes It All Go*

	● Lesson 2.7, **Activity 3**, Instructional Guide (steps 5–6), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 2.5 ○ **Activity 1**, Instructional Guide ○ **Activity 2**, Instructional Guide (steps 1–5) and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources**, Print Materials (8.5" x 11"), Organism Name Cards: Set 2, pages 29–34 ● Lesson 2.3 ○ **Activity 3**, Instructional Guide, Possible Responses tab, Teacher Support tab ("Instructional Suggestion, Going Further: Chemical Reactions") and Modeling Tool: 2.3 Plant Needs Model ○ **Investigation Notebook,** page 34 [Animals use food for body repair, growth, motion, and warmth] ***Ecosystem Restoration*** unit: ● Lesson 1.3 ○ **Activity 4**, Instructional Guide and Possible Responses tab ○ **Student book,** *Matter Makes It All Up*, pages 5–11 ● Lesson 1.6, **Activity 3**, Instructional Guide (steps 2–3), Possible Responses tab, and Critical Juncture Assessment (hummingbird icon) ● Lesson 1.5, **Activity 1**, Instructional Guide, Possible Responses tab, and simulation ● Lesson 2.2 ○ **Activity 2**, Instructional Guide ○ **Student book,** *Energy Makes It All Go*, pages 4, 6 ***Modeling Matter*** unit: ● Lesson 1.6 ○ **Activity 2**, Instructional Guide, On-the-Fly Assessment (hummingbird icon), and Teacher Support tab ("Background, Pedagogical Goals: Developing Models") ○ **Investigation Notebook,** page 14

ETS3. Technological Systems	
5.3-5-ETS3-1(MA). Use informational text to provide examples of improvements to existing technologies (innovations) and the development of new technologies (inventions). Recognize that technology is any modification of the natural or designed world done to fulfill human needs or wants.	***The Earth System*** unit: ● Lesson 1.2 ○ **Activity 3**, Instructional Guide ○ **Student book,** *Water Shortages, Water Solutions* ● Lesson 1.1, **Activity 1**, Teacher Support tab ("Instructional Suggestion, Nature of Science: Connecting to Engineering, Technology and Applications of Science") ● Lesson 2.8 ○ **Activity 2**, Instructional Guide ○ **Student book,** *Engineering Clean Water***,** pages 4–10 ***Modeling Matter*** unit: ● Lesson 1.8 ○ **Activity 1**, Instructional Guide ○ **Student book**, *Break It Down*, pages 10–15 ● Lesson 1.1, **Activity 4**, Instructional Guide (step 4)
5.3-5-ETS3-2(MA). Use sketches or drawings to show how each part of a product or device relates to other parts in the product or device.*	***The Earth System*** unit: ● **Unit Guide**, Unit Overview ● Lesson 4.4 ○ **Activity 1**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Examples of Systems") ○ **Student book**, *How The Earth System Explains Dinosaur Extinction* ○ **Activity 2**, Instructional Guide, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 3**, Instructional Guide and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Earth System Interactions Matching Game" and "Instructional Suggestion, Crosscutting Concepts: Making Connections Across Science Topics") ○ **Activity 4**, Instructional Guide (steps 3–6) and Teacher Support tab ("Providing More Experience: Home Investigation")

	○ **Lesson Brief**, Digital Resources, "Optional: Chapter 4 Home Investigation: Earth System Interactions copymaster" and "Labeling Earth System Interactions copymaster" ● Lesson 4.3 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, "Assessment Guide" ● Lesson 2.3, **Activity 4**, Instructional Guide (steps 1–4), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 2.3 Condensation ● Lesson 3.3, **Activity 2**, Instructional Guide (steps 1–4), Possible Responses tab, and Modeling Tool: 3.3 Raindrop Formation ● Lesson 4.2, **Activity 2**, Instructional Guide, Possible Responses tab, and Modeling Tool: 4.2 Rain Shadow ● Lesson 1.3 ○ **Activity: Human Impact on Water**, Instructional Guide (steps 5–8) and Teacher Support tab ("Instructional Suggestion, Going Further: Hydrosphere-Biosphere Interactions in the Ocean") ○ **Student book**, *Water Encyclopedia*, pages 16, 27 ● Lesson 4.2 ○ **Activity 3**, Instructional Guide, and Teacher Support tab ("Instructional Suggestion, Going Further: Hydrosphere-Geosphere Interactions") ○ **Lesson Brief**, Digital Resources, "Extension: Hydrosphere-Geosphere Interactions copymaster" ***Modeling Matter*** unit: ● Lesson 1.6 ○ **Activity 2,** Instructional Guide, On-the-Fly Assessment (hummingbird icon), and Teacher Support tab ("Background, Pedagogical Goals: Developing Models") ○ **Investigation Notebook**, page 14 ● Lesson 2.4, **Activity 2**, Instructional Guide (steps 2–4), Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Modeling Tool: 2.4 Dissolving Model

Grade 6	**Amplify Science Citations**
Earth and Space Sciences	
ESS1. Earth's Place in the Universe	
6.MS-ESS1-1a. Develop and use a model of the Earth-Sun-Moon system to explain the causes of lunar phases and eclipses of the Sun and Moon.	[Eclipses of the moon] ***Earth, Moon, and Sun*** unit: ● Chapter 3, Chapter Overview ● Lesson 3.1 o **Activity 2**, screen 3 of 3, Instructional Guide (steps 5–11), Student View, and "An Ancient Machine for Predicting Eclipses" article o **Activity 3**, screen 2 of 2, Instructional Guide (steps 6–11), Student View, simulation, and Possible Responses tab [Eclipses of the sun] ***Earth, Moon, and Sun*** unit*:* ● Lesson 3.3, **Activity 5**, Student View and Teacher Support tab ("Rationale, Pedagogical Goals: Applying an Understanding of Lunar Eclipses to Explain Solar Eclipses") [Seasons] ***Earth, Moon, and Sun*** unit: ● Lesson 3.1 ○ **Activity 4**, Instructional Guide (steps 4–5) and Teacher Support tab ("Instructional Suggestion, Providing More Experience: Modeling Seasons" and "Assessment, Assessment Opportunity: Student Understanding of the Cause of Earth's Seasons") ○ **Activity 5**, screen 2 of 2, Instructional Guide, Student View, Possible Responses tab, and "The Endless Summer of the Arctic Tern" article [Differential intensity of sunlight] ***Ocean, Atmosphere, and Climate*** unit*:* ● Lesson 1.4, **Activity 2**, Instructional Guide and Student View

6.MS-ESS1-4. Analyze and interpret rock layers and index fossils to determine the relative ages of rock formations that result from processes occurring over long periods of time.	***Plate Motion*** unit*:* ● Lesson 3.2, **Activity 5**, Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Rock Strata and Geologic Time") ● Lesson 4.2, **Activity 2**, Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.1, **Activity 3**, Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.2, **Activity 5**, Student View, Possible Responses tab, Sorting Tool activity: Earth's History, "Steno and the Shark" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Rock Strata and Geologic Time") ● Lesson 3.4 o **Activity 3**, Instructional Guide o **Activity 4**, Student View and Possible Responses tab
6.MS-ESS1-5(MA). Use graphical displays to illustrate that Earth and its solar system are one of many in the Milky Way galaxy, which is one of billions of galaxies in the universe.	***Earth, Moon, and Sun*** unit: ● Lesson 2.4, **Activity 5**, "Gravity in the Solar System" article (paragraph 6)
ESS2. Earth's Systems	
6.MS-ESS2-3. Analyze and interpret maps showing the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence that Earth's plates have moved great distances, collided, and spread apart.	***Plate Motion*** unit: ● Lesson 4.3 o **Activity 3**, Instructional Guide (steps 1–5), Student View, and On-the-Fly Assessment (hummingbird icon) o **Activity 4**, Instructional Guide (steps 1–6) and Student View o **Activity 6**, Student View o **Lesson Brief,** Digital Resources, "Rubrics for Final Written Argument" and "Science Seminar Reasoning Tool copymaster" ● Lesson 3.3, **Activity 3**, Instructional Guide (steps 1–17), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.5, **Activity 2**, Instructional Guide (steps 1–10), Student View and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.1, **Activity 2**, Instructional Guide and simulation
Life Science	
LS1. From Molecules to Organisms: Structures and Processes	

6.MS-LS1-1. Provide evidence that all organisms (unicellular and multicellular) are made of cells.	***Microbiome*** unit*:*
	● Lesson 2.8, **Activity 2**, Student View, "Viruses: On the Edge of Life" article, and Teacher Support tab
	● Lesson 2.6, **Activity 3**, "Bacteria: B. animalis" article, "Bacteria: B. fragilis" article, and "Bacteria: L. reuteri" article
	● Lesson 2.4
	  ○ **Activity 3**, "Bacteria: Salmonella" article
	  ○ **Activity 5**, "Bacteria: C. difficile" article
	● Lesson 1.3, **Activity 4**, Instructional Guide (steps 1–6), Student View, and On-the-Fly Assessment (hummingbird icon)
	● Lesson 2.8
	  ○ **Activity 1**, Student View
	  ○ **Lesson Brief,** Digital Resources, "End-of-Unit Assessment Scoring Guide"
	● Lesson 1.2, **Activity 5**, Instructional Guide (steps 1–2), Student View, "Cells" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Cellular Structures and the Subsystems of Multicellular Organisms")
	
	Populations and Resources unit*:*
	● Lesson 2.4,
	  ○ **Activity 2**, screens 1–2 of 2, Instructional Guide (steps 6–9), Student View, and simulation
	  ○ **Lesson Brief**, Digital Resources, "Rubrics for Assessing Students' Investigations of the Number of Deaths in a Population"
	
	Traits and Reproduction unit*:*
	● Lesson 3.2, **Activity 3**, Instructional Guide (steps 1–8), Student View, and simulation

6.MS-LS1-2. Develop and use a model to describe how parts of cells contribute to the cellular functions of obtaining food, water, and other nutrients from its environment, disposing of wastes, and providing energy for cellular processes.	***Microbiome*** unit*:* ● Lesson 1.2, **Activity 5**, Instructional Guide (steps 1–2), Student View, "Cells" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Cellular Structures and the Subsystems of Multicellular Organisms")

	● Lesson 3.3, **Activity 3**, Instructional Guide (steps 1–5), Student View, Possible Responses tab, Modeling Tool: 3.3 Model a Cell, and On-the-Fly Assessment (hummingbird icon) ***Traits and Reproduction*** unit*:* ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 1–9), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.5, **Activity 3**, Instructional Guide (steps 1–9), Student View, simulation, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.3 ○ **Activity 2**, Instructional Guide (steps 1–2) and *Surprising Spider Silk* article set ○ **Activity 3**, screens 1–4 of 4, Instructional Guide (steps 1–15) and Student View ***Evolutionary History*** unit*:* ● Lesson 2.5, **Activity 2**, Instructional Guide (steps 1–7), Modeling Tool: Population Changes, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ***Populations and Resources*** unit*:* ● Lesson 1.2, **Activity 4**, Student View and Teacher Support tab ("Background, Pedagogical Goals: Developing Models" and "Instructional Suggestion, Going Further: Gathering Initial Models for Future Reflection")
6.MS-LS1-3. Construct an argument supported by evidence that the body systems interact to carry out essential functions of life.	***Metabolism*** unit*:* ● Lesson 3.3, **Activity 5**, Student View and "The Big Climb" article ● Lesson 2.6, **Activity 5**, Student View and *Systems of the Human Body* article set ● Lesson 2.1 ○ **Activity 2**, Instructional Guide (steps 1–6) and Student View ○ **Activity: Playing Body Systems Model Video**, Instructional Guide (steps 1–2) and Body Systems Model video

	○ **Activity 3**, Instructional Guide (steps 1–2) ● Lesson 2.2, **Activity 2**, *Patient Stories* article set ● Lesson 3.4, **Activity 4**, *Odd Organisms and How They Get the Molecules They Need* article set
LS4. Biological Evolution: Unity and Diversity	
6.MS-LS4-1. Analyze and interpret evidence from the fossil record to describe organisms and their environment, extinctions, and changes to life forms throughout the history of Earth.	***Evolutionary History*** unit*:* ● Lesson 2.4 ○ **Activity 1**, Student View, Possible Responses tab, and Sorting Tool activity: Evolutionary Time ○ **Activity 4**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and simulation (Vertebrates Mode) ○ **Activity 5**, Student View and "Steno and the Shark" article ● Lesson 2.5, **Activity 2**, Instructional Guide (steps 1–7), Student View, Possible Responses tab, and Modeling Tool: Population Changes ● Lesson 3.2, **Activity 4**, Student View, Possible Responses tab, and simulation
6.MS-LS4-2. Construct an argument using anatomical structures to support evolutionary relationships among and between fossil organisms and modern organisms.	***Evolutionary History*** unit*:* ● Lesson 3.2, **Activity 3**, Instructional Guide (steps 1–7), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 3**, Student View ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ***Natural Selection*** unit*:* ● Lesson 1.4, **Activity 2**, Instructional Guide (steps 1–6), Student View, Possible Responses tab, simulation, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3 ○ **Activity 3**, Instructional Guide (steps 1–7) and Student View ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Newt Mystery Explanation copymaster"

Physical Science	
PS1. Matter and Its Interactions	
6.MS-PS1-6. Plan and conduct an experiment involving exothermic and endothermic chemical reactions to measure and describe the release or absorption of thermal energy.	***Phase Change Engineering Internship*** unit: ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster" ***Chemical Reactions*** unit*:* ● Lesson 2.5, **Activity 4**, Student View, Teacher Support tab ("Rationale, Pedagogical Goals: Reading About Endothermic and Exothermic Reactions," "Assessment, Assessment Opportunity: Student Understanding of Energy in Chemical Reactions unit"), and "Endothermic and Exothermic Reactions" article

6.MS-PS1-7(MA). Use a particulate model of matter to explain that density is the amount of matter (mass) in a given volume. Apply proportional reasoning to describe, calculate, and compare relative densities of different materials.	***Chemical Reactions*** unit*:*
	● Lesson 1.3, **Activity 4,** Instructional Guide (steps 1–7), Student View, Possible Responses tab, Sorting Tool: Evaluating Evidence, and On-the-Fly Assessment (hummingbird icon)
	● Lesson 2.1, **Activity 4,** Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon)
	● Lesson 2.2, **Activity 3,** Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon)
	● Lesson 4.3
	  ○ **Activity 4,** Student View and Possible Responses tab
	  ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Arguments"
	● Lesson 1.5, **Activity 3,** Instructional Guide (steps 6–7) and "Atomic Zoom-In: Comparing Substances at a Very Small Scale" article
	
	Force and Motion Engineering Internship unit*:*
	● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab
	● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster"

6.MS-PS1-8(MA). Conduct an experiment to show that many materials are mixtures of pure substances that can be separated by physical means into their component pure substances.	***Chemical Reactions*** unit*:* ● Lesson 1.3, **Activity 3,** screen 2 of 2, Instructional Guide and Student View ● Lesson 1.5, **Activity 2,** screen 3 of 3, Instructional Guide, Student View, and simulation (Chemical Stockroom mode) ● Lesson 1.4, **Activity 3**, screen 2 of 3, Instructional Guide (steps 9–11) and Teacher Support tab (“Background Science Note: About (Pure) Substances” ***Modeling Matter*** unit (grade 5): ● Lesson 2.3 ○ **Activity 2**, Instructional Guide, ○ **Student book**, *Solving Dissolving*, pages 5–8, 12–13 ● Lesson 1.8 ○ **Activity 1**, Instructional Guide ○ **Student book**, *Break It Down: How Scientists Separate Mixtures*, pages 5–6, 11, 18–19, 23 ● Lesson 3.7 ○ **Activity 2**, Instructional Guide ○ **Lesson Brief**, Digital Resources, “Assessment Guide” ● Lesson 1.3, **Activity 1**, Teacher Support tab (“Rationale, Pedagogical Goals: Particles vs. Molecules”)
PS2. Motion and Stability: Forces and Interactions	
6.MS-PS2-4. Use evidence to support the claim that gravitational forces between objects are attractive and are only noticeable when one or both of the objects have a very large mass.	***Magnetic Fields*** unit*:* ● Lesson 1.3, **Activity 4,** screen 1 of 2, Instructional Guide (steps 1–5) and Teacher Support tab (“Background, Crosscutting Concepts: Systems and System Models”) ● Lesson 3.2, **Activity 4,** screen 2 of 2, Student View, “Escaping a Black Hole” article, and Teacher Support tab (“Assessment, Assessment Opportunity: Student Understanding of Mass and Gravity”) ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument”

	Force and Motion unit*:* ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument"
PS4. Waves and Their Applications in Technologies for Information Transfer	
6.MS-PS4-1. Use diagrams of a simple wave to explain that (a) a wave has a repeating pattern with a specific amplitude, frequency, and wavelength, and (b) the amplitude of a wave is related to the energy of the wave.	***Light Waves*** unit*:* ● Lesson 2.3 ○ **Activity: The Shape of Waves**, The Shape of Waves video ○ **Activity 4,** screen 1 of 2, Instructional Guide (steps 1–5) and Student View ○ **Activity 3,** screens 1–2 of 3, Instructional Guide (steps 1–8) and Student View ● Lesson 2.4, **Activity 2**, screen 2 of 2, Instructional Guide (step 15) ● Lesson 3.1, **Activity 3**, screens 1–2 of 2, Instructional Guide (steps 1–7), and simulation
6.MS-PS4-2. Use diagrams and other models to show that both light rays and mechanical waves are reflected, absorbed, or transmitted through various materials.	***Light Waves*** unit*:* ● Lesson 2.3, **Activity 5,** Student View, "Why No One in Space Can Hear You Scream" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of How Sound Waves Travel") ● Lesson 2.4, **Activity 2,** Instructional Guide (steps 6–10), Student View, Possible Responses tab, simulation, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3, **Activity 4,** Student View, Possible Responses tab, and "Rubrics for Final Written Argument"
6.MS-PS4-3. Present qualitative scientific and technical information to support the claim that digitized signals (sent as wave pulses representing 0s and 1s) can be used to encode and transmit information.	***Light Waves*** unit*:* ● Lesson 3.1, **Activity 4,** Student View, "How Fiber-optic Communication Works" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of the Reliability of Digitized Signals")
Technology/Engineering	

ETS1. Engineering Design	
6.MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution. Include potential impacts on people and the natural environment that may limit possible solutions.*	***Phase Change Engineering Internship***: ● Ch.1, Day 9, **Activity: Finalizing the Proposal,** Possible Responses tab ● Ch.1, Day 7**, Lesson Brief**, Digital Resources, "Printable Proposal Rubric" ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal,** Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster"
6.MS-ETS1-5(MA). Create visual representations of solutions to a design problem. Accurately interpret and apply scale and proportion to visual representations.*	***Force and Motion Engineering Internship*** unit: ● Ch.1, Day 7, **Activity: Outlining Design Decisions,** Instructional Guide (steps 1–6) and Possible Responses tab ● Ch. 1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch. 1, Day 8, **Activity: Revising Design Decisions,** Instructional Guide (steps 1–7 and Possible Responses tab) ● Ch. 1, Day 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–6)
6.MS-ETS1-6(MA). Communicate a design solution to an intended user, including design features and limitations of the solution.	***Force and Motion Engineering Internship*** unit: ● Ch. 1,Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch. 1, Day 8, **Activity: Revising Design Decisions,** Instructional Guide (steps 1–7) and Possible Responses tab ● Ch. 1, Day 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–6)

	Phase Change Engineering Internship unit: ● Ch. 1, Day 5, **Activity: Analyzing Designs,** Instructional Guide (steps 1–3) ● Ch. 1, Day 6, **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and BabyWarmer Design Tool ● Ch. 1, Day 7 ○ **Activity: Outlining Design Decisions,** Instructional Guide (steps 1–6) and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster" ● Ch. 1, Day 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–9)
ETS2. Materials, Tools, and Manufacturing	
6.MS-ETS2-1(MA). Analyze and compare properties of metals, plastics, wood, and ceramics, including flexibility, ductility, hardness, thermal conductivity, electrical conductivity, and melting point.	***Chemical Reactions*** unit*:* ● Lesson 1.3, **Activity 4,** Instructional Guide (steps 1–7), Student View, Possible Responses tab, Sorting Tool: Evaluating Evidence, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 4,** Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.2, **Activity 3,** Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Arguments" ● Lesson 1.5, **Activity 3,** Instructional Guide (steps 6–7) and "Atomic Zoom-In: Comparing Substances at a Very Small Scale" article ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster"

6.MS-ETS2-2(MA). Given a design task, select appropriate materials based on specific properties needed in the construction of a solution.*	***Phase Change Engineering Internship*** unit*:* ● **Unit Guide**, Unit Overview ● Ch.1, Day 5 ○ **Activity: Introducing The Design Cycle**, Instructional Guide (steps 1–5) and The Design Cycle video ○ **Activity: Testing Incubator Designs**, Instructional Guide (steps 1–3) and BabyWarmer Design Tool ● Ch.1, Day 6 ○ **Activity: Testing Final Designs**, Instructional Guide (steps 1–5) and BabyWarmer Design Tool ○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster ***Force and Motion Engineering Internship*** unit*:* ● **Unit Guide**, Unit Overview ● Ch.1, Day 3, **Activity: Introducing The Design Cycle**, Instructional Guide (steps 1–3) and The Design Cycle video ● Ch.1, Day 4 ○ **Activity: Investigating SupplyDrop**, Instructional Guide (steps 1–8) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch.1, Day 6 ○ **Activity: Testing Final Designs**, Instructional Guide (steps 1–5) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster"
6.MS-ETS2-3(MA). Choose and safely use appropriate measuring tools, hand tools, fasteners, and common hand-held power tools used to construct a prototype.*	***Phase Change Engineering Internship*** unit: ● **Unit Guide**, Unit Overview ● Ch. 1, Day 1, **Lesson Brief**, Digital Resources, Video: Engineering Tips: Optimal Designs ● Ch. 1, Day 5 ○ **Activity: Testing Incubator Designs**, Instructional Guide (steps 1–3) and BabyWarmer Design Tool

	○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster" ○ **Activity: Analyzing Designs**, Instructional Guide (steps 1–6) ● Ch. 1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) ○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster" ***Force and Motion Engineering Internship*** unit: ● **Unit Guide**, Unit Overview ● Ch. 1, Day 4 ○ **Activity: Investigating SupplyDrop,** Instructional Guide (steps 1–8) and SupplyDrop Design Tool, ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch. 1, Day 5 ○ **Activity: Analyzing Results**, Instructional Guide (step 1–4) and Engineering Tip: Analyzing Data video ○ **Lesson Brief**, Digital Resources, "Results Analysis copymaster" ● Ch. 1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and SupplyDrop Design Tool, ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster"

Grade 7	**Amplify Science Citations**
Earth and Space Sciences	
ESS2. Earth's Systems	
7.MS-ESS2-2. Construct an explanation based on evidence for how Earth's surface has changed over scales that range from local to global in size.	***Rock Transformations*** unit: ● Lesson 3.4 o **Activity 2,** Instructional Guide (steps 1–8), Student View, and On-the-Fly Assessment (hummingbird icon) o **Lesson Brief,** Digital Resources, "Write and Share Routine: Student 1–3 copymaster" ***Plate Motion*** unit:

	● Lesson 4.2, **Activity 2,** Instructional Guide (steps 1–7), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.1, **Lesson Brief,** Digital Resources, "Science Seminar Evidence Cards copymaster" ● Lesson 3.2, **Activity 5**, Student View, Possible Responses tab, Sorting Tool activity: Earth's History, "Steno and the Shark" article and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Rock Strata and Geologic Time") ***Earth, Moon, and Sun*** unit*:* ● Lesson 1.3, **Activity 3**, Instructional Guide (steps 1–7), Student View, and On-the-Fly Assessment (hummingbird icon)
7.MS-ESS2-4. Develop a model to explain how the energy of the Sun and Earth's gravity drive the cycling of water, including changes of state, as it moves through multiple pathways in Earth's hydrosphere.	***Weather Patterns*** unit*:* ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–12), Student View, simulation, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 3,** Instructional Guide (steps 1–9,) Student View, and Teacher Support tab ● Lesson 1.2, **Activity 1**, Instructional Guide (steps 1–5) and Student View ***Plate Motion*** unit: ● Lesson 2.4 o **Activity 4,** Instructional Guide (steps 1–5), Student View, and On-the-Fly Assessment (hummingbird icon) o **Lesson Brief,** Digital Resources, "Modeling Tool: Modeling Convergent and Divergent Plate Boundaries copymaster" ***Earth's Changing Climate*** unit*:* ● Lesson 1.3, **Activity 3**, Instructional Guide (steps 5–9) and Student View
ESS3. Earth and Human Activity	
7.MS-ESS3-2. Obtain and communicate information on how data from past geologic events are analyzed for patterns and used to forecast the location and likelihood of future catastrophic events.	***Plate Motion Engineering Internship*** unit: ● Ch.1, Day 9 o **Activity: Finalizing the Proposal**, Possible Responses tab

	○ **Lesson Brief,** Digital Resources, "Printable Proposal Rubric" ***Plate Motion*** unit: ● Lesson 1.3, **Activity 3**, Instructional Guide (steps 1–24), Student View, and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources,** Print Materials (8.5" x 11"), Earthquake Map and Plate Boundary Map, pages 24–27 ● Lesson 4.3 ○ **Activity 3**, Instructional Guide (steps 1–5), Student View, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief,** Digital Resources, "Science Seminar Reasoning Tool copymaster" ***Ocean, Atmosphere, and Climate*** unit*:* ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–7), Student View, simulation, and On-the-Fly Assessment (hummingbird icon)
7.MS-ESS3-4. Construct an argument supported by evidence that human activities and technologies can mitigate the impact of increases in human population and per capita consumption of natural resources on the environment.	***Earth's Changing Climate***: ● Lesson 3.1 ○ **Activity 3**, Instructional Guide (steps 1–10), Student View, and On-the-Fly Assessment (hummingbird icon) ○ **Printable Resources,** Print Materials (8.5" x 11"), Human Activities Evidence cards, page 36–37 ● Lesson 4.3 ○ **Activity 3**, Student View and Possible Responses tab ○ **Lesson Brief,** Digital Resources, "Rubrics for Final Written Argument" ***Ocean, Atmosphere, and Climate*** unit*:* ● Lesson 2.4, **Activity 3**, Instructional Guide (steps 1–9), Student View, Modeling Tool: 2.4 Currents and Temperature, and On-the-Fly Assessment (hummingbird icon)
Life Science	

LS1. From Molecules to Organisms: Structures and Processes	
7.MS-LS1-4. Construct an explanation based on evidence for how characteristic animal behaviors and specialized plant structures increase the probability of successful reproduction of animals and plants.	***Traits and Reproduction*** unit*:* ● Lesson 3.2, **Activity 5**, Student View, "Why the Corpse Flower Smells So Bad" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Plant Structures Used for Reproduction") ● Lesson 3.1, **Activity 5**, Student View, "Invasion of the Periodical Cicadas" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of How Animal Behaviors Affect the Odds of Reproduction") ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ***Populations and Resources*** unit*:* ● Lesson 2.1, **Activity 2**, *Reproduction and Energy* article set ***Metabolism*** unit*:* ● Lesson 4.2, **Activity 3**, Instructional Guide (steps 1–5), Student View, and On-the-Fly Assessment (hummingbird icon) ***Natural Selection*** unit*:* ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ● Lesson 3.2, **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon)
LS2. Ecosystems: Interactions, Energy, and Dynamics	
7.MS-LS2-1. Analyze and interpret data to provide evidence for the effects of periods of abundant and scarce resources on the growth of organisms and the size of populations in an ecosystem.	***Populations and Resources*** unit*:* ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–4), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3

	○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ● Lesson 3.3 ○ **Activity 3**, Instructional Guide (steps 1–7), Student View, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Write and Share Routine copymasters" ● Lesson 2.4 **Activity 2**, Instructional Guide (steps 3–6) and Student View ● Lesson 4.2 ○ **Activity 2**, Instructional Guide (steps 1–7) and Student View ○ **Activity 3**, Instructional Guide (steps 1–11) and Student View ○ **Lesson Brief**, Digital Resources, "Island Evidence Card I copymaster" ● Lesson 4.1 ○ **Lesson Brief**, Digital Resources, "Island Evidence Cards A-H copymaster" ***Natural Selection*** unit*:* ● Lesson 1.4, **Activity 2**, Instructional Guide (steps 1–6), Student View, simulation, and On-the-Fly Assessment (hummingbird icon)
7.MS-LS2-2. Describe how relationships among and between organisms in an ecosystem can be competitive, predatory, parasitic, and mutually beneficial and that these interactions are found across multiple ecosystems.	***Populations and Resources*** unit*:* ● Lesson 2.4 ○ **Activity 3**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "2.4 Write and Share copymaster" ● Lesson 3.3, **Activity 4**, Student View, "The Ant and the Acacia" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Mutually Beneficial Relationships among Organisms") ● Lesson 2.7 ○ **Activity 2**, Instructional Guide (steps 1–13), Student View, and Possible Responses tab

	○ **Lesson Brief**, Digital Resources, “Modeling Tool: Increasing Births in the Moon Jelly Population copymaster” and “Modeling Tool: Decreasing Deaths in the Moon Jelly Population copymaster” ○ **Activity 3**, Instructional Guide (step 13) ***Natural Selection*** unit*:* ● Lesson 1.4, **Activity 2**, Instructional Guide (steps 1–6), Student View, simulation, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 6–15), Student View, and simulation ***Evolutionary History*** unit*:* ● Lesson 4.3 ○ **Activity 3**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument”
7.MS-LS2-3. Develop a model to describe that matter and energy are transferred among living and nonliving parts of an ecosystem and that both matter and energy are conserved through these processes.	***Matter and Energy in Ecosystems*** unit*:* ● **Unit Guide**, Unit Overview ● Lesson 3.2 ○ **Activity 1**, Student View and Possible Responses tab ○ **Activity 2**, Instructional Guide (steps 1–7), Student View, and "Carbon in the Global Ecosystem" article (paragraphs 4 and 5) ○ **Activity 3**, Instructional Guide (steps 1–4) and Student View ● Lesson 3.4 ○ **Activity 2**, Instructional Guide (steps 1–7), Student View, Possible Responses tab, and Sorting Tool activity: Cause and Effect in the Biodome ○ **Activity 3**, Instructional Guide (steps 1–5), Student View, Possible Responses tab, and Modeling Tool: Biodome Model ● Lesson 2.1, **Activity 4**, Instructional Guide (steps 1–4), Student View, and “A Feast for Decomposers” article ● Lesson 2.5, “Getting Energy in a Cave Ecosystem” article

	● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–6), Student View, Possible Responses tab, and simulation ***Populations and Resources*** unit*:* ● Lesson 2.7 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–8), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Increasing Births in the Moon Jelly Population copymaster") ● Lesson 4.1, **Activity 2**, Instructional Guide (steps 5–8) and Student View ● **Printable Resources**, Print Materials (8.5" x 11"), Island Population Cards, pages 23–26
7.MS-LS2-4. Analyze data to provide evidence that disruptions (natural or human-made) to any physical or biological component of an ecosystem can lead to shifts in all its populations.	***Matter and Energy in Ecosystems*** unit*:* ● **Unit Guide**, Unit Overview ● Lesson 3.4 ○ **Activity 2**, Instructional Guide (steps 1–8), Student View, Possible Responses tab, and Sorting Tool activity: Cause and Effect in the Biodome ○ **Activity 3**, Instructional Guide (steps 1–5), Student View, Possible Responses tab, and Modeling Tool: Biodome Model ● Lesson 4.3, **Activity 4**, Student View and Possible Responses tab ***Populations and Resources*** unit*:* ● **Unit Guide**, Unit Overview ● Lesson 3.3 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and simulation ○ **Activity 3**, Instructional Guide (steps 1–7), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Lesson 3.3 Write and Share routine copymaster" ● Lesson 4.3, **Activity 4**, Student View and Possible Responses tab

	Natural Selection unit*:* ● **Unit Guide**, Unit Overview ● Lesson 1.4 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and simulation ○ **Activity 3**, Instructional Guide (steps 1–9), Student View, and Possible Responses tab ○ **Activity 4**, Instructional Guide (steps 1–7), Student View, Possible Responses tab, and simulation ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Fur and Temperature, Population B copymaster" ● Lesson 4.3, **Activity 4**, Student View and Possible Responses tab
7.MS-LS2-5. Evaluate competing design solutions for protecting an ecosystem. Discuss benefits and limitations of each design.*	***Populations and Resources*** unit*:* ● Lesson 1.3, **Activity 3**, Student View, "How Ecosystems Clean Earth's Water" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of the Importance of Ecosystem Services to Humans") ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument") ● Lesson 4.1, **Activity 2**, Instructional Guide (step 1) and Teacher Support tab ("Background, Crosscutting Concept: Stability and Change") ***Natural Selection Engineering Internship*** unit*:* ● Ch.1, Day 8 ○ **Activity: Revising Design Decisions**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Proposal Rubric copymaster" ***Metabolism Engineering Internship*** unit*:* ● Ch.1, Day 9

	○ **Activity: Finalizing the Proposal**, Instructional Guides and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Printable Proposal Rubric"
7.MS-LS2-6(MA). Explain how changes to the biodiversity of an ecosystem—the variety of species found in the ecosystem—may limit the availability of resources humans use.	***Populations and Resources*** unit*:* ● Lesson 1.3, **Activity 3**, Student View and "How Ecosystems Clean Earth's Water" article ● Lesson 3.1, **Lesson Brief**, Digital Resources, "Jelly Population Explosion" article
Physical Science	
PS2. Motion and Stability: Forces and Interactions	
7.MS-PS2-3. Analyze data to describe the effect of distance and magnitude of electric charge on the strength of electric forces.	[Magnetic forces attractive or repulsive] ***Magnetic Fields*** unit*:* ● Lesson 1.2 ○ **Activity 3,** Instructional Guide (steps 4–7) and Student View ○ **Activity 4,** screen 2 of 2, Instructional Guide (steps 4–5), Student View, and simulation ○ **Lesson Brief**, Digital Resources, "Exploring and Simulating Magnets copymaster" ○ **Activity 5,** screens 1–2 of 2, Instructional Guide (steps 1–7) [Magnetic forces, strength and distance] ***Magnetic Fields*** unit*:* ● Lesson 3.2, **Activity 2,** Instructional Guide (steps 1–10), Student View, and simulation [Electromagnetic forces] ***Magnetic Fields*** unit*:* ● Lesson 3.5 ○ **Activity: How an Electromagnet Works,** Instructional Guide (steps 1–2) and "How an Electromagnet Works" video ○ **Activity 2,** Instructional Guide (steps 1–4)

	○ **Activity 3**, Student View and simulation ● Lesson 1.5, **Activity 5,** Student View and "Painting with Static Electricity" article [Electric forces] ***Magnetic Fields*** unit*:* ● Lesson 3.2, **Activity 4,** "Escaping a Black Hole" article (paragraph 3) ● Lesson 4.1 ○ **Activity 3,** Instructional Guide (steps 1–8) and Student View ○ **Lesson Brief**, Digital Resources, "Roller Coaster Design Claims copymaster" ● Lesson 1.5, **Activity 5,** Student View and "Painting with Static Electricity" article
7.MS-PS2-5. Use scientific evidence to argue that fields exist between objects with mass, between magnetic objects, and between electrically charged objects that exert force on each other even though the objects are not in contact.	***Magnetic Fields*** unit*:* ● Lesson 1.5, **Activity 5,** Student View, "Painting with Static Electricity" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Electric Fields") ● Lesson 3.2 ○ **Activity 3,** Instructional Guide (steps 1–7), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 4,** screen 2 of 2, Student View, "Escaping a Black Hole" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Mass and Gravity") ***Force and Motion*** unit*:* ● Lesson 1.6, **Activity 3,** Instructional Guide (steps 1–10), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.2, **Activity 4,** Instructional Guide (steps 1–4), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1

	○ **Activity 2,** Instructional Guide (steps 1–16), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Assessing Students' Investigations of Forces on Different Objects" ***Thermal Energy*** unit*:* ○ Lesson 3.3, **Lesson Brief**, Digital Resources, "Planning and Conducting Investigations of Thermal Energy Transfer copymaster" and "Rubrics for Assessing Students' Investigations of Thermal Energy Transfer"
PS3. Energy	
7.MS-PS3-1. Construct and interpret data and graphs to describe the relationships among kinetic energy, mass, and speed of an object.	***Force and Motion*** unit*:* ● Lesson 2.1, **Activity 2,** Instructional Guide (steps 1–14), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3, **Activity 4,** screen 2 of 2, Student View, "Wrecking Ball" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Mass and Speed in Relation to Kinetic Energy") ● Lesson 4.3, **Activity 5,** Instructional Guide (steps 1–9), Student View, Possible Responses tab, simulation, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Mass and Velocity in Relation to Kinetic Energy")
7.MS-PS3-2. Develop a model to describe the relationship between the relative positions of objects interacting at a distance and their relative potential energy in the system.	***Magnetic Fields*** unit*:* ● Lesson 2.4 ○ **Activity 4,** Instructional Guide (steps 1–8), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Spacecraft Launch Energy copymaster" ● Lesson 3.3 ○ **Activity 3,** Instructional Guide (steps 1–5), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Spacecraft Launches copymaster"

	● Lesson 4.3, ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument” ***Force and Motion*** unit*:* ● Lesson 3.3, **Activity 4,** Student View, "Wrecking Ball" article, and Teacher Support tab (“Assessment, Assessment Opportunity: Student Understanding of Mass and Speed in Relation to Kinetic Energy”)
7.MS-PS3-3. Apply scientific principles of energy and heat transfer to design, construct, and test a device to minimize or maximize thermal energy transfer.*	***Thermal Energy*** unit*:* ● Lesson 3.3, **Activity 4,** screens 1–2 of 2, Student View, Possible Responses tab, “Dumpling Dilemma: Oil or Water?” article, and Teacher Support tab (“Rationale, Pedagogical Goals: Additional Reading About Thermal Energy and Temperature” and “Assessment, Assessment Opportunity: Student Understanding of How the Nature of a Material Affects Energy Transfer”) ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Assessing Students' Final Written Arguments” ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9 ○ **Activity: Finalizing the Proposal,** Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Printable Proposal Rubric copymaster” ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 4: ○ **Activity: Analyzing Incubator Materials,** Instructional Guide (steps 8–11), Possible Responses tab, and BabyWarmer Design Tool ○ **Activity 2,** Instructional Guide (steps 1–6), *Futura Chemical Engineer’s Dossier*, "Insulating Materials" article

	○ **Lesson Brief**, Digital Resources, “Insulating Materials Analysis copymaster” ● Ch.1, Day 9, **Activity: Finalizing the Proposal,** Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, “Printable Proposal Rubric” ***Light Waves*** unit*:* ● Lesson 3.3, **Activity 3,** Instructional Guide (steps 1–5), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ***Harnessing Human Energy*** unit*:* ○ Lesson 2.2, **Activity 4,** Instructional Guide (steps 1–8) and Sorting Tool activity: Introducing Energy Transfer
7.MS-PS3-4. Conduct an investigation to determine the relationships among the energy transferred, how well the type of matter retains or radiates heat, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	***Thermal Energy*** unit*:* ● Lesson 3.2, **Activity 2,** Instructional Guide (steps 1–9), Student View, and “Thermal Energy Is NOT Temperature” article ● Lesson 3.4 ○ **Activity 2,** Instructional Guide (steps 1–5), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, “Modeling Tool: Differences in Temperature Change copymaster” ● Lesson 3.3 ○ **Lesson Brief,** ▪ Materials and Preparation, “Preparation Before the Day of the Lesson,” step 10 ▪ Digital Resources, “Planning and Conducting Investigations of Thermal Energy Transfer copymaster” and “Rubrics for Assessing Students’ Investigations of Thermal Energy Transfer” ○ **Activity 4,** “Dumpling Dilemma: Oil or Water?” article ● Lesson 4.3, **Activity 4,** Student View, Possible Responses tab, and *“*Rubrics for Assessing Students' Final Written Arguments”

	Force and Motion unit*:* ● Lesson 2.1, **Activity 2,** Instructional Guide (steps 1–14), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1 ○ **Activity 2,** Instructional Guide (steps 1–16), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Assessing Students' Investigations of Forces on Different Objects"
7.MS-PS3-5. Present evidence to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	***Thermal Energy*** unit*:* ● Lesson 4.3, **Activity 4,** Student View, Possible Responses tab, and "Rubrics for Assessing Students' Final Written Arguments" ***Harnessing Human Energy*** unit*:* ● Lesson 2.1, **Activity 3,** Instructional Guide (steps 1–16), Student View, Possible Responses tab, and simulation ***Force and Motion*** unit*:* ● Lesson 3.3, **Activity 4,** screen 2 of 2, Student View, "Wrecking Ball" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Mass and Speed in Relation to Kinetic Energy")
7.MS-PS3-6(MA). Use a model to explain how thermal energy is transferred out of hotter regions or objects and into colder ones by convection, conduction, and radiation.	***Thermal Energy*** unit*:* ● Lesson 2.3, ○ **Activity 2,** Student View, Possible Responses tab, and simulation ○ **Activity 3**, Student View and "How Air Conditioners Make Cities Hotter" article (paragraphs 6–8) ● Lesson 3.1, **Activity 2,** "Thermal Energy is NOT Temperature" article (paragraph 7)
7.MS-PS3-7(MA). Use informational text to describe the relationship between kinetic and potential energy and illustrate conversions from one form to another.	***Harnessing Human Energy*** unit*:* ● Lesson 2.2, **Activity 4,** Instructional Guide (steps 1–8) and Sorting Tool activity: Introducing Energy Transfer ***Light Waves*** unit*:*

	● Lesson 1.2, **Activity 3,** Instructional Guide (steps 1–15) and Student View ***Thermal Energy*** unit*:* ● Lesson 2.3, **Activity 4,** Instructional Guide (steps 4–12)
Technology/Engineering	
ETS1. Engineering Design	
7.MS-ETS1-2. Evaluate competing solutions to a given design problem using a decision matrix to determine how well each meets the criteria and constraints of the problem. Use a model of each solution to evaluate how variations in one or more design features, including size, shape, weight, or cost, may affect the function or effectiveness of the solution.*	***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch.1, Day 8, **Activity: Revising Design Decisions,** Instructional Guide (steps 1–7) and Possible Responses tab ● Ch.1, Day 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–6) ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 5, **Activity: Analyzing Designs,** Instructional Guide (steps 1–3) ● Ch.1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and BabyWarmer Design Tool ● Ch.1, Day 7 ○ **Activity: Outlining Design Decisions,** Instructional Guide (steps 1–6) and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster" ● Lesson 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–9)
7.MS-ETS1-4. Generate and analyze data from iterative testing and modification of a proposed object, tool, or process to optimize the object, tool, or process for its intended purpose.*	***Phase Change Engineering Internship***: ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab

	● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric" ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal,** Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster"
7.MS-ETS1-7(MA). Construct a prototype of a solution to a given design problem.*	***Phase Change Engineering Internship*** unit*:* ● **Unit Guide**, Unit Overview ● Ch.1, Day 1, **Lesson Brief**, Digital Resources, "Video: Engineering Tips: Optimal Designs" ● Ch.1, Day 5 ○ **Activity: Testing Incubator Designs,** Instructional Guide (steps 1–3) and BabyWarmer Design Tool ○ **Activity: Analyzing Designs,** Instructional Guide (steps 1–6) o **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster" ● Ch.1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) ○ **Lesson Brief**, Digital Resources, "BabyWarmer Data copymaster**"** ***Force and Motion Engineering Internship*** unit*:* ● **Unit Guide**, Unit Overview ● Ch.1, Day 4, ○ **Activity: Investigating SupplyDrop,** Instructional Guide (steps 1–8) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch.1, Day 5 o **Activity: Analyzing Results**, Instructional Guide (step 1–4) and Engineering Tip: Analyzing Data video ○ **Lesson Brief**, Digital Resources, "Results Analysis copymaster"

	● Ch.1, Day 6 ○ **Activity: Testing Final Designs,** Instructional Guide (steps 1–5) and SupplyDrop Design Tool ○ **Lesson Brief**, Digital Resources, "SupplyDrop Data copymaster" ● Ch. 1, Lesson 8, **Activity: Revising Design Decisions,** Instructional Guide (steps 1–6) and Possible Responses tab
ETS3. Technological Systems	
7.MS-ETS3-1(MA). Explain the function of a communication system and the role of its components, including a source, encoder, transmitter, receiver, decoder, and storage.	***Light Waves*** unit*:* ● Lesson 3.1, **Activity 4,** Student View, "How Fiber-optic Communication Works" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of the Reliability of Digitized Signals")
7.MS-ETS3-2(MA). Compare the benefits and drawbacks of different communication systems.	***Light Waves*** unit*:* ● Lesson 3.1, **Activity 4,** Student View, "How Fiber-optic Communication Works" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of the Reliability of Digitized Signals")
7.MS-ETS3-3(MA). Research and communicate information about how transportation systems are designed to move people and goods using a variety of vehicles and devices. Identify and describe subsystems of a transportation vehicle, including structural, propulsion, guidance, suspension, and control subsystems.	Amplify Science, which was designed specifically for the NGSS, does not currently address this standard.
7.MS-ETS3-4(MA). Show how the components of a structural system work together to serve a structural function. Provide examples of physical structures and relate their design to their intended use.	***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 3, **Activity: Revising the Egg Drop Model Designs,** Instructional Guide (steps 6–9) and Teacher Support tab ("Background, Crosscutting Concepts: Structure and Function") ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 2, **Activity 2,** *Futura Chemical Engineer's Dossier*, "Phase Change Materials" article ● Ch.1, Day 4, **Activity: Analyzing Incubator Material,** Instructional Guide (steps 1–11) and Teacher Support tab ("Rationale, Connection to Crosscutting Concept of Structure and Function")

	Chemical Reactions unit*:* ○ Lesson 2.1, **Activity 5,** Student View, and "Synthetic Materials: Making Substances in the Lab" article
7.MS-ETS3-5(MA). Use the concept of systems engineering to model inputs, processes, outputs, and feedback among components of a transportation, structural, or communication system.	***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 1, **Activity: Introducing Futura,** Instructional Guide (steps 2–7, 11–12), Welcome to Futura video, and Teacher Support tab ("Instructional Suggestion, Pedagogical Goals: Pre-thinking about Criteria") ● Ch.1, Day 10, **Activity: Applying Engineering Skills,** Instructional Guide (steps 1–9) and Teacher Support tab ("Instructional Suggestion, Providing More Support: Examples of Constraints and Criteria")

Grade 8	**Amplify Science Citations**
Earth and Space Sciences	
ESS1. Earth's Place in the Universe	
8.MS-ESS1-1b. Develop and use a model of the Earth-Sun system to explain the cyclical pattern of seasons, which includes Earth's tilt and differential intensity of sunlight on different areas of Earth across the year.	***Earth, Moon, and Sun*** unit: ● Lesson 1.3, **Activity 3**, screen 2 of 2, Instructional Guide (step 7) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.4, **Activity 3**, Instructional Guide (step 9) and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.4 o **Activity 1**, Student View o **Activity 2**, Student View o **Activity 3**, Student View ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ● Lesson 3.1, **Activity 5**, screen 2 of 2, Instructional Guide, Student View, Possible Responses tab, "The Endless Summer of the Arctic Tern" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of the Cause of Earth's Seasons") ***Earth's Changing Climate*** unit: ● Lesson 1.3, **Activity 3**, Instructional Guide (steps 5–9), Student View, and Teacher Support tab ("Background, Pedagogical Goals: Developing Models") ***Geology on Mars*** unit:

	● Lesson 1.1, **Activity: Introducing the Student Planetary Geologist Role,** Meet a Planetary Geologist video
8.MS-ESS1-2. Explain the role of gravity in ocean tides, the orbital motions of planets, their moons, and asteroids in the solar system.	***Geology on Mars*** unit: ● Lesson 1.1, **Activity 5**, "Scale in the Solar System" article (paragraphs 1–5) ● Lesson 1.3, **Activity 4**, Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon) ***Earth, Moon, and Sun*** unit: ● Lesson 2.4, **Activity 5**, "Gravity in the Solar System" article, Student View, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Gravity in the Solar System and the Galaxy") ● Lesson 1.3, **Activity 3**, screen 2 of 2, Instructional Guide (step 7) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 1–12), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.3, **Activity 3**, screen 1 of 2, Instructional Guide (steps 1–5)
ESS2. Earth's Systems	
8.MS-ESS2-1. Use a model to illustrate that energy from Earth's interior drives convection that cycles Earth's crust, leading to melting, crystallization, weathering, and deformation of large rock formations, including generation of ocean sea floor at ridges, submergence of ocean sea floor at trenches, mountain building, and active volcanic chains.	***Plate Motion*** unit: ● Chapter 2, Chapter Overview ● Lesson 2.2, **Activity 2**, Instructional Guide (steps 1–3, 8–9) and "Listening to Earth" article ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–11) and Student View ● Lesson 2.4, **Activity 3**, Instructional Guide and simulation ***Plate Motion Engineering Internship*** unit*:* ○ Ch.1, Day 3, **Activity: Researching Plate Boundaries**, Instructional Guide (steps 1–7), and *Futura Geohazards Engineer's Dossier,* "Plate Motion and Tsunamis" article
8.MS-ESS2-5. Interpret basic weather data to identify patterns in air mass interactions and the relationship of those patterns to local weather.	***Weather Patterns*** unit*:* ● Lesson 2.3, **Activity 3**, Instructional Guide (steps 1–12), Student View, simulation, and On-the-Fly Assessment (hummingbird icon)

	● Lesson 3.2, **Activity 4**, Student View, "How We Predict the Weather" article and Possible Responses tab ***Ocean, Atmosphere, and Climate*** unit*:* ● Lesson 3.3, **Activity 2**, Instructional Guide (steps 1–7), Student View, Modeling Tool: 3.3 Christchurch Model and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 o **Activity 4**, Instructional Guide (steps 1–7) and Student View o **Lesson Brief,** Digital Resources, "Rubrics for Assessing Students' Final Written Arguments" o **Activity 6**, Student View ● Lesson 2.3: o **Activity 2,** Instructional Guide (steps 1–8) and Student View o **Activity 3**, Instructional Guide (steps 1–7), Student View, and simulation o **Activity 4**, Instructional Guide (steps 1–5) and Student View
8.MS-ESS2-6. Describe how interactions involving the ocean affect weather and climate on a regional scale, including the influence of the ocean temperature as mediated by energy input from the Sun and energy loss due to evaporation or redistribution via ocean currents.	***Weather Patterns*** unit: ● Lesson 3.1 o **Activity: Modeling Wind and Air Parcels,** Instructional Guide (steps 1–6) o **Activity 3**, Instructional Guide (steps 1–12), Student View, and simulation o **Activity 4**, Student View and "Types of Rain" article ***Ocean, Atmosphere, and Climate*** unit: ● Lesson 1.2 o **Activity: Chasing El Niño**, Chasing El Niño video o **Activity 4**, "Effects of El Niño Around the World" article ● Lesson 2.1, **Activity 2**, "The Ocean in Motion" article ● Lesson 2.3 o **Activity 2**, Instructional Guide (steps 1–8) and Student View

	○ **Activity 3**, Instructional Guide (steps 1–7), Student View, and simulation ○ **Activity 4**, Instructional Guide (steps 1–5) and Student View ● Lesson 3.2 ○ **Activity: Gulf Stream Video**, Instructional Guide (steps 1–3) and Gulf Stream video ○ **Activity 2**, Instructional Guide (steps 1–6,) Student View and "The Gulf Stream: A Current That Helped Win a War" article ○ **Activity 3**, Instructional Guide
ESS3. Earth and Human Activity	
8.MS-ESS3-1. Analyze and interpret data to explain that the Earth's mineral and fossil fuel resources are unevenly distributed as a result of geologic processes.	***Rock Transformations*** unit*:* ● Lesson 2.3, **Activity 4**, Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Renewable and Nonrenewable Resources") ● Lesson 2.4 ○ **Activity 2**, Instructional Guide (steps 1–9), Student View, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief,** Digital Resources, "Write and Share Routine Student 1–4 copymaster" ● Lesson 3.2, **Activity 3**, Instructional Guide (steps 1–8), Student View, and simulation ***Plate Motion*** unit*:* ● Lesson 3.2, **Activity 3**, "A Continental Puzzle" article and Teacher Support tab ("Rationale, Pedagogical Goals: Understanding the Nature of Science") ***Ocean, Atmosphere, and Climate*** unit*:* ● Lesson 2.4, **Activity 3**, Instructional Guide (steps 1–9), Student View, Modeling Tool: 2.4 Currents and Temperature, and On-the-Fly Assessment (hummingbird icon)

8.MS-ESS3-5. Examine and interpret data to describe the role that human activities have played in causing the rise in global temperatures over the past century.	***Earth's Changing Climate***:
	● Lesson 4.3
	  ○ **Activity 3**, Student View and Possible Responses tab
	  ○ **Lesson Brief,** Digital Resources, "Rubrics for Final Written Argument"
	● Lesson 3.3, **Activity 3**, Instructional Guide (steps 1–7), Modeling Tool: Climate Change Solution, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon)
	● Lesson 4.3, **Activity 2**, Instructional Guide (step 11)
	
	Ocean, Atmosphere, and Climate unit*:*
	● Lesson 2.1, **Activity 2**, Instructional Guide (step 12), Student View, "The Ocean in Motion" article, and On-the-Fly Assessment (hummingbird icon)
	● Lesson 4.2
	  ○ **Activity 2**, Instructional Guide (steps 1–5) and Student View
	  ○ **Activity: Introducing the Science Seminar**, Instructional Guide (steps 1–6)
	  ○ **Activity 3**, Instructional Guide (steps 1–11) and Student View

Life Science	
LS1. From Molecules to Organisms: Structures and Processes	
8.MS-LS1-5. Construct an argument based on evidence for how environmental and genetic factors influence the growth of organisms.	***Traits and Reproduction*** unit*:* ● Lesson 4.1, **Activity 5**, Student View, Possible Responses tab, "Growing Giant Pumpkins" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of How Genetic and Environmental Factors Influence Growth") ***Natural Selection*** unit*:* ● Lesson 3.2, **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3

	○ **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Write and Share Routine copymaster" ● Lesson 4.3, **Activity 4**, Instructional Guide (steps 1–5), Student View, and Possible Responses tab
8.MS-LS1-7. Use informational text to describe that food molecules, including carbohydrates, proteins, and fats, are broken down and rearranged through chemical reactions forming new molecules that support cell growth and/or release of energy.	***Metabolism*** unit*:* ● **Unit Guide**, Unit Overview ● *Systems of the Human Body* article set (Ch. 3: The Digestive System) ● Lesson 3.4, **Activity 4**, *Odd Organisms and How They Get the Molecules They Need* article set ● Lesson 1.2, **Activity 2**, Instructional Guide (steps 9–10), Student View, and simulation ● Lesson 2.7, **Activity 2**, Instructional Guide (steps 1–3), Student View, and *Patient Stories: Problems with Body Systems* article set (Ch. 4: Diabetes and Ch. 5: Injury to the Pancreas) ● Lesson 3.1, **Activity 4**, Instructional Guide (steps 1–6), Student View, and simulation ● Lesson 3.3: ○ **Activity 2**, Instructional Guide (steps 1–7), "Growth and Repair" article, and simulation ○ **Activity 3**, Instructional Guide (steps 1–6), Student View, and Modeling Tool: 3.3 Model a Cell ***Metabolism Engineering Internship*** unit*:* ● **Unit Guide**, Unit Overview ● Ch.1, Day 2 ○ **Activity: Discussing Metabolism and Food**, Instructional Guide (steps 1–5) ○ **Activity: Researching Different Ingredients**, Instructional Guide (steps 1–6) ○ **Lesson Brief**, Digital Resources, "Researching Ingredients copymaster" and "Ingredients and Additional Metabolism Information" article
LS3. Heredity: Inheritance and Variation of Traits	

8.MS-LS3-1. Develop and use a model to describe that structural changes to genes (mutations) may or may not result in changes to proteins, and if there are changes to proteins there may be harmful, beneficial, or neutral changes to traits.	***Traits and Reproduction*** unit*:* ● Lesson 2.4 ○ **Activity 2**, screen 2 of 2, Instructional Guide (steps 3–10), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, “Modeling Tool: Variation in Spider Offspring Model copymaster” ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument” ● Lesson 4.4 ○ **Activity 1**, screens 1–18 of 18, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “End-of-Unit Assessment Answer Key and Scoring Guide” ● Lesson 1.3 ○ **Activity 2**, Instructional Guide (steps 1–2) and *Surprising Spider Silk* article set ○ **Activity 3**, Instructional Guide (steps 1–15), Student View, and Teacher Support tab (“Background, Crosscutting Concept: Structure”) ***Natural Selection*** unit*:* ● Lesson 3.2, **Activity 2**, Instructional Guide (steps 1–10), Student View, “Mutations: Not Just for Superheroes” article, and On-the-Fly Assessment (hummingbird icon) ***Evolutionary History*** unit: ● Lesson 2.5, **Activity 2**, Instructional Guide (steps 1–7), Modeling Tool: Population Changes, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon)
8.MS-LS3-2. Construct an argument based on evidence for how asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with	***Traits and Reproduction*** unit*:* ● Lesson 3.3

genetic variation. Compare and contrast advantages and disadvantages of asexual and sexual reproduction.	○ **Activity 3**, Instructional Guide (steps 1–12), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 4**, Student View, Possible Responses tab, "Sea Anemones: Two Ways to Reproduce" article, and Teacher Support tab ("Assessment, Assessment Opportunity: Student Understanding of Sexual and Asexual Reproduction") o **Lesson Brief**, Digital Resources, "Modeling Tool: Venom Inheritance Model copymaster" ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ● Lesson 4.4 ○ **Activity 2**, Student View and Possible Responses tab ○ **Activity 3**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "End-of-Unit Assessment Answer Key and Scoring Guide" ● Lesson 3.3, **Activity 2**, screen 2 of 3, Teacher Support tab ("Instructional Suggestion, Going Further: Mathematical Thinking") ***Evolutionary History*** unit*:* ● Lesson 2.5, **Activity 2**, Instructional Guide (steps 1–7), Modeling Tool: Population Changes, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ***Populations and Resources*** unit*:* ● Lesson 1.2, **Activity 4**, Student View and Teacher Support tab ("Background, Pedagogical Goals: Developing Models" and "Instructional Suggestion, Going Further: Gathering Initial Models for Future Reflection") ***Natural Selection*** unit*:* ● Lesson 3.3

	○ **Activity 2**, Instructional Guide (steps 1–7), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Write and Share Routine #1, #2, and #3 copymaster" ● Lesson 3.2 ○ **Activity 3**, Instructional Guide (steps 1–4), Student View, and Teacher Support tab ("Background, Crosscutting Concept: Cause and Effect")
8.MS-LS3-3(MA). Communicate through writing and in diagrams that chromosomes contain many distinct genes and that each gene holds the instructions for the production of specific proteins, which in turn affects the traits of an individual.	***Traits and Reproduction*** unit*:* ● **Unit Guide**, Unit Overview ● Lesson 2.1, **Lesson Brief**, Digital Resources, "Hemophilia, Proteins, and Genes" article ● Lesson 2.2 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–13) and Student View ○ **Activity 3**, Instructional Guide (steps 1–5) and Student View ● Lesson 2.3 ○ **Activity 1**, Student View ○ **Activity: Playing Mutations and New Traits**, Instructional Guide (steps 1–3) and Mutations and New Traits video ○ **Activity 2**, Instructional Guide (steps 1–8), Student View, Possible Responses tab, and simulation ○ **Activity 3**, Instructional Guide (steps 1–9), Student View, and Possible Responses tab ● Lesson 2.4 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–10), Student View, and Possible Responses tab ○ **Activity 3**, Instructional Guide (steps 1–13), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Variation in Spider Offspring Model copymaster" ***Natural Selection*** unit*:* ● Lesson 2.1

	○ **Activity 4**, Instructional Guide (steps 1–5), Student View, and "Glowing Jellies" article ○ **Activity 5**, Instructional Guide (steps 1–3) and Student View ● Lesson 2.2 ○ **Activity 1**, Student View ○ **Activity: Modeling Traits in a Cell**, Instructional Guide (steps 1–6) and simulation ● Lesson 3.1, **Lesson Brief**, Digital Resources, "Mutations: Not Just for Superheroes" article
8.MS-LS3-4(MA). Develop and use a model to show that sexually reproducing organisms have two of each chromosome in their cell nuclei, and hence two variants (alleles) of each gene that can be the same or different from each other, with one random assortment of each chromosome passed down to offspring from both parents.	***Traits and Reproduction*** unit*:* ● Chapter 3, Chapter Overview ● Lesson 3.3 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–14), Student View, Possible Responses tab, and simulation ○ **Activity 3**, Instructional Guide (steps 1–2), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Venom Inheritance Model copymaster" ○ **Activity 4**, Student View ● Lesson 3.6 ○ **Activity 1**, Student View ○ **Activity 2**, Instructional Guide (steps 1–5), Student View, and Possible Responses tab ○ **Activity 3**, Instructional Guide (steps 1–3), Student View, and Possible Responses tab ○ **Activity 4**, Instructional Guide (steps 1–4), Student View, Possible Responses tab, and simulation ● Lesson 4.1, **Activity 3**, Instructional Guide (steps 1–8) and Student View
LS4. Biological Evolution: Unity and Diversity	
8.MS-LS4-4. Use a model to describe the process of natural selection, in which genetic variations of some traits in a population increase some individuals' likelihood of surviving and reproducing in a changing environment. Provide evidence that natural selection occurs over many generations.	***Natural Selection*** unit*:* ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument"

	● Lesson 4.4 ○ **Activity 1**, screens 1-–8 of 18, Student View and Possible Responses tab ○ **Activity 2**, Student View and Possible Responses tab ○ **Activity 3**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “End-of-Unit Assessment Answer Key and Scoring Guide” ● Lesson 2.4, **Activity 2**, Instructional Guide (steps 1–6) and On-the-Fly Assessment (hummingbird icon) ***Populations and Resources*** unit*:* ● Lesson 2.7 ○ **Activity 2**, Instructional Guide (steps 1–12), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Modeling Tool: Increasing Births in the Moon Jelly Population copymaster” and “Modeling Tool: Decreasing Deaths in the Moon Jelly Population copymaster” ○ **Activity 3**, Instructional Guide (step 13)
8.MS-LS4-5. Synthesize and communicate information about artificial selection, or the ways in which humans have changed the inheritance of desired traits in organisms.	***Natural Selection*** unit*:* ● Lesson 3.2, **Activity 5**, Student View, “How to Make a Venomous Cabbage” article, and Teacher Support tab (“Assessment, Assessment Opportunity: Student Understanding of Artificial Selection”) ● Lesson 4.3 ○ **Activity 4**, Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubric for Final Written Argument” ● Lesson 3.2 ○ **Activity 2**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ***Traits and Reproduction*** unit*:* ● Lesson 2.1, **Lesson Brief**, Digital Resources, “Hemophilia, Proteins, and Genes” article, paragraphs 5–7 ● Lesson 3.5

	○ **Lesson Brief**, Digital Resources, "Cloning Mammoths: A Mammoth Task" article ○ **Activity 3**, Instructional Guide and Student View ● Lesson 2.1, **Activity 3**, Instructional Guide (steps 1–10), "Hemophilia, Proteins, and Genes" article, and On-the-Fly Assessment (hummingbird icon) ***Microbiome*** unit*:* ● Lesson 2.1, **Activity 5**, Instructional Guide (steps 1–5), "The Human Microbiome" article, and On-the-Fly Assessment (hummingbird icon)
Physical Science	
PS1. Matter and Its Interactions	
8.MS-PS1-1. Develop a model to describe that (a) atoms combine in a multitude of ways to produce pure substances which make up all of the living and nonliving things that we encounter, (b) atoms form molecules and compounds that range in size from two to thousands of atoms, and (c) mixtures are composed of different proportions of pure substances.	***Chemical Reactions*** unit*:* ● Lesson 1.6, **Activity 3**, screen 2 of 3, Instructional Guide (step 8) and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.4, **Activity 1**, screens 1–12 of 12, Student View ● Lesson 2.1 ○ **Activity 2,** screens 3 of 3, Instructional Guide and Student View ○ **Activity 3,** screen 2 of 2, Instructional Guide, Student View, and simulation (Laboratory A mode) ● Lesson 2.2, **Activity 3,** Instructional Guide (steps 1–9) ● Lesson 3.4, **Activity 4,** Instructional Guide (steps 1–4), Student View, and Possible Responses tab ***Phase Change*** unit*:* ● Lesson 1.5, **Activity 3**, Instructional Guide (steps 1–10), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 1.6, **Activity 4**, Instructional Guide (steps 1–9), Student View, Possible Responses tab, Modeling Tool activity: Methane Lake Freezing, Modeling Tool activity: Methane Lake Evaporating, and On-the-Fly Assessment (hummingbird icon)

8.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.	***Chemical Reactions*** unit*:* ● Lesson 1.3, **Activity 4,** Instructional Guide (steps 1–7), Student View, Possible Responses tab, Sorting Tool: Evaluating Evidence, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 4,** Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.2, **Activity 3,** Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Arguments” ● Lesson 1.5, **Activity 3,** Instructional Guide (steps 6–7) and “Atomic Zoom-In: Comparing Substances at a Very Small Scale” article ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, “Printable Proposal Rubric copymaster”
8.MS-PS1-4. Develop a model that describes and predicts changes in particle motion, relative spatial arrangement, temperature, and state of a pure substance when thermal energy is added or removed.	***Force and Motion*** unit*:* ● Lesson 1.6, **Activity 3,** Instructional Guide (steps 1–9), Student View, Possible Responses tab, On-the-Fly Assessment (hummingbird icon), and Teacher Support tab (“Background, Crosscutting Concepts: Cause and Effect”) ***Phase Change*** unit*:* ● Lesson 1.6 , **Activity 4,** Instructional Guide (steps 1–9), Student View, Possible Responses tab, Modeling Tool activity: Methane Lake Freezing, Modeling Tool activity: Methane Lake Evaporating, and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 2,** screen 2 of 2, Instructional Guide (step 13) ● Lesson 4.4 ○ **Activity 4,** Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Argument”

	Thermal Energy unit*:* ● Lesson, 1.4 ○ **Activity 3,** Instructional Guide (steps 1–10), Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Differences in Temperature copymaster" ● Lesson 2.3, **Activity 5,** Teacher Support tab ("Rationale, Pedagogical Goals: Discussing the Everyday and Scientific Meanings of Heat") ● Lesson 3.3 ○ **Activity: Setting Up the Thermal Energy and Size Demo,** Instructional Guide (steps 1–10) ○ **Activity 2,** Instructional Guide (steps 1–11), Student View, Possible Responses tab, and simulation ○ **Activity 4,** screen 2 of 2, Student View, Possible Responses tab, and "Dumpling Dilemma: Oil or Water?" article ○ **Lesson Brief,** Digital Resources, "Planning and Conducting Investigations of Thermal Energy Transfer copymaster" and "Rubrics for Assessing Students' Investigations of Thermal Energy Transfer"
8.MS-PS1-5. Use a model to explain that atoms are rearranged during a chemical reaction to form new substances with new properties. Explain that the atoms present in the reactants are all present in the products and thus the total number of atoms is conserved.	***Chemical Reactions*** unit: ● Lesson 3.4 ○ **Activity 3,** Instructional Guide (steps 1–5) and Student View ○ **Lesson Brief**, Digital Resources, "Modeling Tool: Products of the Reaction copymaster" ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Assessing Students' Final Written Arguments" ● Lesson 4.4 ○ **Activity 2,** Student View and Possible Responses tab ○ **Activity 3,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "End-of-Unit Assessment

	Answer Key and Scoring Guide" ***Phase Change*** unit*:* ○ Lesson 1.6, **Activity 4,** Instructional Guide (steps 1–9), Student View, Possible Responses tab, Modeling Tool activity: Methane Lake Freezing, Modeling Tool activity: Methane Lake Evaporating, and On-the-Fly Assessment (hummingbird icon)
PS2. Motion and Stability: Forces and Interactions	
8.MS-PS2-1. Develop a model that demonstrates Newton's third law involving the motion of two colliding objects.	***Force and Motion*** unit*:* ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument" ● Lesson 4.4 ○ **Activity 2,** Student View and Possible Responses tab ○ **Activity 3,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "End-of-Unit Assessment Answer Key and Scoring Guide" ***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal,** Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster" ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, "Printable Proposal Rubric copymaster" ***Magnetic Fields*** unit*:* ● Lesson 2.4, **Activity 4,** Instructional Guide (steps 1–8), Student View, Possible Responses tab, Modeling Tool: Spacecraft Launch Energy copymaster, and On-the-Fly Assessment (hummingbird icon)

	● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Final Written Argument"
8.MS-PS2-2. Provide evidence that the change in an object's speed depends on the sum of the forces on the object (the net force) and the mass of the object.	***Force and Motion*** unit*:* ● Lesson 1.6 ○ **Activity 3,** Instructional Guide (steps 3–11), Student View, Possible Responses tab, and On-the-Fly Assessment (hummingbird icon) ○ **Activity 4,** Student View ● Lesson 2.3, **Activity 3,** Instructional Guide (steps 1–13), Student View, Possible Responses tab, Modeling Tool activity: Claim 1, Modeling Tool activity: Claim 2, Ch. 2 and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1 ○ **Activity 2,** Instructional Guide (steps 1–16), Student View, and Possible Responses tab ○ **Lesson Brief**, Digital Resources, "Rubrics for Assessing Students' Investigations of Forces on Different Objects" ***Thermal Energy*** unit*:* ● Lesson 2.4, **Activity 4,** Instructional Guide (steps 1–4), Student View, and On-the-Fly Assessment (hummingbird icon) ● Lesson 3.3 ○ **Lesson Brief** ▪ Materials and Preparation, "Preparation Before the Day of the Lesson," step 10 ▪ Digital Resources, "Planning and Conducting Investigations of Thermal Energy Transfer copymaster" and "Rubrics for Assessing Students' Investigations of Thermal Energy Transfer" ○ **Activity 4,** "Dumpling Dilemma: Oil or Water?" article ***Phase Change*** unit*:* ● Lesson 3.2 ○ **Activity 3,** Instructional Guide (steps 2–8), Student View, and "Liquid Oxygen" article

	○ **Activity 4,** Instructional Guide (steps 1–9), Student View, and simulation ***Magnetic Fields*** unit*:* ● Lesson 3.1, **Activity 2,** Instructional Guide (steps 1–13) and Student View
Technology/Engineering	
ETS2. Materials, Tools, and Manufacturing	
8.MS-ETS2-4(MA). Use informational text to illustrate that materials maintain their composition under various kinds of physical processing; however, some material properties may change if a process changes the particulate structure of a material.	***Force and Motion Engineering Internship*** unit*:* ● Ch.1, Day 3, **Activity: Revising the Egg Drop Model Designs,** Instructional Guide (steps 6–9) and Teacher Support tab ("Background, Crosscutting Concepts: Structure and Function") ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 2, **Activity 2,** and *Futura Chemical Engineer's Dossier*, "Phase Change Materials" article ● Ch.1, Day 4, **Activity: Analyzing Incubator Material,** Instructional Guide (steps 1–11) and BabyWarmer Design Tool ***Chemical Reactions*** unit*:* ○ Lesson 2.1, **Activity 5,** Student View and "Synthetic Materials: Making Substances in the Lab" article
8.MS-ETS2-5(MA). Present information that illustrates how a product can be created using basic processes in manufacturing systems, including forming, separating, conditioning, assembling, finishing, quality control, and safety. Compare the advantages and disadvantages of human vs. computer control of these processes.	***Chemical Reactions*** unit*:* ● Lesson 2.1, **Activity 4,** Instructional Guide (step 2) and On-the-Fly Assessment (hummingbird icon) ● Lesson 2.1, **Activity 5,** Student View, Teacher Support tab ("Rationale, Pedagogical Goals: Reading about Synthetic Materials," and "Assessment: Assessment Opportunity: Student Understanding of Synthetic Materials"), and "Synthetic Materials: Making Substances in the Lab" article ● Lesson 2.2, **Activity 3,** Instructional Guide (step 6) and On-the-Fly Assessment (hummingbird icon) ● Lesson 4.3 ○ **Activity 4,** Student View and Possible Responses tab

	○ **Lesson Brief**, Digital Resources, “Rubrics for Final Written Arguments” ***Harnessing Human Energy*** unit*:* ● Lesson 3.3, **Activity 2,** Instructional Guide (steps 1–13), Student View, and On-the-Fly Assessment (hummingbird icon) ● **Printable Resources, “**Print Materials (8.5” x 11”), Ed-You-Swivel Evidence Cards, pages 24–28 ***Force and Motion Engineering Internship*** unit: ● Lesson 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Lesson 7, **Lesson Brief**, Digital Resources, “Printable Proposal Rubric copymaster” ***Phase Change Engineering Internship*** unit*:* ● Ch.1, Day 9, **Activity: Finalizing the Proposal**, Possible Responses tab ● Ch.1, Day 7, **Lesson Brief**, Digital Resources, “Printable Proposal Rubric copymaster” ***Magnetic Fields*** unit: ● Lesson 4.1 ○ **Activity 4,** Instructional Guide (steps 1–12) and Student View ○ **Lesson Brief**, Digital Resources, “Science Seminar Evidence Cards A–D copymaster”