Publisher: Twig Education

Program Title: Twig Science

Components: Twig Science Teacher Editions (TE) , Twig Science Student Twig Books (TB), Leveled Readers (LR) (On-Level, Above, Below and English Learners), www.twigscience.com, www.twigsciencetools.com, www.twigsciencereporter.com

Standards Map for Kindergarten Through Grade Eight
Grade 4– Next Generation Science Standards

4-LS1 From Molecules to Organisms: Structures and Processes

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Engaging in Argument from Evidence** Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). ▪ Construct an argument with evidence, data, and/or a model. (4-LS1-1)	**KEY:** **M = Module** **DQ = Driving Question** **L = Lesson** **TE = Teacher Edition** **TB = Student Edition known as the Twig Book** **LR = Leveled Reader** **EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ1 L3 (TE pp. 22–27, TB pp. 13–14) L6 (TE pp. 42–49, TB pp. 21–24) L7 (TE pp. 50–58, TB pp. 25–26)	**4-LS1-1.** **Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.** [Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin. ****Each structure has specific functions within its associated system.**] [*Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.*]	**KEY:** **M = Module** **DQ = Driving Question** **L = Lesson** **TE = Teacher Edition** **TB = Student Edition known as the Twig Book** **LR = Leveled Reader** **EXAMPLES** **Grade 4 Module 5** **Super Survivors** M5_DQ1 L1 (TE pp. 8–13, TB pp. 3–4) L2 (TE pp. 14–21, TB pp. 5–12) L3 (TE pp. 22–27, TB pp. 13–14) L4 (TE pp. 28–33, TB pp. 15–18) L5 (TE pp. 34–41, TB pp. 19–20) L6 (TE pp. 42–49, TB pp. 21–24) L7 (TE pp. 50–58, TB pp. 25–26) Key Resources L1 **Amazing Animals: Body Coverings** video; **A Walk in the Forest** Prior-Knowledge Read-Aloud text L2 **Extreme Plants** text (TB) L4 **Parts of a Flower** video L5 **Breathing** video L6 **Eating and Drinking** video **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32)
DCI	**LS1.A: Structure and Function** ▪ Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ1 L1 (TE pp. 8–13, TB pp. 3–4) L2 (TE pp. 14–21, TB pp. 5–12) L3 (TE pp. 22–27, TB pp. 13–14) L4 (TE pp. 28–33, TB pp. 15–18) L5 (TE pp. 34–41, TB pp. 19–20) L6 (TE pp. 42–49, TB pp. 21–24) L7 (TE pp. 50–58, TB pp. 25–26) Key Resources L1 **Amazing Animals: Body Coverings** video		

		L4 **Parts of a Flower** video L5 **Breathing** video L6 **Eating and Drinking** video **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46) Key Resources L1 **Super Hearing** video L2 **Touch** video L3 **Super Sniffers** video		L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46) Key Resources L1 **Super Hearing** video L2 **Touch** video L3 **Super Sniffers** video **Grade 4 Module 5** **Leveled Reader: Amazing Animal Senses** Chapter 1 (LR 2–14)
CCC	**Systems and System Models** ▪ A system can be described in terms of its components and their interactions. (4-LS1-1)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ1 L5 (TE pp. 34–41, TB pp. 19–20) L6 (TE pp. 42–49, TB pp. 21–24) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Developing and Using Models**	**EXAMPLE ONE** **Grade 4 Module 5**	**4-LS1-2.**	**EXAMPLES** **Grade 4 Module 5**

	Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ▪ Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)	**Super Survivors** M5_DQ4 L2 (TE pp. 160–165, TB pp. 73–74) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36)	**Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.** [Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]	**Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46) Key Resources L1 **Super Hearing** video L2 **Touch** video L3 **Super Sniffers** video **Grade 4 Module 5** **Super Survivors** M5_DQ4 L1 (TE pp. 150–159, TB pp. 69–72) L3 (TE pp. 166–173, TB pp. 75–82) L4 (TE pp. 174–181, TB pp. 83–84) L5 (TE pp. 182–187, TB pp. 85–86) L6 (TE pp. 188–193, TB pp. 87–90) Key Resources L1 **Optical Illusions** video, **Selective Sight** video L3 **Bees: Super Sensors, Super Learners** text (TB) L5 **Prey Responses** video L6 **Dragonfly Reaction Time** video **Grade 4 Module 5** **Super Survivors** **Animal Senses** Benchmark Assessment (TE pp. 194–197) **Grade 4 Module 5** **Leveled Reader: Amazing Animal Senses** Chapter 1 (LR 2–14)
DCI	**LS1.D: Information Processing** ▪ Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46) Key Resources L1 **Super Hearing** video L2 **Touch** video L3 **Super Sniffers** video		
CCC	**Systems and System Models** ▪ A system can be described in terms of its components and their interactions. (4-LS1-2)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ2 L1 (TE pp. 64–71, TB pp. 29–32) L2 (TE pp. 72–79, TB pp. 33–34) L3 (TE pp. 80–87, TB pp. 35–36) L4 (TE pp. 88–96, TB pp. 37–46) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ1 L4 (TE pp. 28–33, TB pp. 15–18) L5 (TE pp. 34–41, TB pp. 19–20)		

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4-ESS1 Earth's Place in the Universe

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ▪ Identify the evidence that supports particular points in an explanation. (4-ESS1-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ2 L2 (TE pp. 46–52, TB pp. 19–24) L3 (TE pp. 54–61, TB pp. 25–31) L4 (TE pp. 62–68, TB pp. 32–34)	**4-ESS1-1.** **Identify evidence from patterns in rock formations and fossils in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.** [Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [*Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.*]	**EXAMPLES** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_ DQ2 L1 (TE pp. 40–45, TB pp. 17–18) L2 (TE pp. 46–52, TB pp. 19–24) L3 (TE pp. 54–61, TB pp. 25–31) L4 (TE pp. 62–68, TB pp. 32–34) Key Resources L1 **Rock Layers** investigation L2 **Layers of Time: Part 1** video L3 **Layers of Time: Part 2** video L4 **How Did the Grand Canyon Form?** video **Grade 4 Module 3** **Leveled Reader: Sculpting Landscapes** Chapter 1 (LR 2–14)
DCI	**ESS1.C: The History of Planet Earth** ▪ Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ2 L1 (TE pp. 40–45, TB pp. 17–18) L2 (TE pp. 46–52, TB pp. 19–24) L3 (TE pp. 54–61, TB pp. 25–31) L4 (TE pp. 62–68, TB pp. 32–34) Key Resources L1 **Rock Layers** investigation **EXAMPLE TWO** **Grade 4 Module 3** **Leveled Reader: Sculpting Landscapes** Chapter 1 (LR 2–14)		

CCC	**Patterns** ▪ Patterns can be used as evidence to support an explanation. (4-ESS1-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ2 L1 (TE pp. 40–45, TB pp. 17–18) L2 (TE pp. 46–52, TB pp. 19–24) L3 (TE pp. 54–61, TB pp. 25–31) L4 (TE pp. 62–68, TB pp. 32–34) Key Resources L1 **Rock Layers** investigation		
CCC	***Connections to Nature of Science*** ***Scientific Knowledge Assumes an Order and Consistency in Natural Systems*** ▪ Science assumes consistent patterns in natural systems. (4-ESS1-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ2 L1 (TE pp. 40–45, TB pp. 17–18) L2 (TE pp. 46–52, TB pp. 19–24) L4 (TE pp. 62–68, TB pp. 32–34) **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L2 (TE pp. 14–21, TB pp. 5–6)		

4-ESS2 Earth's Systems

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38)	**4-ESS2-1.** **Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.** [Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of	**EXAMPLES** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L1 (TE pp. 6–13, TB pp. 3–4)

	test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ▪ Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)	L2 (TE pp. 84–91, TB pp. 39–40) L3 (TE pp. 92–97, TB pp. 41–43) Key Resources L1–3 **Stream Tray** model **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L2 (TE pp. 118–125, TB pp. 49–50) L3 (TE pp. 126–131, TB pp. 51–54) L5 (TE pp. 138–145, TB pp. 58–61) **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L2 (TE pp. 14–21, TB pp. 5–6)	vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [*Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]*	L2 (TE pp. 14–21, TB pp. 5–6) L3 (TE pp. 22–27, TB pp. 7–12) L4 (TE pp. 28–34, TB pp. 13–14) Key Resources L2 **Time-Lapse Tour** interactive; **Our Changing Planet** Prior-Knowledge Read-Aloud text L4 **Time-Traveling Tour Guides Trailer** video **Grade 4 Module 3** **Sculpting Landscapes** Benchmark Assessment (TE pp. 168–173) Key Resources **Erosion and Weathering** video **Grade 4 Module 3** **Leveled Reader: Sculpting Landscapes** Chapter 3 (LR 22–30) **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38) L2 (TE pp. 84–91, TB pp. 39–40) L3 (TE pp. 92–97, TB pp. 41–43) L4 (TE pp. 98–102, TB pp. 44) Key Resources L1–3 **Stream Tray** model **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L1 (TE pp. 110–117, TB pp. 47–48) L2 (TE pp. 118–125, TB pp. 49–50) L3 (TE pp. 126–131, TB pp. 51–54) L4 (TE pp. 132–137, TB pp. 55–57) L5 (TE pp. 138–145, TB pp. 58–61) L6 (TE pp. 146–153, TB pp. 62–64) Key Resources L2 **El Capitan** video; **Glacial Erosion** model L3 **Wind Erosion** model; **Wind Erosion** video
DCI	**ESS2.A: Earth Materials and Systems** ▪ Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L1 (TE pp. 110–117, TB pp. 47–48) L2 (TE pp. 118–125, TB pp. 49–50) L3 (TE pp. 126–131, TB pp. 51–54) L4 (TE pp. 132–137, TB pp. 55–57) L5 (TE pp. 138–145, TB pp. 58–61) L6 (TE pp. 146–153, TB pp. 62–64) **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1		

		L1 (TE pp. 6–13, TB pp. 3–4) L2 (TE pp. 14–21, TB pp. 5–6) L4 (TE pp. 28–34, TB pp. 13–14) **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38) L2 (TE pp. 84–91, TB pp. 39–40) L3 (TE pp. 92–97, TB pp. 41–43) L4 (TE pp. 98–102, TB pp. 44) Key Resources L1–3 **Stream Tray** model L3 **The Power of Water** video		
DCI	**ESS2.E: Biogeology** ▪ Living things affect the physical characteristics of their regions. (4-ESS2-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L1 (TE pp. 6–13, TB pp. 3–4) L2 (TE pp. 14–21, TB pp. 5–6) L3 (TE pp. 22–27, TB pp. 7–12) Key Resources L2 **Time-Lapse Tour** interactive **Our Changing Planet** Prior-Knowledge Read-Aloud text **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L2 (TE pp. 84–91, TB pp. 39–40) **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4		

		L6 (TE pp. 146–153, TB pp. 62–64)		
CCC	**Cause and Effect** ▪ Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L1 (TE pp. 110–117, TB pp. 47–48) L2 (TE pp. 118–125, TB pp. 49–50) L5 (TE pp. 138–145, TB pp. 58–61) L6 (TE pp. 146–153, TB pp. 62–64) **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L1 (TE pp. 6–13, TB pp. 3–4) L2 (TE pp. 14–21, TB pp. 5–6) L3 (TE pp. 22–27, TB pp. 7–12) **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38) L2 (TE pp. 84–91, TB pp. 39–40) L3 (TE pp. 92–97, TB pp. 41–43) L4 (TE pp. 98–102, TB pp. 44) **EXAMPLE FOUR** **Grade 4 Module 3** **Sculpting Landscapes** Benchmark Assessment (TE pp. 168–173) Key Resources **Erosion and Weathering** video		

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Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Analyzing and Interpreting Data** Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used. ▪ Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ2 L1 (TE pp. 48–54, TB pp. 23–25) L2 (TE pp. 56–63, TB pp. 26–29) L3 (TE pp. 64–71, TB pp. 30–32) Key Resources L1–3 **Earth Explorer** interactive **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** **Analyzing Maps** Benchmark Assessment TE pp. 88–91 **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38)	**4-ESS2-2.** **Analyze and interpret data from maps to describe patterns of Earth's features.** [Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]	**EXAMPLES** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ2 L1 (TE pp. 48–54, TB pp. 23–25) L2 (TE pp. 56–63, TB pp. 26–29) L3 (TE pp. 64–71, TB pp. 30–32) Key Resources L1-3 **Earth Explorer** interactive L3 **Where on Earth are You?** video L4 **California Earthquakes** text (TB) **Grade 4 Module 4** **Earthquake Engineering** **Analyzing Maps** Benchmark Assessment TE pp. 88–91 **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ1 L2 (TE pp. 14–21, TB pp. 5–6) **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ3 L1 (TE pp. 74–82, TB pp. 37–38) **Grade 4 Module 4** **Leveled Reader: Shake, Rattle, and Roll** Chapter 1 (LR 2–15)
DCI	**ESS2.B: Plate Tectonics and Large-Scale System Interactions** ▪ The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur in bands that are often along the boundaries between continents and oceans. Major mountain chains form inside	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ2 L1 (TE pp. 48–54, TB pp. 23–25) L2 (TE pp. 56–63, TB pp. 26–29) L3 (TE pp. 64–71, TB pp. 30–32) L4 (TE pp. 72–79, TB pp. 33–38) L5 (TE pp. 80–87, TB pp. 39–46) Key Resources L1–3 **Earth Explorer** interactive L4 **California Earthquakes** text (TB) **EXAMPLE TWO**		

	continents or near their edges. Maps can help locate the different land and water features areas of Earth. (4-ESS2-2)	**Grade 4 Module 4** **Earthquake Engineering** **Analyzing Maps** Benchmark Assessment TE pp. 88–91		
CCC	**Patterns** ▪ Patterns can be used as evidence to support an explanation. (4-ESS2-2)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ2 L1 (TE pp. 48–54, TB pp. 23–25) L2 (TE pp. 56–63, TB pp. 26–29) L3 (TE pp. 64–71, TB pp. 30–32) L4 (TE pp. 72–79, TB pp. 33–38) L5 (TE pp. 80–87, TB pp. 39–46) Key Resources L1–3 **Earth Explorer** interactive L4 **California Earthquakes** text (TB) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** **Analyzing Maps** Benchmark Assessment TE pp. 88–91		

4-ESS3 Earth and Human Activity

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Obtaining, Evaluating, and Communicating Information** Obtaining, evaluating, and communicating information in 3–5	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L1 (TE pp. 128–135, TB pp. 59–68)	**4-ESS3-1.** **Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses**	**EXAMPLES** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1

	builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods. ▪ Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)	L2 (TE pp. 136–141, TB pp. 69–70) L3 (TE pp. 142–149, TB pp. 71–76) L4 (TE pp. 150–155, TB pp. 77–79) L5 (TE pp. 156–161, TB pp. 80–81) L6 (TE pp. 162–166, TB pp. 82–83) L7 (TE pp. 168–173, TB pp. 84–86) Key Resources L1 **Energy in The United States** text (TB) L3 **Fuels** video; **Fossil Fuels** text (TB) **EXAMPLE TWO** **Grade 4 Module 2** **Benchmark Assessment: Nuclear Energy** TE pp. 174–178 **EXAMPLE THREE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L1 (TE pp. 58–63, TB pp. 25–32) L5 (TE pp. 82–87, TB pp. 39–44) L9 (TE pp. 110–114, TB pp. 51–53) L10 (TE pp. 116–120, TB pp. 54–56) Key Resources L1 **Solar Power** video L5 **Wind Turbines** video; **Interview with Dr. Anoushka Sivaraman** text (TB)	**affect the environment.** [Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]	L3 (TE pp. 20–25, TB pp. 7–13) **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L1 (TE pp. 58–63, TB pp. 25–32) L5 (TE pp. 82–87, TB pp. 39–44) L9 (TE pp. 110–114, TB pp. 51–53) L10 (TE pp. 116–120, TB pp. 54–56) Key Resources L1 **Solar Power** video L5 **Wind Turbines** video; **Interview with Dr. Anoushka Sivaraman** text (TB) L9 **Wind Turbine** evaluation L10 **Hydroelectric Power Station** video **Grade 4 Module 2** **Leveled Reader: Renewable Energy** Chapter 1 (LR 2–13) **Module 4.2** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L1 (TE pp. 128–135, TB pp. 59–68) L2 (TE pp. 136–141, TB pp. 69–70) L3 (TE pp. 142–149, TB pp. 71–76) L4 (TE pp. 150–155, TB pp. 77–79) L5 (TE pp. 156–161, TB pp. 80–81) L6 (TE pp. 162–166, TB pp. 82–83) L7 (TE pp. 168–173, TB pp. 84–86) Key Resources L1 **Energy in The United States** text (TB) L3 **Fuels** video; **Fossil Fuels** text (TB) L5 **Energy Debate** video L6 **Energy Debate** Activity **Grade 4 Module 2 Benchmark Assessment: Nuclear Energy** TE pp. 174–178
DCI	**ESS3.A: Natural Resources** ▪ Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L1 (TE pp. 58–63, TB pp. 25–32) L5 (TE pp. 82–87, TB pp. 39–44) L10 (TE pp. 116–120, TB pp. 54–56)		

	ways. Some resources are renewable over time, and others are not. (4-ESS3-1)	**EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L1 (TE pp. 128–135, TB pp. 59–68) L2 (TE pp. 136–141, TB pp. 69–70) L3 (TE pp. 142–149, TB pp. 71–76) L4 (TE pp. 150–155, TB pp. 77–79) L5 (TE pp. 156–161, TB pp. 80–81) L6 (TE pp. 162–166, TB pp. 82–83) L7 (TE pp. 168–173, TB pp. 84–86) Key Resources L1 **Energy in The United States** text (TB) L3 **Fuels** video; **Fossil Fuels** text (TB) **EXAMPLE THREE** **Grade 4 Module 2** **Benchmark Assessment: Nuclear Energy** TE pp. 174–178 **EXAMPLE FOUR** **Grade 4 Module 2** **Leveled Reader: Renewable Energy** Chapter 3 (LR 22–29)		
CCC	**Cause and Effect** ▪ Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L2 (TE pp. 136–141, TB pp. 69–70) L3 (TE pp. 142–149, TB pp. 71–76) L4 (TE pp. 150–155, TB pp. 77–79) L5 (TE pp. 156–161, TB pp. 80–81) L6 (TE pp. 162–166, TB pp. 82–83) L7 (TE pp. 168–173, TB pp. 84–86)		

		EXAMPLE TWO **Grade 4 Module 2** **Benchmark Assessment: Nuclear Energy** TE pp. 174–178		
CCC	***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L5 (TE pp. 82–87, TB pp. 39–44) L9 (TE pp. 110–114, TB pp. 51–53) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L7 (TE pp. 168–173, TB pp. 84–86)		
CCC	**Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L1 (TE pp. 58–63, TB pp. 25–32) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L1 (TE pp. 128–135, TB pp. 59–68) L6 (TE pp. 162–166, TB pp. 82–83)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	**Publisher Citations**	**Performance Expectation**	**Publisher Citations**

SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ▪ Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) L3 (TE pp. 140–144, TB pp. 74–76) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L3 (TE pp. 162–167, TB pp. 83–89) L4 (TE pp. 168–173, TB pp. 90–92) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L3 (TE pp. 192–194, TB p. 98–99) **EXAMPLE FOUR** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64)	**4-ESS3-2.** **Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*** [Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [*Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.*]	**EXAMPLES** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) L3 (TE pp. 140–144, TB pp. 74–76) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L2 (TE pp. 156–161, TB pp. 81–82) L3 (TE pp. 162–167, TB pp. 83–89) L4 (TE pp. 168–173, TB pp. 90–92) Key Resources L2 **LAX Engineer** video L3 **Made in Japan: Earthquake-Proof Homes** text (TB) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99) **Grade 4 Module 3** **Sculpting Landscapes** Benchmark Assessment (TE pp. 168–173) Key Resources **Erosion and Weathering** video **Grade 4 Module 4** **Earthquake Solutions** Benchmark Assessment TE pp. 174–177
DCI	**ESS3.B: Natural Hazards** ▪ A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) (Note: This	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L2 (TE pp. 156–161, TB pp. 81–82) L4 (TE pp. 168–173, TB pp. 90–92) **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4		

	Disciplinary Core Idea can also be found in 3.WC.)	L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64) **EXAMPLE THREE** **Grade 4 Module 3** **Leveled Reader: Sculpting Landscapes** Chapter 1 (LR 2–13)		**Grade 4 Module 4** **Leveled Reader: Shake, Rattle, and Roll** Chapter 3 (LR 22–30)
DCI	**ETS1.B: Designing Solutions to Engineering Problems** ▪ Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) L3 (TE pp. 140–144, TB pp. 74–76) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L2 (TE pp. 156–161, TB pp. 81–82) L3 (TE pp. 162–167, TB pp. 83–89) L4 (TE pp. 168–173, TB pp. 90–92) Key Resources L2 **LAX Engineer** video L3 **Made in Japan: Earthquake-Proof Homes** text (TB) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99) **EXAMPLE FOUR** **Grade 4 Module 3** **Time-Traveling Tour Guide**		

		M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64)		
CCC	**Cause and Effect** ▪ Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3-2)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L6 (TE pp. 146–153, TB pp. 62–64) **EXAMPLE TWO** **Grade 4 Module 3** **Sculpting Landscapes** Benchmark Assessment (TE pp. 168–173) Key Resources **Erosion and Weathering** video **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Solutions** Benchmark Assessment TE pp. 174–177		
CCC	***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L2 (TE pp. 156–161, TB pp. 81–82) L3 (TE pp. 162–167, TB pp. 83–89) Key Resources L2 **LAX Engineer** video L3 **Made in Japan: Earthquake-Proof Homes** text (TB) **EXAMPLE TWO** **Grade 4 Module 3** **Time-Traveling Tour Guide**		

	meet societal demands. (4-ESS3-2)	M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64)		

4-PS3 Energy

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ▪ Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ1 L2 (TE Spark, p. 69, TB pp. 19–20) **EXAMPLE TWO** **Grade 4 Module 1** **Egg Racers** M1_DQ2 L1 (TE Investigate, p. 103, TB pp. 35–36) L3 (TE Reflect, p. 121, TB p. 41) **EXAMPLE THREE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L3 (TE Investigate and Reflect, pp. 155–157, TB pp. 54–55)	**4-PS3-1.** **Use evidence to construct an explanation relating the speed of an object to the energy of that object. [**Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.]** [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]	**EXAMPLES** **Grade 4 Module 1** **Egg Racers** M1_DQ1 L2 (TE Spark, p. 69, TB pp. 19–20) L5 (TE Investigate p. 91, TB pp. 30) Key Resources L3 **Energy All Around** text (TB) L4 **Transferring Energy** investigation L5 **Balloon Car** investigation **Grade 4 Module 1** **Egg Racers** M1_DQ2 L1 (TE Report p. 105, TB pp. 35–36) L2 (TE Investigate and Report pp. 112–114, TB pp. 37–40) L3 (TE, 116–121, TB p. 41) L4 (TE, 122–127, TB pp. 42–44) Key Resources L1 **Energy Stations** investigation L2 **Rubber-Band-Powered Car** investigation **Grade 4 Module 1** **Egg Racers** M1_DQ3 L3 (TE, 155–158, TB pp. 54–56)
DCI	**PS3.A: Definitions of Energy** ▪ The faster a given object is moving, the more energy it possesses. (4-PS3-1)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ1 L2 (TE Spark, p. 68, TB pp. 19–20) L3 (TE Investigate, pp. 76–77, TB pp. 21–26)		

		L5 (TE Investigate, pp. 90–91, TB pp. 30) **EXAMPLE TWO** **Grade 4 Module 1** **Egg Racers** M1_DQ2 L1 (TE pp. 100–107, TB pp. 35–36) L2 (TE pp. 108–115, TB pp. 37–40) L3 (TE pp. 116–121, TB p. 41) L4 (TE Spark and Investigate, pp. 124–125, TB pp. 42–43) **EXAMPLE THREE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L3 (TE Investigate and Report, pp. 155–157, TB pp. 54–55)		**Grade 4 Module 1** **Leveled Reader: The Science of Baseball** Chapter 3 (LR 22–30)
CCC	**Energy and Matter** ▪ Energy can be transferred in various ways and between objects. (4-PS3-1)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ1 L2 (TE pp. 66–73, TB pp. 20) L3 (TE pp. 74–79, TB pp. 21–26) L4 (TE pp. 80–87, TB pp. 27–29) L5 (TE Connect, p. 93, TB pp. 31–32) Key Resources L3 **Energy All Around** text (TB) L4 **Transferring Energy** investigation L5 **Balloon Car** investigation **EXAMPLE TWO** **Grade 4 Module 1** **Egg Racers** M1_DQ2 L1 (TE, pp. 102–107, TB pp. 35–36)		

		L2 (TE, pp. 108–115, TB pp. 37–40) L3 (TE, pp. 116–121, TB p. 41) L4 (TE Spark and Investigate, pp. 124–125, TB pp. 42–44) **EXAMPLE THREE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L3 (TE Investigate, Report, and Connect, pp. 155-158, TB pp. 54–55)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ▪ Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (4-PS3-2)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L4 (TE pp. 26–31, TB pp. 14–15) L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50) Key Resources L6 **Building Wind Turbine** model L7 **Improving Wind Turbine** model L8 **Testing Wind Turbine** model **EXAMPLE THREE** **Grade 4 Module 5** **Super Survivors**	**4-PS3-2.** **Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.** [Assessment Boundary: Assessment does not include quantitative measurements of energy.]	**EXAMPLES** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L1 (TE pp. 8–13, TB pp. 3–4) L2 (TE pp. 14–19, TB pp. 5–6) L3 (TE pp. 20–25, TB pp. 7–13) L4 (TE pp. 26–31, TB pp. 14–15) L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) L7 (TE pp. 44–50, TB pp. 20–22) Key Resources L1 **Humans and Earth** Prior-Knowledge Read-Aloud text; **Sparks Energy, Inc. Trailer** video L2 **Wind and Water Power** video L3 **How Can We Use the Sun's Energy?** text (TB) L4 **Melting Ice** investigation L5 **Solar Cookers** interactive **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2

		M5_DQ5 L1 (TE pp. 206–213, TB pp. 93–96) L4 (TE pp. 230–239, TB pp. 107–110) Key Resources L1 **Save Our Ship** video		L2 (TE pp. 64–69, TB pp. 33–34) L3 (TE pp. 70–75, TB pp. 35–36) L4 (TE pp. 76–81, TB pp. 37–38) L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50) Key Resources L3 **Building Circuits** investigation L4 **Building Circuits** investigation L6 **Building Wind Turbine** model L7 **Improving Wind Turbine** model L8 **Testing Wind Turbine** model **Grade 4 Module 5** **Super Survivors** M5_DQ5 L1 (TE pp. 206–213, TB pp. 93–96) L2 (TE pp. 214–221, TB pp. 97–104) L3 (TE pp. 222–229, TB pp. 105–106) L4 (TE pp. 230–239, TB pp. 107–110) L7 (TE pp. 254–260, TB pp. 117–118) Key Resources L1 **Save Our Ship** video L2 **Long Distance Communication** text (TB) L4 **How Do Sounds Travel?** video
DCI	**PS3.A: Definitions of Energy** ▪ Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L1 (TE pp. 8–13, TB pp. 3–4) L2 (TE pp. 14–19, TB pp. 5–6) L3 (TE pp. 20–25, TB pp. 7–13) L4 (TE pp. 26–31, TB pp. 14–15) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L3 (TE pp. 70–75, TB pp. 35–36) L4 (TE pp. 76–81, TB pp. 37–38) **EXAMPLE THREE** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L1 (TE pp. 206–213, TB pp. 93–96) L2 (TE pp. 214–221, TB pp. 97–104) L4 (TE pp. 230–239, TB pp. 107–110) L7 (TE pp. 254–260, TB pp. 117–118)		
DCI	**PS3.B: Conservation of Energy and Energy Transfer** ▪ Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L2 (TE pp. 14–19, TB pp. 5–6) L4 (TE pp. 26–31, TB pp. 14–15) L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) **EXAMPLE TWO**		

	motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2) ▪ Light also transfers energy from place to place. (4-PS3-2) ▪ Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2)	**Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L2 (TE pp. 64–69, TB pp. 33–34) L3 (TE pp. 70–75, TB pp. 35–36) L4 (TE pp. 76–81, TB pp. 37–38) L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) **EXAMPLE THREE** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L1 (TE pp. 206–213, TB pp. 93–96) L2 (TE pp. 214–221, TB pp. 97–104) L3 (TE pp. 222–229, TB pp. 105–106) L4 (TE pp. 230–239, TB pp. 107–110) L7 (TE pp. 254–260, TB pp. 117–118)		
CCC	**Energy and Matter** ▪ Energy can be transferred in various ways and between objects. (4-PS3-2)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L2 (TE pp. 14–19, TB pp. 5–6) L3 (TE pp. 20–25, TB pp. 7–13) L4 (TE pp. 26–31, TB pp. 14–15) L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) L7 (TE pp. 44–50, TB pp. 20–22) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L2 (TE pp. 64–69, TB pp. 33–34) L3 (TE pp. 70–75, TB pp. 35–36) L6 (TE pp. 88–94, TB pp. 45–46)		

		L8 (TE pp. 104–109, TB pp. 49–50) **EXAMPLE THREE** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L1 (TE pp. 206–213, TB pp. 93–96) L4 (TE pp. 230–239, TB pp. 107–110) L7 (TE pp. 254–260, TB pp. 117–118)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Asking Questions and Defining Problems** Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. ▪ Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L1 (TE Investigate, pp. 138–139, TB pp. 47–48) L2 (TE Spark and Investigate, pp. 146–147, TB pp. 51–52) L3 (TE Reflect p. 159, TB pp. 56) **EXAMPLE TWO** **Grade 4 Module 1** **Egg Racers** M1_DQ4 L2 (TE Investigate, p. 187, TB pp. 63)	**4-PS3-3.** **Ask questions and predict outcomes about the changes in energy that occur when objects collide.** [Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]	**EXAMPLES** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L1 (TE Investigate, pp. 138–139, TB pp. 47–48) L2 (TE Spark and Investigate, pp. 146–147, TB pp. 51–52) L3 (TE Investigate and Report, 155–157, TB pp. 54–56) **Grade 4 Module 1** **Golf Ball** Benchmark Assessment (TE pp. 166–169) **Grade 4 Module 1** **Egg Racers** M1_DQ4 L1 (TE Spark and Investigate, pp. 178–180, TB pp. 61–62) L2 (TE Report, p. 188, TB pp. 63–64) L3 (TE Reflect, p.197, TB pp. 65–66) L4 (TE Investigate, p. 201, TB pp. 67–68) L5 (TE Investigate, p. 205, TB p. 70)
DCI	**PS3.A: Definitions of Energy** ▪ Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-3)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L3 (TE Investigate, Report, and Reflect, pp. 155–158, TB pp. 54–55)		

		EXAMPLE TWO **Grade 4 Module 1** **Egg Racers** M1_DQ4 L1 (TE Spark, p. 178, TB pp. 61–62) L5 (TE Investigate and Connect, pp. 205–206, TB p. 70)		**Grade 4 Module 1** **Leveled Reader: The Science of Baseball** Chapter 1 (LR pp. 2–15)
DCI	**PS3.B: Conservation of Energy and Energy Transfer** ▪ Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-3)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L1 (TE, pp. 134–143, TB pp. 49–50) L2 (TE, pp. 144–151, TB pp. 51–53) L3 (TE, pp. 152–159, TB pp. 54–56) L4 (TE, pp. 160–165, TB pp. 57–58) **EXAMPLE TWO** **Grade 4 Module 1** **Benchmark Assessment: Motion and Energy in Golf Balls** (TE pp. 166–169) **EXAMPLE THREE** **Grade 4 Module 1** **Leveled Reader: The Science of Baseball** Chapter 1 (LR pp. 2–15)		
DCI	**PS3.C: Relationship Between Energy and Forces** ▪ When objects collide, the contact forces transfer energy so as to change the objects'	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L2 (TE Investigate and Report, pp. 147–148, TB pp. 51–53)		

	motions. (4-PS3-3)	L3 (TE Investigate and Report, pp. 155–157, TB pp. 54–56) L4 (TE Report, p. 164, TB pp. 57–58) **EXAMPLE TWO** **Grade 4 Module 1** **Egg Racers** M1_DQ4 L1 (TE Spark, p. 178, TB pp. 61–62) L2 (TE Investigate, pp. 186–187, TB pp. 63–64) L3 (TE Investigate, pp. 194–195, TB pp. 65–66) L4 (TE Investigate and Reflect, pp. 200–201, TB pp. 67–69) L5 (TE, pp. 202–206, TB p. 70) **EXAMPLE THREE** **Grade 4 Module 1** **Leveled Reader: The Science of Baseball** Chapter 1 (LR pp. 2–15)		
CCC	**Energy and Matter** ▪ Energy can be transferred in various ways and between objects. (4-PS3-3)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ3 L1 (TE pp. 134–143, TB pp. 47–50) L2 (TE Report, pp. 148–149, TB pp. 51–53) L3 (TE Investigate, Report, and Connect, pp. 155–158, TB pp. 54–56) L4 (TE Spark, p. 164, TB pp. 57–58) **EXAMPLE TWO** **Grade 4 Module 1**		

		Benchmark Assessment: Motion and Energy in Golf Balls (TE pp. 166–169) **EXAMPLE THREE** **Grade 4 Module 1** **Egg Racers** M1_DQ4 L1 (TE Spark and Investigate, pp. 178–179, TB pp. 61–62) L2 (TE Spark and Investigate, pp. 186–187, TB pp. 63–64) L3 (TE Report and Reflect, p. 197, TB pp. 65–66) L4 (TE Investigate and Reflect, 200–201, TB pp. 67–68) L5 (TE, pp. 204–206, TB p. 70)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		**Publisher Citations**	**Performance Expectation**	**Publisher Citations**
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ▪ Apply scientific ideas to solve design problems. (4-PS3-4)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50)	**4-PS3-4.** **Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*** [Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]	**EXAMPLES** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) L7 (TE pp. 44–50, TB pp. 20–22) Key Resources L5–6 **Solar Cookers** interactive **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50) Key Resources L6 **Building Wind Turbine** model L7 **Improving Wind Turbine** model L8 **Testing Wind Turbine** model
DCI	**PS3.B: Conservation of Energy and Energy Transfer** ▪ Energy can also be transferred	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2		

	from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-4)	L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50)		**Grade 4 Module 2.** **Leveled Reader: Renewable Energy** Chapter 3 (LR 22–29)
DCI	**PS3.D: Energy in Chemical Processes and Everyday Life** ▪ The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L3 (TE pp. 70–75, TB pp. 35–36) L6 (TE pp. 88–94, TB pp. 45–46) L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ3 L1 (TE pp. 128–135, TB pp. 59–68)		
DCI	**ETS1.A: Defining Engineering Problems** ▪ Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L7 (TE pp. 96–103, TB pp. 47–48) L8 (TE pp. 104–109, TB pp. 49–50)		

	the constraints into account. (secondary to 4-PS3-4)			
CCC	**Energy and Matter** ▪ Energy can be transferred in various ways and between objects. (4-PS3-4)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) L7 (TE pp. 44–50, TB pp. 20–22) **EXAMPLE TWO** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L6 (TE pp. 88–94, TB pp. 45–46) L8 (TE pp. 104–109, TB pp. 49–50)		
CCC	***Connections to Engineering, Technology, and Applications of Science*** **Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers improve existing technologies or develop new ones. (4-PS3-4)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L7 (TE pp. 44–50, TB pp. 20–22)		
CCC	***Connections to Nature of Science*** **Science is a Human Endeavor** ▪ Most scientists and engineers work in teams. (4-PS3-4) ▪ Science affects everyday life. (4-PS3-4)	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L8 (TE pp. 104–109, TB pp. 49–50) **EXAMPLE TWO** **Grade 4 Group Work Week** M0_DQ1 L1 (TE pp. 6–13, TB pp. 3–4) L2 (TE pp. 14–19, TB p. 5) L5 (TE pp. 34–39, TB pp. 9–10)		

		L7 (TE pp. 46–51, TB pp. 13–14)		

4-PS4 Waves and their Applications in Technologies for Information Transfer

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ▪ Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L2 (TE pp. 12–19, TB pp. 5–6) L3 (TE pp. 20–27, TB pp. 7–9) L4 (TE pp. 28–33, TB pp. 10–12) Key Resources L4 **Making Waves** interactive **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L5 (TE pp. 240–245, TB pp. 111–112) L6 (TE pp. 246–253, TB pp. 113–116) L7 (TE pp. 254–260, TB pp. 117–118) Key Resources L6 **Waves Breakers** interactive	**4-PS4-1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.** [Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [*Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]*	**EXAMPLES** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L2 (TE pp. 12–19, TB pp. 5–6) L3 (TE pp. 20–27, TB pp. 7–9) L4 (TE pp. 28–33, TB pp. 10–12) L5 (TE pp. 34–41, TB pp. 13–20) Key Resources L4 **Making Waves** interactive L5 **How Big Was That Earthquake?** text **Grade 4 Module 5** **Super Survivors** M5_DQ5 L5 (TE pp. 240–245, TB pp. 111–112) L6 (TE pp. 246–253, TB pp. 113–116) L7 (TE pp. 254–260, TB pp. 117–118) Key Resources L6 **Wave Breakers** interactive **Grade 4 Module 5** **Super Survivors** **Driving Question 6** M5_DQ6 L5 (TE pp. 294–301, TB pp. 133–136)
SEP	***Connections to Nature of Science*** **Scientific Knowledge is Based on Empirical Evidence** ▪ Science findings are based on recognizing patterns. (4-PS4-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L3 (TE pp. 20–27, TB pp. 7–9)		

DCI	**PS4.A: Wave Properties** ▪ Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1) ▪ Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L2 (TE pp. 12–19, TB pp. 5–6) L3 (TE pp. 20–27, TB pp. 7–9) L4 (TE pp. 28–33, TB pp. 10–12) L5 (TE pp. 34–41, TB pp. 13–20) Key Resources L4 **Making Waves** interactive L5 **How Big Was That Earthquake?** text (TB) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L5 (TE pp. 240–245, TB pp. 111–112) L6 (TE pp. 246–253, TB pp. 113–116) L7 (TE pp. 254–260, TB pp. 117–118) Key Resources L6 **Wave Breakers** interactive		
CCC	**Patterns** ▪ Similarities and differences in patterns can be used to sort, classify and analyze simple rates of change for natural phenomena. (4-PS4-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L2 (TE pp. 12–19, TB pp. 5–6) L3 (TE pp. 20–27, TB pp. 7–9) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ5 L6 (TE pp. 246–253, TB pp. 113–116) L7 (TE pp. 254–260, TB pp. 117–118)		

Science and Engineering Practices Disciplinary Core Ideas	Publisher Citations	Performance Expectation	Publisher Citations

Crosscutting Concepts				
SEP	**Developing and Using Models** Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions. ▪ Develop a model to describe phenomena. (4-PS4-2)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ3 L1 (TE pp. 102–109, TB pp. 49–52) L2 (TE pp. 110–117, TB pp. 53–54) L3 (TE pp. 118–123, TB pp. 55–56) L4 (TE pp. 124–131, TB pp. 57–60) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ4 L2 (TE pp. 160–165, TB pp. 73–74)	**4-PS4-2.** **Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.** [*Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.*]	**EXAMPLES** **Grade 4 Module 5** **Super Survivors** M5_DQ3 L1 (TE pp. 102–109, TB pp. 49–52) L2 (TE pp. 110–117, TB pp. 53–54) L3 (TE pp. 118–123, TB pp. 55–56) L4 (TE pp. 124–131, TB pp. 57–60) L5 (TE pp. 132–137, TB pp. 61–66) Key Resources L5 **Light Entering the Eye** video **Grade 4 Module 5** **Super Survivors** M5_DQ4 L2 (TE pp. 160–165, TB pp. 73–74) **Grade 4 Module 5** **Super Survivors** **Benchmark Assessment:** Light Reflections (TE pp. 138–141)
DCI	**PS4.B: Electromagnetic Radiation** ▪ An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ3 L1 (TE pp. 102–109, TB pp. 49–52) L2 (TE pp. 110–117, TB pp. 53–54) L3 (TE pp. 118–123, TB pp. 55–56) L4 (TE pp. 124–131, TB pp. 57–60) L5 (TE pp. 132–137, TB pp. 61–66) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ4 L2 (TE pp. 160–165, TB pp. 73–74)		
CCC	**Cause and Effect** Cause and effect relationships are routinely identified.	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ3 L1 (TE pp. 102–109, TB pp. 49–52) L2 (TE pp. 110–117, TB pp. 53–54) L3 (TE pp. 118–123, TB pp. 55–56) L5 (TE pp. 132–137, TB pp. 61–66)		

Publisher: Twig Education

Program Title: Twig Science

Components: Twig Science Teacher Editions (TE) , Twig Science Student Twig Books (TB), Leveled Readers (LR) (On-Level, Above, Below and English Learners), www.twigscience.com, www.twigsciencetools.com, www.twigsciencereporter.com

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems. ▪ Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L1 (TE pp. 268–275, TB pp. 121–125) L2 (TE pp. 276–281, TB pp. 126–127) L3 (TE pp. 282–287, TB pp. 128–129) L4 (TE pp. 288–293, TB pp. 130–132)	**4-PS4-3.** **Generate and compare multiple solutions that use patterns to transfer information.*** [Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]	**EXAMPLES** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L1 (TE pp. 268–275, TB pp. 121–125) L2 (TE pp. 276–281, TB pp. 126–127) L3 (TE pp. 282–287, TB pp. 128–129) L5 (TE pp. 294–301, TB pp. 133–136) L6 (TE pp. 302–307, TB pp. 137–138) L7 (TE pp. 308–315, TB pp. 139–142) L9 (TE pp. 324–327, TB p. 145) L10 (TE pp. 328–333, TB pp. 146–148) Key Resources L7 **Scoreboard Stunts** video
DCI	**PS4.C: Information Technologies and Instrumentation** ▪ Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L5 (TE pp. 294–301, TB pp. 133–136) L6 (TE pp. 302–307, TB pp. 137–138) L7 (TE pp. 308–315, TB pp. 139–142) L8 (TE pp. 316–323, TB pp. 143–144) L9 (TE pp. 324–327, TB p. 145) L10 (TE pp. 328–333, TB pp. 146–148) Key Resources L7 **Scoreboard Stunts** video		
DCI	**ETS1.C: Optimizing the Design Solution**	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors**		

	Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)	M5_DQ6 L4 (TE pp. 288–293, TB pp. 130–132) L9 (TE pp. 324–327, TB p. 145) L10 (TE pp. 328–333, TB pp. 146–148)		
CCC	**Patterns** ▪ Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L5 (TE pp. 294–301, TB pp. 133–136) L6 (TE pp. 302–307, TB pp. 137–138) L7 (TE pp. 308–315, TB pp. 139–142) L8 (TE pp. 316–323, TB pp. 143–144) Key Resources L7 **Scoreboard Stunts** video		
CCC	***Connections to Engineering, Technology, and Applications of Science*** **Interdependence of Science, Engineering, and Technology** ▪ Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L5 (TE pp. 294–301, TB pp. 133–136)		

3–5-ETS1 Engineering Design

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts	Publisher Citations	Performance Expectation	Publisher Citations

SEP	**Asking Questions and Defining Problems** Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships. ▪ Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3–5-ETS1-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L1 (TE pp. 6–11, TB pp. 3–4) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L1 (TE pp. 98–103, TB pp. 49–51) L2 (TE pp. 104–109, TB pp. 52–53) L3 (TE pp. 110–115, TB pp. 54–58) Key Resources L1 **Building Loads** video **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73)	**3–5-ETS1-1.** **Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.**	**EXAMPLES** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) Key Resources L5–6 **Solar Cookers** interactive **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L1 (TE pp. 6–11, TB pp. 3–4) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L1 (TE pp. 98–103, TB pp. 49–51) L2 (TE pp. 104–109, TB pp. 52–53) L3 (TE pp. 110–115, TB pp. 54–58) Key Resources L1 **Building Loads** video **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99)
DCI	**ETS1.A: Defining and Delimiting Engineering Problems** ▪ Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes	**EXAMPLE ONE** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ1 L5 (TE pp. 32–37, TB pp. 16–17) L6 (TE pp. 38–43, TB pp. 18–19) Key Resources L5–6 **Solar Cookers** interactive **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L1 (TE pp. 6–11, TB pp. 3–4) **EXAMPLE THREE**		

	the constraints into account. (3–5-ETS1-1)	**Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73)		
CCC	**Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ People's needs and wants change over time, as do their demands for new and improved technologies. (3–5-ETS1-1)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ1 L1 (TE pp. 6–11, TB pp. 3–4) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ5 L2 (TE pp. 156–161, TB pp. 81–82) L3 (TE pp. 162–167, TB pp. 83–89) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L4 (TE pp. 198–201, TB p. 100) L5 (TE pp. 202–206, TB p. 101)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Constructing Explanations and Designing Solutions** Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L3 (TE pp. 110–115, TB pp. 54–58) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering**	**3–5-ETS1-2.** **Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.**	**EXAMPLES** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L3 (TE pp. 110–115, TB pp. 54–58) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4

	and in designing multiple solutions to design problems. ▪ Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3–5-ETS1-2)	M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L3 (TE pp. 192–194, TB p. 98–99) **EXAMPLE FOUR** **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L3 (TE pp. 70–75, TB pp. 35–36) L4 (TE pp. 76–81, TB pp. 37–38)		L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99) **Grade 4 Module 5** **Super Survivors** M5_DQ6 L1 (TE pp. 268–275, TB pp. 121–125) **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64) **Grade 4 Module 2** **Sparks Energy, Inc.** M2_DQ2 L3 (TE pp. 70–75, TB pp. 35–36) L4 (TE pp. 76–81, TB pp. 37–38) **Grade 4 Module 3** **Leveled Reader: Sculpting Landscapes** Chapter 3 (LR 22–30)
DCI	**ETS1.B: Developing Possible Solutions** ▪ Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2) ▪ At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L1 (TE pp. 268–275, TB pp. 121–125) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L3 (TE pp. 110–115, TB pp. 54–58) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) **EXAMPLE FOUR** **Grade 4 Module 3** **Time-Traveling Tour Guide**		

		M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64)		
CCC	**Influence of Engineering, Technology, and Science on Society and the Natural World** ▪ Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3–5-ETS-2)	**EXAMPLE ONE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L4 (TE pp. 132–137, TB pp. 55–57) L6 (TE pp. 146–153, TB pp. 62–64) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L4 (TE pp. 198–201, TB p. 100) L5 (TE pp. 202–206, TB p. 101)		

Science and Engineering Practices Disciplinary Core Ideas Crosscutting Concepts		Publisher Citations	Performance Expectation	Publisher Citations
SEP	**Planning and Carrying Out Investigations** Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. ▪ Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair	**EXAMPLE ONE** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L2 (TE pp. 276–281, TB pp. 126–127) L4 (TE pp. 288–293, TB pp. 130–132) L8 (TE pp. 316–323, TB pp. 143–144) L9 (TE pp. 324–327, TB p. 145) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L1 (TE pp. 98–103, TB pp. 49–51) L2 (TE pp. 104–109, TB pp. 52–53) L3 (TE pp. 110–115, TB pp. 54–58)	**3–5-ETS1-3.** **Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.**	**EXAMPLES** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L1 (TE pp. 98–103, TB pp. 49–51) L3 (TE pp. 110–115, TB pp. 54–58) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L2 (TE pp. 134–138, TB pp. 72–73) **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97)

	tests in which variables are controlled and the number of trials considered. (3–5-ETS1-3)	**EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99)		L3 (TE pp. 192–194, TB p. 98–99) **Grade 4 Module 5** **Super Survivors** M5_DQ6 L2 (TE pp. 276–281, TB pp. 126–127) L4 (TE pp. 288–293, TB pp. 130–132) L8 (TE pp. 316–323, TB pp. 143–144) L9 (TE pp. 324–327, TB p. 145) L10 (TE pp. 328–333, TB pp. 146–148)
DCI	**ETS1.B: Developing Possible Solutions** ▪ Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3–5-ETS1-3)	**EXAMPLE ONE** **Grade 4 Module 1** **Egg Racers** M1_DQ4 L2 (TE Investigate and Report, pp. 187–188, TB pp. 63–64) L3 (TE Investigate, pp. 194–195, TB pp. 65–66) L4 (TE Investigate, pp. 200–201, TB pp. 67–68) L5 (TE Spark, Investigate, and Report, pp. 204–206, TB p. 70) **EXAMPLE TWO** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ3 L2 (TE pp. 104–109, TB pp. 52–53) L3 (TE pp. 110–115, TB pp. 54–58) **EXAMPLE THREE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ4 L1 (TE pp. 128–133, TB pp. 69–71) L2 (TE pp. 134–138, TB pp. 72–73) L3 (TE pp. 140–144, TB pp. 74–76) **EXAMPLE FOUR** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6		**Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L6 (TE pp. 146–153, TB pp. 62–64) **Grade 4 Module 1** **Egg Racers** M1_DQ4 L1 (TE, pp.176–183, TB pp. 61–62) L2 (TE Investigate and Report, pp. 187–188, TB pp. 63–64) L3 (TE Investigate, pp. 194–195, TB pp. 65–66) L4 (TE Spark and Investigate, pp. 200–201,TB pp. 67–68) L5 (TE Report and Connect, p. 206, TB p. 70)

		L1 (TE pp. 184–187, TB pp. 95–96) L2 (TE pp. 188–191, TB p. 97) L3 (TE pp. 192–194, TB p. 98–99) **EXAMPLE FIVE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L6 (TE pp. 146–153, TB pp. 62–64)		
DCI	**ETS1.C: Optimizing the Design Solution** ▪ Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3–5-ETS1-3)	**EXAMPLE ONE** **Grade 4 Module 4** **Earthquake Engineering** M4_DQ6 L3 (TE pp. 192–194, TB p. 98–99) **EXAMPLE TWO** **Grade 4 Module 5** **Super Survivors** M5_DQ6 L4 (TE pp. 288–293, TB pp. 130–132) L9 (TE pp. 324–327, TB p. 145) L10 (TE pp. 328–333, TB pp. 146–148) **EXAMPLE THREE** **Grade 4 Module 3** **Time-Traveling Tour Guide** M3_DQ4 L6 (TE pp. 146–153, TB pp. 62–64)		