Kindergarten, Standard 1. Physical Science

SC.K.1.1

Prepared Graduates:
Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.

Grade Level Expectation:
Pushes and pulls can have different strengths and directions and can change the speed or direction of an object's motion or start or stop it.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object. (K-PS2-1)
[Clarification Statement: Examples of pushes or pulls could include a string attached to an object being pulled, a person pushing an object, a person stopping a rolling ball, and two objects colliding and pushing on each other.]
[Assessment Boundary: Assessment is limited to different relative strengths or different directions, but not both at the same time. Assessment does not include non-contact pushes or pulls such as those produced by magnets.

FOSS Materials and Motion
IG: pp. 43, 265, 268, 270, 273, 277-280, 296-299, 313, 316
EA: *Performance Assessment*, IG pp. 275-276 (Step 7), IG p. 278 (Step 8), IG p. 280 (Step 15), IG p. 285 (Step 8), IG p. 286-287 (Step 5), IG p. 290 (Step 15), IG p. 295 (Step 11), IG p. 298 (Step 7)
Notebook Entry
IG: p. 280 (Step 15) IG p. 290 (Step 15), p. 299 (Step 11) IG p. 305 (Steps 11-12)

b. Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull. (K-PS2-2)
[Clarification Statement: Examples of problems requiring a solution could include having a marble or other object move a certain distance, follow a particular path, and knock down other objects. Examples of solutions could include tools such as a ramp to increase the speed of the object and a structure that would cause an object such as a marble or ball to turn.] [Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

FOSS Materials and Motion
IG: pp. 48-49, 270, 273, 276, 295, 297 (Step 6), 299 (Step 10), 302, 316
EA: *Performance Assessment*, IG p. 285 (Step 8), IG p. 289 (Step 12), IG p. 290 (Step 15), IG p. 299 (Step 10), IG p. 295 (Step 11), IG p. 298 (Step 7), IG p. 302 (Step 5), IG p. 304 (Step 5), IG p. 305 (Steps 11-12)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- With guidance, plan and conduct an investigation in collaboration with peers.

FOSS Materials and Motion
IG: pp. 265, 266, 271, 278, 286, 287, 289, 297, 304, 317
SRB: p. 58
TR: pp. C14-C16, C32-C33

2. Analyzing and Interpreting Data

- Analyze data from tests of an object or tool to determine if it works as intended.

FOSS Materials and Motion
IG: pp. 271, 278, 285, 295, 297-298, 304, 317
TR: pp. C17-C19, C34-C37

3. Connections to the Nature of Science

- Scientists use different ways to study the world.

FOSS Materials and Motion
IG: pp. 272 and 296 (Steps 1 and 3)

Elaboration on the GLE

1. PS2.A: Forces and Motion

- Pushes and pulls can have different strengths and directions. Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

FOSS Materials and Motion
IG: pp. 43, 265, 268, 270, 273, 277-280, 296-299, 313, 316
SRB: pp. 47-57

2. PS2.B: Types of Interactions

- When objects touch or collide, they push on one another and can change motion.

FOSS Materials and Motion
IG: pp. 43, 265, 268, 270, 273, 286-290, 304-305, 313, 316
SRB: pp. 60-68

3. PS3.C: Relationship Between Energy and Forces

- A bigger push or pull makes things speed up or slow down more quickly.

FOSS Materials and Motion
IG: pp. 43, 265, 268, 270, 273, 277-280, 298 (Step 7), 299 (Step 10), 313, 316
SRB: p. 58
DOR: "Roller Coaster Builder"

Cross Cutting Concepts

1. Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-1)

FOSS Trees and Weather
IG: pp. 265, 272, 278, 282, 286, 287, 288, 297, 204, 304, 313, 317
TR: pp. D9-D11, D24-D27

Kindergarten, Standard 1. Physical Science

SC.K.1.2

Prepared Graduates:
Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:
Sunlight affects the Earth's surface.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Make observations to determine the effect of sunlight on Earth's surface. (K-PS3-1)
[Clarification Statement: Examples of Earth's surface could include sand, soil, rocks, and water.]
[Assessment Boundary: Assessment of temperature is limited to relative measures such as warmer/cooler.]

FOSS Materials and Motion
IG: pp. 43, 48-49, 209, 217, 219, 254-256, 259 (Step 24), 316
EA: *Performance Assessment*, IG p. 256 (Steps 10-12)

FOSS Trees and Weather
IG: pp. 39, 44-45, 167, 173, 185 (Step 7), 188, 266
EA: *Performance Assessment*, IG p. 185 (Step 7), IG p. 188 (Steps 9-11)

b. Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area. (K-PS3-2)
[Clarification Statement: Examples of structures could include umbrellas, canopies, and tents that minimize the warming effect of the sun.]

FOSS Materials and Motion
IG: pp. 43, 48-49, 209, 212-213, 217, 219, 316
EA: *Performance Assessment*, IG: p. 253 (Step 9), IG: p. 257 (Steps 17-18), IG: p. 260 (Step 26)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Make observations (firsthand or from media) to collect data that can be used to make comparisons.

FOSS Materials and Motion
IG: pp. 217, 255, 256, 258, 317

FOSS Trees and Weather
IG: pp. 174, 178 (Step 9), 179, 266
TR: pp. C14-C16, C32-C33

2. Constructing Explanations and Designing Solutions

- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.

FOSS Materials and Motion
IG: pp. 217, 253, 257, 317
SRB: pp. 9-12
TR: pp. C22-C24, C38-C39

3. Connections to the Nature of Science

- Scientists use different ways to study the world.

FOSS Materials and Motion
IG: pp. 218, 254 (Steps 2-3), 256 (Step 10)

FOSS Trees and Weather
IG: pp. 175, 179, 189 (Step 11)
SRB: pp. 38-40

Elaboration on the GLE

1. PS3.B: Conservation of Energy and Energy Transfer

- Sunlight warms Earth's surface.

FOSS Materials and Motion
IG: pp. 43, 48-49, 209, 212-213, 217, 219, 254-256, 259 (Step 24), 316

FOSS Trees and Weather
IG: pp. 39, 44-45, 167, 173, 185 (Step 7), 188, 266
SRB: pp. 20-21, 30-31

Cross Cutting Concepts

1. Cause and Effect

- Events have causes that generate observable patterns.

FOSS Materials and Motion
IG: pp. 218, 255, 317
SRB: pp. 60-67

FOSS Trees and Weather
IG: pp. 174, 187, 266
SRB: pp. 28-31
TR: pp. D9-D11, D24-D27

Kindergarten, Standard 2. Life Science

SC.K.2.1

Prepared Graduates:
Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.

Grade Level Expectation:
To live and grow, animals obtain food they need from plants or other animals, and plants need water and light.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence outcomes

a. Use observations to describe patterns of what plants and animals (including humans) need to survive. (K-LS1-1)
[Clarification Statement: Examples of patterns could include that animals need to take in food but plants do not; the different kinds of food needed by different types of animals; the requirement of plants to have light; and that all living things need water.]

FOSS Animals Two by Two
IG: pp. 37, 75, 88 (Step 1), 87, 90, 106 (Step 11), 151, 165, 167, 183, 189, 199, 201, 226, 240
EA: *Performance Assessment*, IG p. 87 (Step 6), IG p. 90 (Step 11), IG p. 189 (Step 14)

FOSS Trees and Weather
IG: pp. 41, 77, 79, 133, 159 (Step 6), 162, 213, 215, 220 (Step 6), 228 (Step 6), 242 (Step 7), 255, 257 (Step 10)
EA: *Performance Assessment*, IG p. 116 (Step 11), IG p. 121 (Step 9)

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

▪Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-LS1-1)

FOSS Animals Two by Two
IG: pp. 75, 94, 106 (Step 11), 109, 139 (Step 1), 165, 240
SRB: pp. 9, 36, 47-54, 56
DOR: *Seashore Surprise*

FOSS Trees and Weather
IG: pp. 77, 102 (Step 4), 104 (Step 6), 108, 134, 149 (Step 7), 150, 214, 227 (Step 4), 255, 266
SRB: pp. 58-59
TR: pp. C17-C19, C34-C37

2. Connections to the Nature of Science

- Scientists look for patterns and order when making observations about the world.

FOSS Animals Two by Two
IG: pp. 272 and 296 (Steps 1 and 3)
IG: pp. 200 and 213

FOSS Trees and Weather
IG: p.139 (Step 1), 140 (Step 9), 145-147, 162 (Step 8)
DOR: Once There Was a Tree

Elaboration on the GLE

1. LS1.C: Organization for Matter and Energy Flow in Organisms

- All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.

FOSS Animals Two by Two
IG: pp. 37, 75, 88 (Step 1), 87, 90, 106 (Step 11), 151, 165, 167, 183, 189, 199, 201, 226, 240
SRB: pp. 5, 22, 38, 65-66, 68

FOSS Trees and Weather
IG: pp. 41, 77, 79, 133, 159 (Step 6), 162, 213, 215, 220 (Step 6), 228 (Step 6), 242 (Step 7), 255, 257 (Step 10)
SRB: pp. 14-19, 50, 53
DOR: "Who Lives Here?"
Summer

Cross Cutting Concepts

1. Patterns

- Patterns in the natural and human designed world can be observed and used as evidence.

FOSS Animals Two by Two
IG: pp. 76, 97, 98, 102, 111, 113, 150, 166, 183 (Step 5), 184 (Step 3), 187, 200, 203, 221, 240
SRB: pp. 10-19, 20-26, 37-47, 55-63

FOSS Trees and Weather
IG: pp. 78, 98 (Step 4), 100, 109, 116 (Step 11), 123, 134, 144 (Step 8), 146, 150, 214, 231, 243, 255, 257, 266
SRB: p. 59
TR: pp. D5-D8, D24-D25

Kindergarten, Standard 3. Earth Science

SC.K.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Grade Level Expectation:

Patterns are observed when measuring the local weather, including how humans and other organisms impact their environment.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Use and share observations of local weather conditions to describe patterns over time. (K-ESS2-1)
[Clarification Statement: Examples of qualitative observations could include descriptions of the weather (Such as sunny, cloudy, rainy, and warm); examples of quantitative observations could include numbers of sunny, windy, and rainy days in a month. Examples of patterns could include that it is usually cooler in the morning than in the afternoon and the number of sunny days versus cloudy days in different months.] [Assessment Boundary: Assessment of quantitative observations is limited to whole numbers and relative measures such as warmer/cooler.]

FOSS Trees and Weather
IG: pp. 39, 44-45, 167, 173, 175, 178 (Step 9), 202 (Steps 20-21), 205, 213, 226, 234, 253, 255, 266
EA: *Performance Assessment*, IG p. 178 (Step 9), IG pp. 180-181 (Steps 8-9), IG p. 202 (Steps 20-21), IG p. 222 (Step 8)

b. Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs. (K-ESS2-2)
[Clarification Statement: Examples of plants and animals changing their environment could include how a squirrel digs in the ground to hide its food and tree roots can break concrete.]

FOSS Animals Two by Two
IG: pp. 37, 38-40, 41-42, 75, 87, 126, 144 (Step 12), 151, 165, 167, 176 (Step 7), 189, 228, 240
EA: *Performance Assessment,* IG p. 87 (Step 6), IG p. 144 (Step 12), IG p. 151 (Steps 22-23), IG p. 183 (Step 5), IG p. 189 (Step 14)

FOSS Trees and Weather
IG: pp. 41, 42-43, 69, 77, 89 (Step 8), 127, 133, 159, 162 (Step 8), 266
EA: *Performance Assessment*, IG p. 85 (Step 14), IG p. 91 (Step 16)

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

FOSS Trees and Weather
IG: pp. 174, 181, 185 (Step 7), 187, 195, 201, 202, 214, 227, 241, 254, 266
SRB: pp. 32-37
TR: pp. C17-C19, C34-C37

2. Engaging in Argument from Evidence

- Construct an argument with evidence to support a claim.

FOSS Animals Two by Two
IG: pp. 127, 151, 165, 181 (Step 19), 183 (Step 5), 189, 240

FOSS Trees and Weather
IG: pp. 78, 85 (Step 14), 91, 134, 144, 266
TR: pp. C25-C27, C40-C41

3. Connections to the Nature of Science

- Scientists look for patterns and order when making observations about the world.

FOSS Trees and Weather
IG: pp. 180 (Step 6) and 256 (Step 9)
SRB: p. 29

Elaboration on the GLE

1. ESS2.D: Weather and Climate

- Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

FOSS Trees and Weather
IG: pp. 39, 44-45, 167, 173, 175, 178 (Step 9), 202 (Steps 20-21), 205, 213, 226, 234, 253, 255, 266
SRB: pp. 38-40, 42-44, 59

2. ESS2.E: Biogeology

- Plants and animals can change their environment.

FOSS Animals Two by Two
IG: pp. 37, 38-40, 41-42, 75, 87, 126, 144 (Step 12), 151, 165, 167, 176 (Step 7), 189, 228, 240

FOSS Trees and Weather
IG: pp. 41, 42-43, 69, 77, 89 (Step 8), 127, 133, 159, 162 (Step 8), 266
DOR: *Once There Was a Tree*

3. ESS3.C: Human Impacts on Earth Systems

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

FOSS Materials and Motion
IG: pp. 137, 140 (Step 13), 141 (Step 14), 190 (Step 8), 191 (Step 1), 195, 247 (Step 2), 249 (Step 10)
SRB: pp. 41-46
DOR: *What is Agriculture?*
"Recycling Center"

Cross Cutting Concepts

1. Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

FOSS Trees and Weather
IG: pp. 174, 188, 214, 215, 240, 243, 257, 266
SRB: pp. 29 and 59
TR: pp. D5-D8, D24-D25

2. Systems and System Models

- Systems in the natural and designed world have parts that work together.

FOSS Animals Two by Two
IG: pp. 76, 85, 128, 166, 176 (Step 7), 228, 230, 266

FOSS Trees and Weather
IG: pp. 78, 85 (Step 14), 94, 98 (Step 4)
TR: pp. D14-D15, D28-D29

Kindergarten, Standard 3. Earth Science

SC.K.3.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

Plants and animals meet their needs in their habitats and impact one another; people can prepare for severe weather.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live. (K-ESS3-1)
[Clarification Statement: Examples of relationships could include that deer eat buds and leaves, therefore, they usually live in forested areas; and grasses need sunlight, so they often grow in meadows. Plants, animals, and their surroundings make up a system.]

FOSS Animals Two by Two
IG: pp. 37, 38-39, 40-41, 74, 77, 126, 129, 151, 164, 167, 176 (Step 7), 178, 183 (Step 5), 227, 240
EA: *Performance Assessment*, IG p. 92 (Step 4), IG p. 95 (Step 8), IG p. 97 (Step 5), IG p. 103 (Step 14), IG p. 176 (Step 7), IG p. 180 (Step 18)

FOSS Trees and Weather
IG: pp. 77, 79, 107 (Step 8), 116 (Step 11), 123, 213, 240, 255, 266
EA: *Performance Assessment*, IG p. 107 (Step 8), IG p. 116 (Step 11), IG p. 121 (Step 9), IG p. 240 (Step 5), IG p. 243 (Step 8)

b. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. (K-ESS3-2)
[Clarification Statement: Emphasis is on local forms of severe weather.]

FOSS Trees and Weather
IG: pp. 44-45, 167, 173, 200 (Steps 13-14), 202 (Step 20), 266
EA: *Performance Assessment*, IG p. 198 (Step 10), IG p. 200 (Step 14), IG p. 202 (Steps 20-21)

Evidence Outcomes Cont'd

c. Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. (K-ESS3-3)
[Clarification Statement: Examples of human impact on the land could include cutting trees to produce paper and using resources to produce bottles. Examples of solutions could include reusing paper and recycling cans and bottles.]

FOSS Materials and Motion
IG: pp. 93, 97, 137, 141 (Step 14), 167, 190, 239, 246, 247-248, 249-250 (Step 10), 316
EA: *Performance Assessment*, IG p. 93 (Step 17), IG p. 103 (Step 23), IG p. 137 (Step 7) IG p. 141 (Steps 15-16), IG p. 171 (Step 13), IG p. 190 (Step 8), IG p. 195 (Step 11), IG p. 250 (Step 14)

Colorado Essential Skills and Science and Engineering Practices

1. Asking Questions and Defining Problems

- Ask questions based on observations to find more information about the designed world.

FOSS Trees and Weather
IG: pp. 179, 199 (Step 12), 266
SRB: pp. 33-37
TR: pp. C7-C10, C30-C31

2. Developing and Using Models.

- Use a model to represent relationships in the natural world.

FOSS Animals Two by Two
IG: pp. 75, 92 (Step 4), 165, 176 (Step 7), 181 (Step 19), 240, 266

FOSS Trees and Weather
IG: pp.78, 94, 98 (Step 4)
TR: pp. C11-C13, C30-C31

3. Obtaining, Evaluating, and Communicating Information

- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.

FOSS Trees and Weather
IG: pp. 174, 182, 198
SRB: pp. 44-45
TR: pp. C28-C29, C40-C41

4. Obtaining, Evaluating, and Communicating Information

- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas.

FOSS Materials and Motion
IG: pp. 86, 162, 212-213, 218, 248-249, 317
SRB: pp. 41-46
TR: pp. C28-C29, C40-C41

Elaboration on the GLE

1. ESS3.A: Natural Resources

- Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

FOSS Animals Two by Two
IG: pp. 37, 38-39, 40-41, 74, 77, 126, 129, 151, 164, 167, 176 (Step 7), 178, 183 (Step 5), 227, 240
SRB: pp. 19, 38, 65

FOSS Trees and Weather
IG: pp. 77, 79, 107 (Step 8), 116 (Step 11), 123, 213, 240, 255, 266
SRB: pp. 4-12, 14-19

2. ESS3.B: Natural Hazards

- Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.

FOSS Trees and Weather
IG: pp. 44-45, 167, 173, 200 (Steps 13-14), 202 (Step 20), 266
SRB: pp. 42-44
DOR: Come a Tide

3. ESS3.C: Human Impacts on Earth Systems

- Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

FOSS Materials and Motion
IG: pp. 93, 97, 137, 141 (Step 14), 167, 190, 239, 246, 247-248, 249-250 (Step 10), 316
SRB: pp. 41 and 45
DOR: What is Agriculture?
Environmental Health

Cross Cutting Concepts

1. Cause and Effect

- Events have causes that generate observable patterns.

FOSS Trees and Weather
IG: pp. 188, 195, 266
SRB: pp. 39-40
TR: pp. D9-D11, D24-D27

FOSS Materials and Motion
IG: pp. 86, 137, 162, 201, 218, 317
SRB: p. 46
TR: pp. D9-D11, D24-D27

2. Systems and System Models

- Systems in the natural and designed world have parts that work together.

FOSS Animals Two by Two
IG: pp. 75, 92 (Step 4), 106 (Step 11), 109, 128, 166, 172, 179, 240

FOSS Trees and Weather
IG: pp. 78, 100, 103, 266
TR: pp. D14-D15, D28-D29

3. Influence of Engineering, Technology, and Science on Society and the Natural World

- People depend on various technologies in their lives; human life would be very different without technology.

FOSS Trees and Weather
IG: pp. 198 and 200 (Steps 13-14)
SRB: pp. 38-40

First Grade, Standard 1. Physical Science

SC.1.1.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Grade Level Expectation:

Sound can make matter vibrate and vibrating matter can make sound.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. (1-PS4-1)
[Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper near a speaker making sound and holding an object near a vibrating tuning fork]

FOSS Sound and Light
IG: *pp.80, 92 (Step 6), 93, 97, 106 (Step 11), 109 (Step 21), 128, 131, 154 (Step 9), 155 (Step 11)*
EA: *Notebook Entry,* IG p. 97 (Step 18)**,** IG p. 111 (Step 25), IG p. 156 (Step 14,) IG p. 164 (Step 15)
EA: *Performance Assessment,* IG p. 106 (Step 10), IG p. 137 (Step 10), IG p. 164 (Step 11)
BM: pp. 2-3 (Items 1-2)**,** pp. 4-5 (Item 3)**,** pp. 6-7 (Item 4)**,** pp. 8-9 (Item 1)**,** pp. 10-11 (Item 3)

b. Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. (1-PS4-2)
[Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.]

FOSS Sound and Light
IG: *pp. 50. 50-51, 213, 215, 236-237 (Step 10), 234, 240 (Step 16), 246, 248, 254 (Step 2)*
EA: *Notebook Entry***,** IG p. 240 (Step 17)
EA: *Performance Assessment*, IG p. 236 (Step 10), IG p. 240 (Step 18)
BM: pp. 22-23 (Item 4)**,** pp. 26-27 (Item 2)**,** pp. 28-29 (Item 5)

IG: Investigations Guide • TR**:** Teacher Resources • SRB**:** Student *Science Resources* Book • DOR**:** Digital-Only Resources
EA: Embedded Assessment • BM**:** Benchmark Assessment • IA**:** Interim Assessment

Evidence Outcomes Cont'd

c. Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light. (1-PS4-3)
[Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).]
[Assessment Boundary: Assessment does not include the speed of light.]

FOSS Sound and Light
IG: pp. 30, 46-47, 50-51, 175, 177, 182 (Step 13), 189 (Step 13), 191 (Steps 17-18), 192 (Step 18), 199 (Steps 11 and 13), 208
EA: *Notebook Entry*, IG p. 182 (Step 14), IG p. 183 (Step 15), IG p. 200 (Step 14)
EA: *Performance Assessment*, IG p. 188 (Step 8)
BM: pp. 16-17 (Item 1), pp. 18-19 (Item 2), pp. 20-21 (Item 3), pp. 24-25 (Item 1), pp. 28-29 (Item 5)

d. Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance. (1-PS4-4)
[Clarification Statement: This performance expectation integrates transitional science content with engineering through a practice or disciplinary core idea.]

FOSS Sound and Light
IG: pp. 128,163, 212, 248 (Step 20), 249, 247 (Step 13)
EA: *Notebook Entry*, IG p. 164 (Step 15), IG p. 247 (Step 19)
EA: *Performance Assessment*, IG p. 164 (Step 11), IG p. 246 (Step 8)
BM: pp. 28-29 (Item 5); pp. 30-31 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question.

FOSS Sound and Light
IG: pp. 81, 91, 95, 105, 106, 115, 129, 136, 153, pp. 175, 181, 186, 188, 198, 213, 220, 222, 227
SRB: pp. 7, 32, 44-45
TR: pp. C14-C17, C36-C39

2. Constructing Explanations and Designing Solutions

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

FOSS Sound and Light
IG: pp. 213, 236, 239-240
SRB: p. 60
TR: pp. C23-C26, C44-C45

3. Connections to the Nature of Science

-
- Scientists use different ways to study the world.

FOSS Materials and Motion
IG: pp. 272 and 296 (Steps 1 and 3)

Elaboration on the GLE

1. 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; it does not move in the direction of the wave - observe, for example, a bobbing cork or seabird - except when the water meets the beach. Sound can make matter vibrate and vibrating matter can make sound.

FOSS Sound and Light
IG: *pp.80, 92 (Step 6), 93, 97, 106 (Step 11), 109 (Step 21), 128, 131, 154 (Step 9), 155 (Step 11)*
SRB: *pp. 6, 9, 25*
DOR: *All about Sound*

2. PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them. Very hot objects give off their own light.

FOSS Sound and Light
IG: *pp.* 30, 46-47, *50-51,* 175, 177, 182 (Step 13), 189 (Step 13), 191 (Steps 17-18), 192 (Step 18), 199 (Steps 11 and 13), 208, *213, 215, 236-237 (Step 10), 234, 240 (Step 16), 246, 248, 254 (Step 2)*
SRB: *p. 43, 57*
DOR: *Light and Darkness,* Light and Shadows, All about Light My Shadow

3. PS4.C: Information Technologies and Instrumentation

- People use their sense to learn about the world around them. Their eyes detect light, their ears detect sound, and they can feel vibrations by touch.

FOSS Sound and Light
IG: pp. 128,163, 212, 248 (Step 20), 249, 247 (Step 13)
SRB: pp. 69-75

Cross Cutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS Sound and Light
IG: pp. 82, 92, 95, 106, 109, 130, 137, 176, 181, 188, 196, 214, 220, 221, 222, 230, 236, 244
SRB: pp. 41, 42
TR: pp. D6-D9, D10-D12

First Grade, Standard 2. Life Science

SC.1.2.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structure function to support life, growth, behavior and reproduction.

Grade Level Expectation:

All organisms have external parts that they use to perform daily functions.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs (1-LS1-1)

[Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and detecting intruders by mimicking eyes and ears.]

FOSS Plants and Animals

IG: pp. 98 (Step 2), 111 (Step 14), 116 (Step 25), 134, 142 (Step 6), 172, 206 (Step 13), 216 (Step 18), 244, 245, 246 (Step 20)
EA: *Performance Assessment*, IG p. 215 (Step 17), IG p. 217 (Step 19)
BM: pp. 6-7 (Item 5), pp. 16-17 (Item 4), pp. 18-19 (Item 2)

b. Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. (1-LS1-2)

[Clarification Statement: Examples of patterns 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).]

FOSS Plants and Animals

IG: *pp. 213 (Step 12), 214, 228, 231, 255 (Step 21), 256*
EA: *Notebook Entry*, IG p. 255 (Step 19)
EA: *Performance Assessment,* IG p. 254 (Step 16)
BM: pp. 21-22 (Item 4)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Use tools and materials provided to design and build a device that solves a specific problem or a solution to a specific problem.

FOSS Plants and Animals
IG: pp. 217 (Step 19), 165, 166, 173, 175, 180, 181, 182
TR: pp. C23-C26, C44-C45

2. Obtaining, Evaluating, and Communicating Information

- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.

FOSS Plants and Animals
IG: pp. 229, 254 (Step 16), 255
SRB: pp. 71-84
DOR: *Animal Offspring and Caring for Animals*
TR: pp. C32-C33, C46-C47

3. Connections to the Nature of Science

- Scientists look for patterns and order when making observations about the world.

FOSS Plants and Animals
IG: pp. 215, 216, 217, 230, 247, 253
SRB: pp. 57-70

Elaboration on the GLE

1. LS1.A: Structure and Function

- All organisms have external parts. Different animals use their body parts 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. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.

FOSS Plants and Animals
IG: pp. 98 (Step 2), 111 (Step 14), 116 (Step 25), 134, 142 (Step 6), 172, 206 (Step 13), 216 (Step 18), 244, 245, 246 (Step 20)
SRB: pp. 57-70
DOR: "Animal Structure Sort"
"Watch it Grow"

2. LS1.B: Growth and Development of Organisms

- Plants and animals have predictable characteristics at different stages of development. Plants and animals grow and change. Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.

FOSS Plants and Animals
IG: *pp. 213 (Step 12), 214, 228, 231, 255 (Step 21), 256*
DOR: *"Find the Parent"*
Animal Offspring and Caring for Animals

3. LS1.D: Information Processing

- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.

FOSS Plants and Animals
IG: pp. 172, 175, 206 (Step 13), 216 (Step 18)
DOR: *Animal Growth*
"Animal Structure Sort"

FOSS Sound and Light
SRB: pp. 15-23, 60-68

Cross Cutting Concepts

1. Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

FOSS Plants and Animals
IG: pp. 98, 102, 110, 136, 145, 174, 206, 216
TR: pp. D19-D21, D30-D31

2. Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS Plants and Animals
IG: pp. 230, 253 (Step 14), 255 (Steps 20 and 21)
TR: pp. D6-D9, D26-D27

First Grade, Standard 2. Life Science

SC.1.2.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

Grade Level Expectation:

Young organisms are very much, but not exactly, like their parents, and also resemble other organisms of the same kind.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents. (1-LS3-1)
[Clarification Statement: Examples of patterns could include features plants or animals share. Examples of observations could include leaves from the same kind of plant are the same shape but can differ in size; and a particular breed of dog looks like its parents but is not exactly the same. This performance expectation integrates traditional science content with engineering through a practice or disciplinary core idea.]

FOSS Plants and Animals
IG: pp. 76, 122, 123, 124, 125 (Step 17), 228, 229, 245 (Step 18), 247, 252 (Step 8), 253 (Step 14), 255, (Step 20)
EA: *Notebook Entry*, IG p. 124 (Step 16)
EA: *Performance Assessment*, IG p. 122 (Step 10), IG p. 125 (Step 17), IG p. 245 (Steps 17-18)
BM: pp. 4-5 (Items 3-4), pp. 8-9 (Item 2), pp. 10-11 (Item 3), pp. 14-15 (Item 3), pp. 20-21 (Item 3)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena.

FOSS Plants and Animals
IG: pp. 122 (Step 10), 124 (Step 15), 245, 253, 255 (Step 21)
SRB: pp. 23-25
DOR: Find the Parent
TR: pp. C23-C26, C44-C45

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

Elaboration on the GLE

1. LS3.A: Inheritance of Traits

- Young animals are very much, but not exactly like, their parents. Plants also are very much, but not exactly, like their parents. (1-LS3-1)

FOSS Plants and Animals
IG: pp. 228, 245 (Step 18), 247, 255, (Step 20)
DOR: Animal Offspring and Caring for Animals

2. LS3.B: Variation of Traits

- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. (1-LS3-1)

FOSS Plants and Animals
IG: pp. 76, 122, 123, 124, 125 (Step 17), 229, 252 (Step 8), 253 (Step 14)
SRB: pp. 20, 21, 22, 26
DOR: Animal Growth

Cross Cutting Concepts

1. Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence.

FOSS Plants and Animals
IG: pp. 78, 122, 230, 252 (Step 8), 253 (Step 14)
TR: pp. D6-D9, D26-D27

First Grade, Standard 3. Earth and Space Science

SC.1.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and the Earth's place in it.

Grade Level Expectation:

Patterns of movement of the sun, moon and stars as seen from Earth can be observed, described and predicted.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

1. Use observations of the sun, moon, and stars to describe patterns that can be predicted (1-ESS1-1)
[Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.]

FOSS Air and Weather
IG: *pp. 135, 142, 145,161 (Step 17), 179 (Step 3), 180, 181, 182 (Step 13), 184, 185 (Step 19), 245, 251, 257*
EA: *Notebook Entry*, IG p. 183 (Step 16), IG p. 185 (Step 20), IG p. 251 (Step 11)
EA: *Performance Assessment,* IG p. 183 (Step 14), IG p. 250 (Steps 10 and 12)
BM: pp. 11-12 (Item 2), pp. 13-14 (Item 3), pp. 24-25 (Item 2), pp. 26-27 (Item 3)

2. Make observations at different times of year to relate the amount of daylight to the time of year. (1-ESS1-2)
[Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
[Boundary Statement: Limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

FOSS Air and Weather
IG: pp. 242, 245, 255, 257, 264 (Step 10), 265, 266
EA: *Notebook Entry*, IG p. 256 (Step 10)
EA: *Performance Assessment,* IG p. 256 (Step 6), IG p. 266 (Step 13)
BM: pp. 26-27 (Item 4)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Plan and conduct investigations collaboratively to produce evidence to answer a question.

FOSS Air and Weather
IG: pp. 243, 255 (Step 5), 256 (Steps 7 and 8)
TR: pp. C14-C17, C36-C39

2. Analyzing and Interpreting Data

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

FOSS Air and Weather
IG: pp. 143, 183, 243, 249, 250
SRB: p. 37
TR: pp. C18-C20, C40-C43

Elaboration on the GLE

1. ESS1.A: The Universe and its Stars

- Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. At night one can see the light coming from many stars with the naked eye, but telescopes make it possible to see many more and to observe them and the moon and the planets in greater detail.

FOSS Air and Weather
IG: *pp. 135, 142, 145,161 (Step 17), 179 (Step 3), 180, 181, 182 (Step 13), 184, 185 (Step 19), 245, 251, 257*
SRB: *pp. 26-28, 33-36*

2. ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted.

FOSS Air and Weather
IG: pp. 242, 245, 255, 257, 264 (Step 10), 265, 266
SRB: pp. 55-58

Cross Cutting Concepts

1. Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

FOSS Air and Weather
IG: pp. 144, 161 (Step 17), 183, 184 (Step 17), 185, 244, 249, 251, 255, 263, 264 (Step 10), 265, 266 (Step 13)
SRB: pp. 30, 37
TR: pp. D6-D9, D26-D27

2. Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past.

FOSS Air and Weather
IG: pp. 37, 144, 161 (Step 19), 184 (Step 17), 256 (Step 7) 263, 264, 265
SRB: pp. 28, 29, 33-36

Second Grade, Standard 1. Physical Science

SC.2.1.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the structure, properties and interactions of matter.

Grade Level Expectation:

Matter exists as different substances that have observable different properties.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. (2-PS1-1)
[Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.]

FOSS Solids and Liquids
IG: pp. 94, 101 (Step 11), 108, 109, 123, 128, 147, 155, 156, 183, 193
EA: *Notebook Entry*, IG p. 90 (Step 14), IG p. 101 (Step 13), IG p. 157 (Step 18), IG p. 194 (Step 16), IG p. 245 (Step 23), IG p. 252 (Step 13)
EA: *Performance Assessment*, IG p. 107 (Step 7), IG p. 148 (Step 7), IG p. 205 (Step 7)
BM: p. 2-3 (Item 1), pp. 6-7 (Item 5), pp. 8-9 (Item 1), pp. 10-11 (Item 3), pp. 14-15 (Items 1-2), pp. 16-17 (Item 3), pp. 18-19 (Item 1)

b. Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. (2-PS1-2)
[Clarification Statement: Examples of properties could include strength, flexibility, hardness, texture, and absorbency.] [Assessment Boundary: Assessment of quantitative measurements is limited to length.]

FOSS Solids and Liquids
IG: pp. 77, 102 (Step 15), 113 (Step 1), 117 (Step 15), 118, 119 (Step 24), 277 (Step 10)
EA: *Notebook Entry,* IG p. 211 (Step 7)
EA: *Performance Assessment*, IG: p. 115 (Step 8), IG p. 199 (Step 8)
BM: pp. 4-5 (Item 3), pp. 6-7 (Item 4)

Evidence Outcomes Cont'd

c. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object.
[Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.]

FOSS Solids and Liquids
IG: pp. pp. 77, 113, 115, 116, 118, 119, 217
EA: *Performance Assessment*, IG p. 115 (Step 8), IG p. 118 (Step 21)
BM: pp. 6-7 (Item 4)

d. Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.
[Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.]

FOSS Solids and Liquids
IG: 227, 233, 235,
242 (Step 12), 243 (Step 15), 266 (Step 8), 267, 268, 269, 270, 271, 272
EA: *Notebook Entry*, IG p. 245 (Step 23), IG p. 252 (Step 13), IG p. 269 (Step 19)
EA: *Performance Assessment*, IG p. 259 (Step 11)
BM: pp. 20-21 (Item 2), pp. 22-23 (Item 3), pp. 24-25 (Item 4)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

FOSS Solids and Liquids
IG: pp. 77, 86, 100, 107, 122, 139, 147, 148, 162, 170, 183, 191, 199, 217, 233, 240, 242
TR: pp. C14-C16, C34-C37

2. Analyzing and Interpreting Data

- Analyze data from tests of an object or tool to determine if it works as intended.

FOSS Solids and Liquids
IG: pp. 78, 114 (Step 6), 116 (Step 13), 119 (Step 23)
TR: pp. C17-C19, C38-C41

3. Constructing Explanations and Designing Solutions

- Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena.

FOSS Solids and Liquids
IG: pp. 78, 115, 117
TR: pp. C22-C24, C42-C45

4. Engaging in Argument from Evidence

- Construct an argument with evidence to support a claim.

FOSS Solids and Liquids
IG: pp. 233, 242-243 (Step 14), 259, 268, 272 (Step 26)
TR: pp. C25-C29, C44-C45

5. Connections to Nature of Science

- Science searches for cause-and-effect relationships to explain natural events.

FOSS Solids and Liquids
IG: pp. 234, 246, 266, 267, 269, 272
SRB: p. 64

Elaboration of the GLE

1. PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. Different properties are suited to different purposes. A great variety of objects can be built up from a small set of pieces.

FOSS Solids and Liquids
IG: pp. 77, 94, 101 (Step 11), 102 (Step 15), 108, 109, 113 (Step 1), 115, 116, 117 (Step 15), 118, 119 (Step 24), 123, 128, 147, 155, 156, 183, 193, 217, 277 (Step 10)
SRB: pp. 10,14-20, 22-25, 26-30, 31-32, 40-42, 46-47, 49, 50
DOR: *All About the Properties of Matter, Properties of Materials, Clothing and Building Materials*

2. PS1.B: Chemical Reactions

- Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.

FOSS Solids and Liquids
IG: 227, 233, 235,
242 (Step 12), 243 (Step 15), 266 (Step 8), 267, 268, 269, 270, 271, 272
SRB: pp. 62-67, 68-76
DOR: *Solids and Liquids, Change It!*

Cross Cutting Concepts

1. Patterns

- Patterns in the natural and human designed world can be observed.

FOSS Solids and Liquids
IG: pp. 78, 107,140, 148, 184, 205, 211
SRB: pp. 44-46, 52-53
TR: pp. D6-D8, D26-D27

2. Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

FOSS Solids and Liquids
IG: pp. 114 (Step 7), 116, 117 (Step 15)
TR: pp. D9-D11, D26-D27

3. Energy and Matter

- Objects may break into smaller pieces and be put together into larger pieces or change shapes.

FOSS Solids and Liquids
IG: pp. 102, 103, 114 (Step 7), 234, 244, 245, 258, 259, 266, 267, 268, 270
TR: pp. . D9-D11, D16-D17, D26-D27, D28-D29

4. Connections to Engineering, Technology and Applications of Science

- Every human made product is designed.

FOSS Solids and Liquids
IG: pp. 78,113,116 (step 13), 117 (Step 16), 124, 125
SRB: pp. 14-17

Second Grade, Standard 2. Life Science

SC.2.2.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

Grade Level Expectation:

Matter exists as different substances that have observable different properties.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Plan and conduct an investigation to determine if plants need sunlight and water to grow. (2-LS2-1)
[Boundary Statement: Limited to testing one variable at a time.]

FOSS Insects and Plants
IG: pp. 100-101 (Step 21), 145, 146 (Step 14), 147 (Step 15), 155-156 (Step 12), 157 (Steps 16 and 17), 173 (Step 2)
EA: *Notebook Entry*, IG p. 146 (Steps 10-11)
EA: *Performance Assessment,* IG p. 153 (Step 6)
BM: pp. 6-7 (Items 2-3), pp. 12-13 (Item 6), pp. 16-17 (Items 4-6), pp. 26-27 (Item 5)

b. Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. (2-LS2-2)

FOSS Insects and Plants
IG: pp. 157, 158 (Steps 19-22), 165, 177, 178 (Step 21), 287, 315, 317, 318
EA: *Performance Assessment*, IG p. 315 (Step 8), IG p. 315 (Step 14, 15)
BM: pp. 10-11 (Item 5), pp. 24-25 (Item 4)

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a simple model based on evidence to represent a proposed object or tool.

FOSS Insects and Plants
IG: pp. 135, 178, 287, 315, 317
TR: pp. C11-C13, C32-C33

2. Planning and Carrying Out Investigations

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question.

FOSS Insects and Plants
IG: pp. 127, 128, 135, 144, 146-147, 152-153, 157, 174
TR: pp. C14-C16, C34-C37

Elaboration on the GLE

1. LS2.A: Interdependent Relationships in Ecosystems

- Animals depend on their surroundings to get what they need. Animals depend on plants or other animals for food. They use their senses to find food and water and use their body parts to gather, catch, eat and chew the food. Plants depend on air, water, and soil to grow. Animals can move around, but plants cannot and depend on animals for pollination or to move seeds around. Different plants survive better in different settings.

FOSS Insects and Plants
IG: pp. 100-101 (Step 21), 145, 146 (Step 14), 147 (Step 15), 155-156 (Step 12), 157 (Steps 16 and 17), 158 (Steps 19-22), 173 (Step 2), 177, 178 (Step 21)
SRB: pp. 6-8, 27-34, 39
DOR: *How Plants Grow, How Seeds get Here … and There, What Is Pollination?*

Cross Cutting Concepts

1. Cause and Effect

- Events have causes that generate observable patterns.

FOSS Insects and Plants
IG: pp. 136, 148, 156, 157, 159
TR: pp. D9-D11, D26-D27

2. Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s).

FOSS Insects and Plants
IG: pp. 84, 85, 158, 162, 163, 165, 168, 175, 177, 178, 190, 288
TR: pp. D18-D20, D30-D31

Second Grade, Standard 2. Life Science

SC.2.2.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

Grade Level Expectation:

A range of different organisms lives in different places.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes
a. Make observations of plants and animals to compare the diversity of life in different habitats. (2-LS4-1) *[Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.]* ***FOSS Insects and Plants*** **IG:** *pp. 107, 112-115, 176, 205, 218, 255, 256, 264, 270, 300, 318* **EA:** *Notebook Entry*, IG p. 120 (Step 9), IG p. 121 (Step 12) IG p. 306 (Step 11) **EA:** *Performance Assessment*, IG p. 107 (Step 5) **BM:** pp. 2-3 (Item 2), pp. 4-5 (Items 3-5), pp. 14-15 (Items 1 and 3), pp. 18-19 (Item 1), pp. 20-21 (Item 3), pp. 22-23 (Items 1-2), pp. 24-25 (Item 3)

Colorado Essential Skills and Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Make observations (firsthand or from media) to collect data, which can be used to make comparisons.

FOSS Insects and Plants
IG: pp. 107, 176, 189, 201, 219, 237, 245, 251, 271, 315
TR: pp. C14-C16, C34-C37

2. Connections to the Nature of Science

- Scientific Knowledge is Based on Empirical Evidence

FOSS Insects and Plants
IG: pp. 93, 100, 113, 121, 190, 218, 220, 224

Elaboration on the GLE

1. LS4.D: Biodiversity and Humans

- There are many different kinds of living things in any area, and they exist in different places on land and in water.

FOSS Insects and Plants
IG: *pp. 107, 112-115, 176, 205, 218, 255, 256, 264, 270, 300, 318*
SRB: *pp. 18-26, 35-40, 41-45*
DOR: *All About Water Ecosystems, Bugs, Habitat Gallery, Habitat Havoc, House and Backyard Insects, Where Does It Live?*

Second Grade, Standard 3. Earth and Space Science

SC.2.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.

Grade Level Expectation:

Some events on Earth occur quickly; others can occur very slowly.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

1. Use information from several sources to provide evidence that Earth events can occur quickly or slowly. (2-ESS1-1)
[Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.]

FOSS Pebbles, Sand, and Silt
IG: p. 88 (Step 8), 89 (Step 9), 90, 97, 110, 144-145, 167 (Step 30), 236
EA: *Notebook Entry*, IG p. 90 (Step 13)
EA: *Performance Assessment,* IG pp. 97-98 (Step 14)
BM: pp. 4-5 (Item 4), pp. 12-13 (Items 4ab)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Make observations from several sources to construct an evidence-based account for natural phenomena.

FOSS Pebbles, Sand, and Silt
IG: pp. 79, 89, 96, 129, 146, 162, 168, 228, 235, 245, 250, 256
TR: pp. C22-C24, C42-C45

Elaboration on the GLE

1. ESS1.C: The History of Planet Earth

- Some events occur in cycles and others have a beginning and end. Some events happen very quickly; others occur very slowly over a time period much longer than one can observe.

FOSS Pebbles, Sand, and Silt
IG: pp. 88 (Step 8), 89 (Step 9), 90, 97, 110, 144-145, 167 (Step 30), 236
SRB: pp. 7 and 78
DOR: *All About Volcanoes, All About Land Formations*

Cross Cutting Concepts

1. Stability and Change

- Things may change slowly or rapidly.

FOSS Pebbles, Sand, and Silt
IG: pp. 80, 89, 95, 97, 130, 145, 165, 228, 236
TR: pp. D21-D23, D30-D31

Second Grade, Standard 3. Earth and Space Science

SC.2.3.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Grade Level Expectation:

Wind and water can change the shape of the land; models can show the shape and these changes to the land.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

1. Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. (2-ESS2-1)
[Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.]

FOSS Pebbles, Sand, and Silt
IG: pp. 95, 110, 144, 145, 163, 166, 165, 168, 256, 259, 260
EA: *Notebook Entry*, IG p. 259 (Step 7)
BM: pp. 12-13 (Items 4ab), pp. 22-23 (Item 4)

2. Develop a model to represent the shapes and kinds of land and bodies of water in an area. (2-ESS2-2)
[Boundary Statement: Does not include quantitative scaling in models.]

FOSS Pebbles, Sand, and Silt
IG: pp. 47, 49, 227, 229, 250-251, 258, 259
EA: *Notebook Entry*, IG p. 259 (Step 7)
BM: pp. 24-25 (Item 6)

3. Obtain information to identify where water is found on Earth and that it can be solid or liquid. (2-ESS2-3)

FOSS Pebbles, Sand, and Silt
IG: pp. 227, 250, 251, 252, 253
EA: *Notebook Entry*, IG p. 253 (Step 12)
BM: pp. 20-21 (Item 3), pp. 22-23 (Item 5)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Compare multiple solutions to a problem.

FOSS Pebbles, Sand, and Silt
IG: pp. 79, 129, 219, 220, 228, 256, 259
TR: pp. C22-C24, C42-C45

2. Developing and Using Models

- Develop a model to represent patterns in the natural world.

FOSS Pebbles, Sand, and Silt
IG: pp. 129, 165, 168, 227, 250, 258
TR: pp. C11-C13, C32-C33

3. Obtaining, Evaluating, and Communicating Information

- Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question.

FOSS Pebbles, Sand, and Silt
IG: pp. 228, 251, 252, 256, 258
TR: pp. D30-D31, D44-D47

Elaboration on the GLE

1. ESS2.A: Earth Materials and Systems

- Wind and water can change the shape of the land. The resulting landforms, together with the materials on the land, provide homes for living things.

FOSS Pebbles, Sand, and Silt
IG: pp. 95, 110, 144, 145, 163, 166, 165, 168, 256, 259, 260
SRB: pp. 3-10, 14-21, 22-23, 24-30, 68-78
DOR: *All About Land Formations*

2. ESS2.B: Plate Tectonics and Large-Scale System Interactions

- Rocks, soils, and sand are present in most areas where plants and animals live. There may also be rivers, streams, lakes and ponds. Maps show where things are located. One can map the shapes and kinds of land and water in any area.

FOSS Pebbles, Sand, and Silt
IG: pp. 47, 49, 227, 229, 250-251, 258, 259
SRB: pp. 81-91

3. ESS2.C: The Roles of Water in Earth's Surface Processes

- Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. It carries soil and rocks from one place to another and determines the variety of life forms that can live in a particular location.

FOSS Pebbles, Sand, and Silt
IG: pp. 227, 250, 251, 252, 253
SRB: pp. 50-60, 61-67

Cross Cutting Concepts

1. Patterns

- Patterns in the natural world can be observed.

FOSS Pebbles, Sand, and Silt
IG: pp. 251 (Steps 4 & 6), 252 (Steps 8-9), 253 (Step 10), 257 (Step 3)
TR: pp. D6-D8, D26-D27

2. Stability and Change

- Things may change slowly or rapidly.

FOSS Pebbles, Sand, and Silt
IG: pp. 2, 3, 45, 49, 80, 81, 89, 95, 97, 97, 110, 123, 125, 130, 131, 144, 145, 163, 165, 166, 168, 220, 221, 227, 228, 229, 240, 256, 259, 260
TR: pp. D21-D23, D30-D31

3. Influence of Science Engineering and Technology

- Developing and using technology has impacts on the natural world.

FOSS Pebbles, Sand, and Silt
IG: pp. 219, 220, 221, 227, 228, 256, 260
SRB: pp. 68-78

4. Connections to the Nature of Science

- Scientists study the natural and material world.

FOSS Pebbles, Sand, and Silt
IG: pp. 80, 88, 100, 107, 114, 130, 134, 221, 227, 240, 250, 256
SRB: pp. 50-60, 68-78

Third Grade, Standard 1. Physical Science

SC.3.1.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the interactions between objects and within systems of objects.

Grade Level Expectation:

Patterns of motion can be used to predict future motion.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object. (3-PS2-1)

[Clarification Statement: Examples could include an unbalanced force on one side of a ball can make it start moving; and balanced forces pushing on a box from both sides will not produce any motion at all.] [Boundary Statement: Limited to one variable at a time: number, size, or direction of forces. Does not include quantitative force size, only qualitative and relative.]

FOSS Motion and Matter
IG: pp. 79, 81, 83, 84-85, 87, 116 (Step 7), 117-118 (Steps 9-11), 119, 126-128, 129, 131, 166
EA: *Performance Assessment*, IG p. 106 (Step 6)
EA: Response Sheet, IG p. 107, SNM No. 3
BM: pp. 4-5 (Item 3), pp. 10-11 (Item 7), pp. 22-23 (Item 3ab), pp. 24-25 (Item 4ab), pp. 30-31 (Item 1abc)

b. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. (3-PS2-2)

[Clarification Statement: Examples of motion with a predictable pattern could include a child swinging in a swing, a ball rolling back and forth in a bowl, and two children on a seesaw.] [Boundary Statement: Does not include technical terms such as period and frequency.]

FOSS Motion and Matter
IG: pp. 123, 125, 126-127, 129, 131, 136 (Step 7), 142 (Step 4), 147 (Step 16), 154 (Steps 9-12), 166
EA: *Performance Assessment*, IG p. 155 (Step 13)
EA: *Notebook Entry*, IG p. 139 (Step 17)
EA: *Response Sheet,* IG p. 145, SNM Nos. 6-7
BM: pp. 4-5 (Item 2), pp. 8-9 (Item 6ab), pp. 32-33 (Item 2), pp. 34-35 (Item 3ab), pp. 36-37 (Item 4ab), pp. 38-39 (Item 5)
IA: *Physical Science Task 1—Swings*

Colorado Essential Skills and Science and Engineering Practices

1. Asking Questions and Defining Problems

- Ask questions that can be investigated based on patterns such as cause and effect.

FOSS Motion and Matter
IG: pp. 79, 80, 85, 94, 105, 108
SNM: No. 2
TR: pp. C7-C10, C34-C35

2. Asking Questions and Defining Problems

- Define a simple problem that can be solved though the development of a new or improved object or tool.

FOSS Motion and Matter
IG: pp. 172, 175, 176, 177, 199, 209, 211
SRB: pp. 42-45
TR: pp. C7-C10, C34-C35

3. Planning and Carrying Out Investigations.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered.

FOSS Motion and Matter
IG: pp. 80, 85, 105, 124, 129, 151, 154, 200
SNM: No. 8
TR: pp. C14-C17, C38-C39

4. Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.

FOSS Motion and Matter
IG: pp. 80, 85, 96, 124, 129, 136, 143
TR: pp. C14-C17, C38-C39

Elaboration on the GLE

1. PS2.A: Forces and Motion

- Each force acts on one particular object and has both strength and a direction. An object at rest typically has multiple forces acting on it, but they add to give zero net force on the object. Forces that do not sum to zero can cause changes in the object's speed or direction of motion. (Boundary: Qualitative and conceptual, but not quantitative addition of forces are used at this level.) The pattern of an objects' motion in various situations can be observed and measured; when an object's motion in various situations can be observed and measured; when that past motion exhibits a regular pattern, future motion can be predicted from it. (Boundary: Technical terms, such as magnitude, velocity, momentum, and vector quantity, are not introduced at this level, but the concept that some quantities need both size and direction to be described is developed.)

FOSS Motion and Matter
IG: pp. 79, 81, 83, 84-85, 87, 116 (Step 7), 117-118 (Steps 9-11), 119, 123, 125, 126-128, 129, 131, 136 (Step 7), 142 (Step 4), 147 (Step 16), 154 (Steps 9-12), 166
SRB: pp. 3, 10-15, 16-21
DOR: *All about Motion and Balance, "Roller Coaster Builder"*

2. PS2.B: Types of Interactions

- Objects in contact exert forces on each other.

FOSS Motion and Matter
IG: pp. 84-85, 87, 116 (Step 7), 117-118 (Steps 9-11), 119
SRB: pp. 3-7
DOR: *All about Motion and Balance*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified.

FOSS Motion and Matter
IG: pp. 86, 97, 99, 101, 109, 114, 137, 138, 144, 157, 165
TR: pp. D9-D11, D28-D29

2. Patterns

- Patterns of change can be used to make predictions.

FOSS Motion and Matter
IG: pp. 86, 106 (Step 4d), 143, 145, 146, 151
TR: pp. D5-D8, D28-D29

Third Grade, Standard 1. Physical Science

SC.3.1.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:

Objects in contact exert forces on each other; electric and magnetic forces between a pair of objects do not require contact.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. (3-PS2-3)
[Clarification Statement: Examples of an electric force could include the force on hair from an electrically charged balloon and the electrical forces between a charged rod and pieces of paper; examples of a magnetic force could include the force between two permanent magnets, the force between an electromagnet and steel paperclips, and the force exerted by one magnet versus the force exerted by two magnets. Examples of cause-and-effect relationships could include how the distance between objects affects strength of the force and how the orientation of magnets affects the direction of the magnetic force.] [Boundary Statement: Limited to forces produced by objects that can be manipulated by students, and electrical interactions are limited to static electricity.]

FOSS Motion and Matter
IG: pp. 79, 81, 82, 84, 87, 98-99 (Step 12), 101 (Step 17), 116 (Step 7), 119
EA: *Notebook Entry*, IG p. 99 (Step 14)
EA: *Performance Assessment*, IG p. 200 (Step 6)
BM: pp. 2-3 (Item 1abc), pp. 18-19 (Item 1ab), pp. 20-21 (Item 2), pp. 26-27 (Item 5), pp. 28-29 (Item 6)
IA: *Physical Science Task 1—Swings*

b. Define a simple design problem that can be solved by applying scientific ideas about magnets. (3-PS2-4)
[Clarification Statement: Examples of problems could include constructing a latch to keep a door shut and creating a device to keep two moving objects from touching each other.]

FOSS Motion and Matter
IG: pp. 176, 177, 210 (Steps 11-12)
EA: *Performance Assessment*, IG p. 200 (Step 6)
BM: pp. 28-29 (Item 6)
IA: *Physical Science Task 2—Toy Shed*

Science and Engineering Practices

1. Asking Questions and Defining Problems

- Ask questions that can be investigated based on patterns such as cause and effect relationships.

FOSS Motion and Matter
IG: pp. 79, 80, 85, 94, 105, 108
SNM: No. 2
TR: pp. C7-C10, C34-C35

2. Asking Questions and Defining Problems

- Define a simple problem that can be solved through the development of a new or improved object or tool.

FOSS Motion and Matter
IG: pp. 172, 175, 176, 177, 199, 209, 211
SRB: pp. 42-45
TR: pp. C7-C10, C34-C35

3. Planning and Carrying Out Investigations

- Plan and conduct an investigation that control variables and provide evidence to support explanations or design solutions.

FOSS Motion and Matter
IG: pp. 80, 85, 96, 124, 129, 136, 143
TR: pp. C14-C17, C38-C39

Elaboration on the GLE

1. PS2.B: Types of Interactions

- Electric, and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between two magnets, on their orientation relative to each other.

FOSS Motion and Matter
IG: pp. 79, 81, 82, 84, 87, 98-99 (Step 12), 101 (Step 17), 116 (Step 7), 119, 176, 177, 210 (Steps 11-12)
SRB: pp. 3-7, 42-45
SNM: No. 2
DOR: *"Magnetic Poles" , All about Magnets*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS Motion and Matter
IG: pp. 86, 97, 99, 101, 109, 114
TR: pp. D9-D11, D28-D29

2. Interdependence of Science, Engineering, and Technology

- Scientific discoveries about the natural world can often lead to new and improved technologies, which are developed through the engineering design process.

FOSS Motion and Matter
IG: p. 203 (Steps 13-14)
SRB: pp. 40-41, 42-45

Third Grade, Standard 2. Life Science

SC.3.2.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.

Grade Level Expectation:

Organisms have unique and diverse life cycles.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death. (3-LS1-1)
[Clarification Statement: Changes organisms go through during their life form a pattern.] [Assessment Boundary: Assessment of plant life cycles is limited to those of flowering plants.] [Boundary Statement: Limited to those of flowering plants and does not include details of human reproduction.]

FOSS Structures of Life
IG: pp. 82, 83, 84, 86, 88-89, 91, 99, 140, 145, 147, 149 151-152, 153, 169-171 (Steps 9-15), 173 (Steps 21-21), 182
EA: *Notebook Entry,* IG p. 170 (Step 13)
BM: pp. 6-7 (Item 4ab), 9-10 (Item 6), 16-17 (Item 12)
IA: *Life Science Task 1— Life Cycles*

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop models to describe phenomena.

FOSS Structures of Life
IG: pp. 81, 82, 87, 90, 135, 137, 146, 152, 170
TR: pp. C11-C13, C36-C37

Elaboration on the GLE

1. LS1.B: Growth and Development of Organisms

- Reproduction is essential to the continued existence of every kind of organism. Plants and animals have unique and diverse life cycles.

FOSS Structures of Life
IG: pp. 82, 83, 84, 86, 88-89, 91, 99, 140, 145, 147, 149 151-152, 153, 169-171 (Steps 9-15), 173 (Steps 21-21), 182
SRB: p. 3-7, 22-25, 26-33, 47-49
DOR: "Life Cycles" , All About Animal Life Cycles

Cross Cutting Concepts

1. Patterns

- Patterns of change can be used to make predictions.

FOSS Structures of Life
IG: pp. 85, 90, 101, 104, 117, 119, 152, 162, 170 (Step 13), 173
TR: pp. D5-D8, D28-D29

Third Grade, Standard 2. Life Science

SC.3.2.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

Grade Level Expectation:

Being part of a group helps animals form groups that help members survive.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Construct an argument that some animals form groups that help members survive. (3-LS2-1)

FOSS Structures of Life
IG: pp. 187, 191, 246 (Step 18), 248-249 (Steps 21-22), 249 (Step 23), 272
EA: Response Sheet IG: p. 257, SNM No. 23
BM: pp. 4-5 (Items 2-3)

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Construct an argument with evidence, data, and/or a model.

FOSS Structures of Life
IG: pp. 188, 202, 244-245, 250, 268 (Step 14), 261
TR: pp. C27-C31, C44-C45

Elaboration on the GLE

1. LS2.D: Social Interactions and Group Behavior

- Being part of a group helps animals obtain food, defend themselves, and cope with changes. Groups may serve different functions and vary dramatically in size.

FOSS Structures of Life
IG: pp. 187, 191, 246 (Step 18), 248-249 (Steps 21-22), 249 (Step 23), 272
SNM: No. 21
DOR: *All About Animal Behavior and Communication* & *Humphrey, the Lost Whale: A True Story*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Structures of Life
IG: pp. 202, 242, 257, 260, 261, 270
TR: pp. D9-D11, D28-D29

Third Grade, Standard 2. Life Science

SC.3.2.3

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

Grade Level Expectation:

Different organisms vary in how they look and function because they have different inherited information; the environment also affects the traits that an organism develops.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. (3-LS3-1)

[Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Boundary Statement: Does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

FOSS Structures of Life
IG: pp. 145, 147, 149, 151, 182, 272, 279, 281, 293, 309 (Step 9), 341
EA: Performance Assessment, IG: p. 309 (Step 10)
BM: pp. 2-3 (Item 1), pp. 18-19 (Item 1ab), pp. 24-25 (Items 5-6)

b. Use evidence to support the explanation that traits can be influenced by the environment. (3-LS3-2)

[Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and a pet dog that is given too much food and little exercise may become overweight.]

FOSS Structures of Life
IG: pp. 187, 189, 194-195, 201, 203, 232 (Step 24), 233 (Step 26), 237 (Step 38), 272
EA: Response Sheet, IG p. 257, SNM No. 23
BM: pp. 8-9 (Item 5ab), pp. 26-27 (Item 1ab), pp. 32-33 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena using logical reasoning.

FOSS Structures of Life
IG: pp. 146, 152, 158, 169, 280, 291, 301, 309, 320, 336
TR: pp. C18-C20, C40-C41

2. Constructing Explanations and Designing Solutions

- Use evidence (e.g., observations, patterns) to support an explanation.

FOSS Structures of Life
IG: pp. 188, 190, 202, 230, 238, 244, 268, 270
TR: pp. C23-C31, C42-C43

3. Constructing Explanations and Designing Solutions

- Use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

FOSS Structures of Life
IG: pp. 188, 190, 202, 230, 238, 244, 268, 270
TR: pp. C23-C31, C42-C43

Elaboration on the GLE

1. LS3.A: Inheritance of Traits

- Many characteristics of organisms are inherited from their parents. Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment.

FOSS Structures of Life
IG: pp. 145, 147, 149, 151, 182, 187, 189, 194-195, 201, 203, 232 (Step 24), 233 (Step 26), 237 (Step 38), 272, 279, 281, 293, 309 (Step 9), 341
DOR: "Walking Stick Survival"

2. LS3.B: Variation of Traits

- Different organisms vary in how they look and function because they have different inherited information. The environment also affects the traits that an organism develops.

FOSS Structures of Life
IG: pp. 187, 189, 194-195, 201, 203, 232 (Step 24), 233 (Step 26), 237 (Step 38), 272, 283-284, 309 (Step 9 and 10), 310 (Step 10), 336 (Step 11), 341
DOR: "Walking Stick Survival"

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

Cross Cutting Concepts

1. Patterns

- Similarities and differences in patterns can be used to sort and classify natural phenomena.

FOSS Structures of Life
IG: p. 152, 162, 173, 335 (Step 10)
TR: pp. D5-D8, D28-D29

2. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Structures of Life
IG: pp. 202, 235 (Step 31), 242, 260, 261, 270
TR: pp. D9-D11, D28-D29

Third Grade, Standard 2. Life Science

SC.3.2.4

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.

Grade Level Expectation:

Some living organisms resemble organisms that once lived on Earth.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. (3-LS4-1)
[Clarification Statement: Examples of data could include type, size, and distributions of fossil organisms. Examples of fossils and environments could include marine fossils found on dry land, tropical plant fossils found in Arctic areas, and fossils of extinct organisms.] [Boundary Statement: Does not include identification of specific fossils or present plants and animals. Assessment is limited to major fossil types and relative ages.]

FOSS Structures of Life
IG: pp. 279, 281, 291, 293, 312 (Steps 20-21), 313 (Steps 22-23), 340-341
EA: *Reading in Science Resources*, IG p. 311 (Steps 17-18), IG p. 313 (Step 22)
BM: pp. 9-10 (Item 7), pp. 14-15 (Item 9)

b. Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)
[Clarification Statement: Examples of cause-and-effect relationships could be plants that have larger thorns than other plants may be less likely to be eaten by predators; and animals that have better camouflage coloration than other animals may be more likely to survive and therefore more likely to leave offspring.]

FOSS Structures of Life
IG: pp. 187, 189, 193-194, 201, 233 (Step 27), 272
EA: Answer the Focus Question, IG p. 237 (Step 38)
BM: pp. 12-13 (Item 8ab)
IA: Life Science Task 2—Walking Sticks

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena using logical reasoning.

FOSS Structures of Life
IG: pp. 280, 291, 301, 309, 320, 336
TR: pp. C18-C20, C40-C41

2. Constructing Explanations and Designing Solutions

- Use evidence (e.g., observations, patterns) to construct an explanation.

FOSS Structures of Life
IG: pp. 188, 190, 202, 230, 238, 244, 268, 270
TR: pp. C23-C31, C42-C43

3. Engaging in Argument from Evidence

- Critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world.

FOSS Structures of Life
IG: pp. 188, 190, 202, 244-245, 250
TR: pp. C27-C31, C44-C45

Elaboration on the GLE

1. LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments.

FOSS Structures of Life
IG: pp. 279, 281, 291, 293, 312 (Steps 20-21), 313 (Steps 22-23), 340-341
SRB: pp. 68-69, 81-88
DOR: All About Fossils

2. LS4.B: Natural Selection

- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing.

FOSS Structures of Life
IG: pp. 187, 189, 193-194, 201, 233 (Step 27), 272
SNM: Nos. 17-20
DOR: "Walking Stick Survival"

Cross Cutting Concepts

1. Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods.

FOSS Structures of Life
IG: pp. 292, 310, 312
TR: pp. D12-D13, D30-D31

2. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Structures of Life
IG: pp. 224, 267, 268, 270
TR: pp. D14-D16, D30-D31

3. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Structures of Life
IG: pp. 202, 235 (Step 31), 242, 260, 261, 270
TR: pp. D9-D11, D28-D29

Third Grade, Standard 2. Life Science

SC.3.2.5

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.

Grade Level Expectation:

Sometimes differences in characteristics between individuals of the same species provide advantages in survival and reproduction.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Construct an argument with evidence that in a particular habitat some organisms can survive well, some survive less well, and some cannot survive at all. (3-LS4-3)
[Clarification Statement: Examples of evidence could include needs and characteristics of the organisms and habitats involved. The organisms and their habitat make up a system in which the parts depend on each other.]

FOSS Structures of Life
IG: pp. 187, 189, 191, 193-194, 201, 203, 247-248 (Steps 19-20), 272
EA: IG p. 237 (Step 38)
BM: pp. 16-17 (Item 12)**,** pp. 34-35 (Item 1ab)**,** pp. 36-37 (Item 2), pp. 38-39 (Item 4ab)**,** pp. 40-41 (Item 5)
IA: *Life Science Task 2—Walking Sticks*

b. Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change. (3-LS4-4)
[Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Boundary Statement: Limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]

FOSS Structures of Life
IG: pp. 187, 260-261 (Steps 18-21), 268 (Step 14), 272
EA: IG p. 261 (Step 21)
BM: pp. 14-15 (Item 10)**,** pp. 16-17 (Item 11)**,** pp. 42-43 (Item 7)

IG: Investigations Guide • TR**:** Teacher Resources • SRB**:** Student *Science Resources* Book • DOR**:** Digital-Only Resources
EA: Embedded Assessment • BM**:** Benchmark Assessment • IA**:** Interim Assessment

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena using logical reasoning.

FOSS Structures of Life
IG: pp. 146, 152, 158, 169, 280, 291, 301, 309, 320, 336
TR: pp. C18-C20, C40-C41

2. Engaging in Argument from Evidence

- Use evidence to construct an explanation

FOSS Structures of Life
IG: pp. 188, 190, 202, 244-245, 250
TR: pp. C27-C31, C44-C45

3. Engaging in Argument from Evidence

- Use evidence to construct an explanation

FOSS Structures of Life
IG: pp. 188, 190, 202, 244-245, 250
TR: pp. C27-C31, C44-C45

4. Engaging in Argument from Evidence

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

FOSS Structures of Life
IG: pp. 188, 202, 244-245, 250, 268 (Step 14), 261
TR: pp. C27-C31, C44-C45

Elaboration on the GLE

1. LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- When the environment changes in ways that affect a place's physical characteristics, temperature, or availability of resources, some organisms survive and reproduce, others move to new locations, yet others move into the transformed environment, and some die.

FOSS Structures of Life
IG: pp. 187, 260-261 (Steps 18-21), 268 (Step 14), 272
SRB: pp. 66-69
DOR: *"Where Does It Live?"*
"What Doesn't Belong?"
All About Fossils

2. LS4.C: Adaptation

- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all.

FOSS Structures of Life
IG: pp. 187, 189, 191, 193-194, 201, 203, 247-248 (Steps 19-20), 272
SNM: Nos. 15, 16
SRB: pp. 42-49, 50-63
DOR: All About Animal Adaptations
"Where Does It Live?"
"What Doesn't Belong?"

3. LS4.D: Biodiversity and Humans

- Populations live in a variety of habitats, and change in those habitats, affects the organisms living there. (3-LS4-4)

FOSS Structures of Life
IG: pp. 187, 260-261 (Steps 18-21), 268 (Step 14), 272
SRB: pp. 66-69
DOR: *"Where Does It Live?" & "What Doesn't Belong?" & All About Fossils*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Structures of Life
IG: pp. 202, 242
TR: pp. D9-D11, D28-D29

2. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Structures of Life
IG: pp. 224, 267, 268, 270
TR: pp. D14-D16, D30-D31

Third Grade, Standard 3. Earth and Space Science

SC.3.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Grade Level Expectation:

Climate describes patterns of typical weather conditions over different scales and variations; historical weather patterns can be analyzed.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. (3-ESS2-1)
[Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Boundary Statement: Graphical displays is limited to pictographs and bar graphs. Does not include climate change.]

FOSS Water and Climate
IG: pp. 196, 200, 202-203, 207 (Step 9), 214-215 (Steps 18-19), 256, 259, 261
EA: *Performance Assessment*, IG p. 212 (Step 13), IG p. 226 (Step 4)
EA: Notebook Entry, IG p. 269 (Step 13)
BM: pp. 14-15 (Item 10), pp. 46-47 (Items 2-3, pp. 50-51 (Item 7), pp. 56-59 (Items 1ab-2), pp. 60-61 (Item 4)
IA: *Earth Science Task 1—Seasons*

b. Obtain and combine information to describe climates in different regions of the world. (3-ESS2-2)

FOSS Water and Climate
IG: pp. 253, 255, 256, 257, 259, 261, 272 (Step 1), 275 (Steps 11-12), 276 (Step 13)
EA: Notebook Entry, IG p. 277 (Step 16)
BM: pp. 12-13 (Item 9), pp. 18-19 (Item 12ab), pp. 62-63 (Item 5), pp. 64-65 (Item 7)
IA: *Earth Science Task 2—Climate*

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data.

- Represent data in tables and various graphical displays (bar graphs, pictographs) to reveal patterns that indicate relationships.

FOSS Water and Climate
IG: pp. 192, 194, 201, 212, 213, 227, 228, 233, 253, 254, 259, 266, 267
TR: pp. C18-C20, C40-C41

2. Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and other reliable media to explain phenomena.

FOSS Water and Climate
IG: pp. 254, 259, 276, 283, 284
TR: pp. C32-C33, C46-C47

Elaboration on the GLE

1. ESS2.D: Weather and Climate

- Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years.

FOSS Water and Climate
IG: pp. 196, 200, 202-203, 207 (Step 9), 214-215 (Steps 18-19), 253, 255, 256, 257, 259, 261, 272 (Step 1), 275 (Steps 11-12), 276 (Step 13)
SRB: pp. 30-36, 48-54
DOR: *"Weather Grapher" & "Climate Regions Map"*

Crosscutting Concepts

1. Patterns

- Patterns of change can be used to make predictions.

FOSS Water and Climate
IG: pp. 201, 212, 213, 215, 222, 236, 260, 268, 269, 273, 277
TR: pp. D5-D8, D28-D29

Third Grade, Standard 3. Earth and Space Science

SC.3.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.

Grade Level Expectation:

Climate describes patterns of typical weather conditions over different scales and variations; historical weather patterns can be analyzed.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. (3-ESS3-1)
[Clarification Statement: Examples of design solutions to weather-related hazards could include barriers to prevent flooding, wind resistant roofs, and lightning rods.]

FOSS Water and Climate
IG: pp. 253, 255, 258, 259, 261, 284-285 (Steps 11-13)
EA: Notebook Entry**,** IG p. 285 (Step 16)
BM: pp. 58-59 (Item 3)

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Make a claim about the merit of a solution to a problem by citing relevant evidence about how it meets the criteria and constraints of the problem.

FOSS Water and Climate
IG: pp. 292, 299, 319, 325
TR: pp. C27-C31, C44-C45

Elaboration on the GLE

1. ESS3.B: Natural Hazards

- A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

FOSS Water and Climate
IG: pp. 253, 255, 258, 259, 261, 284-285 (Steps 11-13)
SRB: pp. 55-60, 61-62

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS Water and Climate
IG: pp. 260, 282, 284, 300, 307, 310
TR: pp. D9-D11, D28-D29

Fourth Grade, Standard 1. Physical Science

SC.4.1.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:

The faster an object moves the more energy it has.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Use evidence to construct an explanation relating the speed of an object to the energy of that object. (4-PS3-1)
*[**Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.]*
[Boundary Statement: Does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]

FOSS Energy
IG: pp. 301 (Step 5), 303 (Step 11), 304 (Step 15), 314 (Step 13), 320 (Step 26), 321
EA: *Notebook Entry*, IG p. 304 (Step 15)
EA: *Response Sheet*, IG p. 315, SNM No. 25
BM: pp. 12-13 (Item 8), pp. 54-55 (Items 2ab), pp. 56-57 (Item 3), pp. 62-63 (Item 9)
IA: *Physical Science Task 1—Speed and Energy*

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Use evidence (e.g., measurements, observations, patterns) to construct an explanation.

FOSS Energy
IG: pp. 303, 304, 306 (Step 20), 314, 321
TR: pp. C23-C26, C46-C53

IG: Investigations Guide • **TR**: Teacher Resources • **SRB**: Student *Science Resources* Book • **DOR**: Digital-Only Resources
EA: Embedded Assessment • **BM**: Benchmark Assessment • **IA**: Interim Assessment

Elaboration on the GLE

1. PS3.A: Definitions of Energy

- The faster a given object is moving, the more energy it possesses. Energy can also be transferred from place to place by moving objects or through sound, light or electric currents.

FOSS Energy
IG: pp. 127-128 (Steps 19-21), 164, 169, 271, 293, 296 (Step 16), 301 (Step 5), 303 (Step 11), 304 (Step 15), 314 (Step 13), 316 (Steps 17-19), 320 (Step 26), 321, 368-369 (Steps 22-24)
SRB: pp. 3-7, 100-105
DOR: *All About Transfer of Energy* & "Reflecting Light

Cross Cutting Concepts

1. Energy and Matter

- Energy can be transferred in various ways and between objects.

FOSS Energy
IG: pp. 277, 286, 293, 295, 314, 321, 322
TR: pp. D18-D20, D34-D35

Fourth Grade, Standard 1. Physical Science

SC.4.1.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:

Energy can be moved from place to place.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents. (4-PS3-2)
[Boundary Statement: Does not include quantitative measurements of energy.]

FOSS Energy
IG: pp. 123 (Step 10), 126 (Step 18), 127-128 (Steps 19-21), 164, 169, 271, 293, 294-295 (Steps 13-15), 296 (Step 16), 314 (Step 13), 316 (Steps 17-19), 320 (Step 26), 321, 368-369 (Steps 22-24)
EA: *Performance Assessment*, IG p. 255 (Step 6), IG p. 293 (Step 10)
BM: pp. 8-9 (Item 4), pp. 22-23 (Items 4-5), pp. 24-25 (Item 6), pp. 26-27 (Items 7-8), pp.56- 57 (Item 4), pp. 58-59 (Item 5), 62-63 (Item 9)

Science and Engineering Practices

1. 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)

FOSS Energy
IG: pp. 121, 138, 140, 152, 153, 246, 302, 311, 312
TR: pp. C14-C17, C38-C41

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

Elaboration on the GLE

1. 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. Light also transfers energy from place to place. 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.

FOSS Energy
IG: pp. 127-128 (Steps 19-21), 164, 169, 271, 293, 296 (Step 16), 314 (Step 13), 316 (Steps 17-19), 320 (Step 26), 321, 368-369 (Steps 22-24)
SRB: pp. 3-7, 100-105
DOR: *All About Transfer of Energy* & "Reflecting Light"

Cross Cutting Concepts

1. Energy and Matter

- Energy can be transferred in various ways and between objects.

FOSS Energy
IG: pp. 125, 129, 137, 139, 142, 156, 248, 260, 295, 314
TR: pp. D18-D20, D34-D35

Fourth Grade, Standard 1. Physical Science

SC.4.1.3

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:

When objects collide contact forces transfer so as to change objects' motion.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Ask questions and predict outcomes about the changes in energy that occur when objects collide. (4-PS3-3)
[Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Boundary Statement: Does not include quantitative measurements of energy.]

FOSS Energy
IG: pp. 305-306 (Steps 17-19), 317-318 (Steps 20-22), 320 (Step 26), 321
EA: *Performance Assessment*, IG p. 293 (Step 10)
EA: *Response Sheet,* IG p. 315, SNM No. 25
BM: pp. 2-3 (Items 1ab), pp. 4-5 (Items 2ab), pp. 58-59 (Item 6), pp. 60-61 (Item 7), pp. 62-63 (Item 8)
IA: *Physical Science Task 1—Speed and Energy*

Colorado Essential Skills and Science and Engineering Practices

1. Asking Questions and Defining Problems

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.

FOSS Energy
IG: pp. 285, 315, 338, 381
TR: pp. C7-C10, C34-C35

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

Disciplinary Core Ideas

1. PS3.C: Relationship Between Energy and Forces

- When objects collide, the contact forces transfer energy so as to change the objects' motions.

FOSS Energy
IG: pp. 305-306 (Steps 17-19), 317-318 (Steps 20-22), 320 (Step 26), 321
SRB: pp. 74-77, 79-82
DOR: *All About Transfer of Energy*

Cross Cutting Concepts

1. Energy and Matter

- Energy can be transferred in various ways and between objects.

FOSS Energy
IG: pp. 295, 314, 351, 352, 366
TR: pp. D18-D20, D34-D35

Fourth Grade, Standard 1. Physical Science

SC.4.1.4

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how energy is transferred and conserved.

Grade Level Expectation:

Energy can be produced, used or released by converting stored energy.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. (4-PS3-4)
[Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.] [Boundary Statement: Does not include quantitative measures of changes in speed of an object or any precise or quantitative definition of energy.]

FOSS Energy
IG: pp. 120 (Step 2), 169, 271, 321, 384
EA: *Notebook Entry*, IG p. 126 (Step 17)
EA: *Response Sheet,* IG p. 156, SNM No. 7
EA: *Performance Assessment*, IG p. 255 (Step 6), IG p. 293 (Step 10), IG p. 381 (Step 18)
EA: *Review*, IG p. 351 (Step 13)
BM: pp. 2-3 (Items 1ab), pp. 4-5 (Items 2ab), pp. 58-59 (Item 6), pp. 60-61 (Item 7), pp. 62-63 (Item 8)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Apply scientific ideas to solve design problems.

FOSS Energy
IG: pp. 124, 126, 141, 249, 264, 266, 303, 304, 314, 357, 363
TR: pp. C23-C26, C46-C53

Elaboration on the GLE

1. 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.

FOSS Energy
IG: pp. 120 (Step 2), 169, 271, 321, 384

Cross Cutting Concepts

1. Energy and Matter

- Energy can be transferred in various ways and between objects.

FOSS Energy
IG: pp. 125, 129, 137, 139, 142, 156, 248, 260, 295, 314, 352, 366
TR: pp. D18-D20, D34-D35

2. Influence of Engineering, Technology, and Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones.

FOSS Energy
IG: pp. 112, 164-165, 264-266
SRB: pp. 58-64, 114-118

3. World Science is a Human Endeavor

- Most scientists and engineers work in teams. Science affects everyday life.

FOSS Energy
IG: pp. 165 (Step 7), 167 (Steps 13-14), 168 (Step 15), 269 (Step 17)
SRB: pp. 21-24, 25-29

Fourth Grade, Standard 1. Physical Science

SC.4.1.5

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Grade Level Expectation:

Waves are regular patterns of motion.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

1. Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move. (4-PS4-1)
[Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Boundary Statement: Does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]

FOSS Energy
IG: pp. 341, 348-349 (Steps 10-11), 351-352 (Steps 14-16), 353-355 (Steps 19-22), 384
EA: *Notebook Entry*, IG p. 352 (Step 18)
BM: pp. 6-7 (Items 3ab)

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a model using an analogy, example, or abstract representation to describe a scientific principle.

FOSS Energy
IG: pp. 338, 347, 361, 365
TR: pp. C11-C13, C34-C37

Elaboration on the GLE

1. 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. Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks).

FOSS Energy
IG: pp. 341, 348-349 (Steps 10-11), 351-352 (Steps 14-16), 353-355 (Steps 19-22), 384
SRB: pp. 86-90
DOR: *All About Waves*

Cross Cutting Concepts

1. Patterns

- Similarities and differences in patterns can be used to sort, classify and analyze simple rates of change for natural phenomena.

FOSS Energy
IG: pp. 346, 347, 351, 352, 357
TR: pp. D6-D9, D28-D29

Fourth Grade, Standard 1. Physical Science

SC.4.1.6

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Grade Level Expectation:

An object can be seen when light reflected from its surface enters the eyes.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen. (4-PS4-2)
[Boundary Statement: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

FOSS Energy
IG: pp. 361 (Step 1), 363 (Step 9), 366 (Step 17), 369-370 (Steps 25-27), 384
EA: *Response Sheet*, IG p. 367, SNM No. 28
BM: pp. 8-9 (Item 5), pp. 10-11 (Item 7)
IA: *Physical Science Task 2—Hide and Seek*

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a model to describe phenomena.

FOSS Energy
IG: pp. 338, 347, 361, 365
TR: pp. C11-C13, C34-C37

Elaboration on the GLE

1. PS4.B: Electromagnetic Radiation

- An object can be seen when light reflected from its surface enters the eyes.

FOSS Energy
IG: pp. 361 (Step 1), 363 (Step 9), 366 (Step 17), 369-370 (Steps 25-27), 384
SRB: pp. 106-110
DOR: *All About Light*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified.

FOSS Energy
IG: pp. 346, 347, 351, 352, 357, 363, 371, 378
TR: pp. D10-D12, D28-D31

Fourth Grade, Standard 1. Physical Science

SC.4.1.7

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how waves are used to transfer energy and information.

Grade Level Expectation:

Patterns can encode, send, receive and decode information.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Generate and compare multiple solutions that use patterns to transfer information. (4-PS4-3)
[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.]

FOSS Energy
IG: pp. 269 (Step 17), 267-268 (Steps 13-15), 271
EA: *Notebook Entry*, IG p. 20, SNM No. 21
BM: pp. 12-13 (Item 9), pp. 50-51 (Item 9)

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

FOSS Energy
IG: pp. 249, 255, 264, 266
TR: pp. C23-C26, C46-C53

Elaboration on the GLE

1. 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.

FOSS Energy
IG: pp. 269 (Step 17), 267-268 (Steps 13-15), 271
SRB: pp. 58-64

Cross Cutting Concepts

1. Patterns

- Similarities and differences in patterns can be used to sort and classify designed products.

FOSS Energy
IG: pp. 240, 255, 266 (Step 8)
TR: pp. D6-D9, D28-D29

2. Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering.

FOSS Energy
IG: pp. 250-251 (17-19), 259 (Step 16), 266 (Step 12)
SRB: pp. 44-46, 49-57

Fourth Grade, Standard 2. Life Science

SC.4.2.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior and reproduction.

Grade Level Expectation:

Organisms have both internal and external structures that serve various functions.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction. (4-LS1-1)
[Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin.] [Boundary Statement: Stress at this level is on understanding the macroscale systems and their functions, not on the microscopic scale.]

FOSS Environments
IG: pp. 126 (Steps 27-28), 153, 155, 160, 163, 185 (Step 25), 262 (Step 15), 273, 311 (Steps 48-49)
EA: *Response Sheet*, IG p. 211, SNM Nos. 12-13
BM: pp. 2-3 (Items 1-2), pp. 4-5 (Item 3), pp. 8-9 (Item 7), pp. 16-17 (Item1a), pp. 18-19 (Item 3), pp. 20-21 (Item 5), pp. 22-23 (Item 6), pp. 28-29 (Item 1b), pp. 34-35 (Item 6), pp. 40-41 (Item 1d), pp. 46-47 (Item 6), pp. 48-49 (Items 2ab)
IA: *Life Science Task 1—Structure Function*

b. 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. (4-LS1-2)
[Clarification Statement: Emphasis is on systems of information transfer.] [Boundary Statement: Does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

FOSS Environments
IG: pp. 145, 101 (Step 6), 208-209 (Step 13), 210-211 (Step 17), 212 (Steps 20-22), 215
EA: IG pp. 212-213 (Step 22)
BM: pp. 6-7 (Items 5-6), pp. 8-9 (Item 8), pp. 18-19 (Item 3), pp. 24-25 (Items 7-8), pp. 32-33 (Item 4)
IA: *Life Science Task 2—Star Nosed Mole*

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Construct an argument with evidence, data, and/or a model.

FOSS Environments
IG: pp. 125, 129, 154, 161, 189, 263, 282, 291, 312, 313
TR: pp. C27-C31, C54-C55

2. Developing and Using Models

- Use a model to test interactions concerning the functioning of a natural system.

FOSS Environments
IG: pp. 127, 153, 154, 180, 196, 201, 210
TR: pp. C11-C13, C34-C37

Elaboration on the GLE

1. LS1.A: Structure and Function

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction.

FOSS Environments
IG: pp. 126 (Steps 27-28), 153, 155, 160, 163, 185 (Step 25), 262 (Step 15), 273, 311 (Steps 48-49)
SRB: pp. 16-17, 91-92
DOR: "Virtual Investigation: Trout Range of Tolerance"

2. 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.

FOSS Environments
IG: pp. 145, 101 (Step 6), 208-209 (Step 13), 210-211 (Step 17), 212 (Steps 20-22), 215
SRB: pp. 17, 48-54
DOR: *Animal Language and Communication, Sense of Hearing*

Cross Cutting Concepts

1. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Environments
IG: pp. 128, 141, 183, 186, 239, 269
TR: pp. D15-D17, D32-D33

Fourth Grade, Standard 3. Earth and Space Science

SC.4.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

Earth has changed over time.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time. (4-ESS1-1)
[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.] [Boundary Statement: 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.]

FOSS Soils, Rocks, and Landforms
IG: pp. 194-195 (Steps 5-6), 198-199 (Steps 16-18), 199-200 (Steps 20-23), 258
EA: *Performance Assessment*, IG p. 180 (Step 23)
EA: *Notebook Entry*, IG p. 197 (Step 15)
BM: pp. 12-13 (Item 8), pp. 18-19 (Item 1ab), pp. 22-23 (Item 4), pp. 30-31 (Items 1ab), pp. 32-33 (Item 2)
IA: *Earth Science Task 1—Changing Landscapes*

Colorado Essential Skills and Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Identify the evidence that supports particular points in an explanation.

FOSS Soils, Rocks, and Landforms
IG: pp. 166, 175, 176, 178, 182, 188, 196, 248, 253, 254
TR: pp. C23-C26, C46-C53

Elaboration on the GLE

1. 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.

FOSS Soils, Rocks, and Landforms
IG: pp. 194-195 (Steps 5-6), 198-199 (Steps 16-18), 199-200 (Steps 20-23), 258
SRB: pp. 23-26, 27-30
DOR: *Fossils* & "Tutorial: Fossils"

Cross Cutting Concepts

1. Patterns

- Patterns can be used as evidence to support an explanation.

FOSS Soils, Rocks, and Landforms
IG: pp.156, 164, 188, 216, 244
TR: pp. D6-D9, D28-D29

2. Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

FOSS Soils, Rocks, and Landforms
IG: pp. 102, 105, 127, 139, 164, 188, 244

Fourth Grade, Standard 3. Earth and Space Science

SC.4.3.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

Four major Earth systems interact.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation. (4-ESS2-1)
[Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of 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.] [Boundary Statement: Limited to a single form of weathering or erosion.]

FOSS Soils, Rocks, and Landforms
IG: pp. 89, 92-93, 101 (Step 3), 124, 129-130 (Steps 18-21), 131-132 (Step 23), 142, 168-169 (Steps 18-20), 181 (Step 27), 182 (Step 28), 201
EA: *Observation*, IG p. 114 (Step 6)
EA: *Response Sheet*, IG p. 118, SNM No. 3
EA: *Performance Assessment*, IG p. 124 (Step 7), IG p. 180 (Step 23)
BM: pp. 12-13 (Item 8), pp. 18-19 (Items 1ab), pp. 22-23 (Item 4), pp. 30-31 (Items 1ab), pp. 32-33 (Item 2)
IA: *Earth Science Task 2—Erosion*

Science and Engineering Practices

1. Planning and Carrying Out Investigations

- Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (4-ESS2-1)

FOSS Soils, Rocks, and Landforms
IG: pp. 103, 114, 124, 139, 163, 175, 176, 179. 182 (Step 28), 187
TR: pp. C14-C17, C38-C41
DOR: "Virtual Investigation: Stream Tables"

IG: Investigations Guide • **TR**: Teacher Resources • **SRB**: Student *Science Resources* Book • **DOR**: Digital-Only Resources
EA: Embedded Assessment • **BM**: Benchmark Assessment • **IA**: Interim Assessment

Elaboration in the GLE

1. 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.

FOSS Soils, Rocks, and Landforms
IG: pp. 124, 129-130 (Steps 18-21), 131-132 (Step 23), 142, 168-169 (Steps 18-20), 181 (Step 27), 182 (Step 28), 201
SRB: pp. 6-8, 9-14
DOR: *Weathering and Erosion*
"Tutorial: Weathering"

2. ESS2.E: Biogeology

- Living things affect the physical characteristics of their regions.

FOSS Soils, Rocks, and Landforms
IG: pp. 89, 92-93, 101 (Step 3), 142
SRB: pp. 4-5
DOR: *Soils*
"Tutorial: Soil Formation"

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS Soils, Rocks, and Landforms
IG: pp. 114, 117, 119, 124, 127, 128, 133, 164, 166, 169, 175, 177, 178, 187, 189, 195, 196
TR: pp. D10-D12, D28-D31

Fourth Grade, Standard 3. Earth and Space Science

SC.4.3.3

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

Earth's physical features occur in patterns.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Analyze and interpret data from maps to describe patterns of Earth's features. (4-ESS2-2)
[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.]

FOSS Soils, Rocks, and Landforms
IG: pp. 227 (Steps 21-23), 239 (Step 16), 240 (Step 18), 256 (Steps 9-11), 258
EA: *Performance Assessment*, IG p. 180 (Step 23), IG p. 245 (Step 5)
BM: *pp. 6-7 (Items 4ab),* pp. 16-17 (Items 11ab), pp. 42-43 (Items 1abc), pp. 48-49 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Analyze and interpret data to make sense of phenomena using logical reasoning.

FOSS Soils, Rocks, and Landforms
IG: pp. 164, 176, 180, 233, 236, 237, 244, 253
TR: pp. C18-C20, C40-C45

Elaboration on the GLE

1. 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 continents or near their edges. Maps can help locate the different land and water features areas of Earth.

FOSS Soils, Rocks, and Landforms
IG: pp. 227 (Steps 21-23), 239 (Step 16), 240 (Step 18), 256 (Steps 9-11), 258
SRB: pp. 31-33, 38-49
DOR: *Volcanoes*
"Topographer"

Cross Cutting Concepts

1. Patterns

- Patterns can be used as evidence to support an explanation.

FOSS Soils, Rocks, and Landforms
IG: pp. 164, 180, 188, 244
TR: pp. D6-D9, D28-D29

Fourth Grade, Standard 3. Earth and Space Science

SC.4.3.4

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

Energy and fuels that humans use are derived from natural sources and their use affects the environment in multiple ways.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. (4-ESS3-1)
[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.]

FOSS Soils, Rocks, and Landforms
IG: pp. 268-270, 278 (Step 6), 283 (Step 15), 301
EA: *Response Sheet*, IG p. 280, SNM No. 18
EA: *Notebook Entry*, IG p. 291 (Step 15)
BM: pp. 8-9 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and other reliable media to explain phenomena.

FOSS Soils, Rocks, and Landforms
IG: pp. 277, 279, 280, 281, 282, 291, 299
TR: pp. C32-C33, C56-C61

Elaboration on the GLE

1. ESS3.A: Natural Resources

- Energy and fuels that humans use are derived from natural sources, and their use affects the environment in multiple ways. Some resources are renewable over time, and others are not.

FOSS Soils, Rocks, and Landforms
IG: pp. 268-270, 278 (Step 6), 283 (Step 15), 301
DOR: *Natural Resources*
"Resource ID" & "Virtual Investigation: Natural Resources"

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Soils, Rocks, and Landforms
IG: pp. 277 (Step 2), 290
TR: pp. D10-D12, D28-D31

2. Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering.

FOSS Soils, Rocks, and Landforms
IG: pp. 282 (Steps 12-14) and 289 (9-11)
SRB: pp. 55-59, 60-64

3. Influence of Engineering, Technology, and Applications of Science

- Over time, people's needs and wants change, as do their demands for new and improved technologies.

FOSS Soils, Rocks, and Landforms
IG: pp. 281 (Steps 10-11) and 289 (9-11)
SRB: pp. 50-54, 60-64

Fourth Grade, Standard 3. Earth and Space Science

SC.4.3.5

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and the Earth's surface processes interact.

Grade Level Expectation:

A variety of hazards result from natural process; humans cannot eliminate natural hazards but can reduce their impacts' effect.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Performance Expectation 4-ESS3-2

a. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans. (4-ESS3-2)
[Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Boundary Statement: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

FOSS Soils, Rocks, and Landforms
IG: pp. 212-213, 217, 239 (Step 16), 240 (Step 18), 254-255 (Step 6), 258
EA: *Notebook Entry*, IG p. 255 (Step 9)
BA: pp. 14-15 (Items 9-10), pp. 50-51 (Items 7ab)

Science and Engineering Practices

1. Constructing Explanations and Designing Solutions

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution.

FOSS Soils, Rocks, and Landforms
IG: pp. 207, 208, 215, 248, 253, 254
TR: pp. C23-C26, C46-C53

Elaboration on the GLE

1. 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.

FOSS Soils, Rocks, and Landforms
IG: pp. 212-213, 217, 239 (Step 16), 240 (Step 18), 254-255 (Step 6), 258
DOR: *Volcanoes*
All About Earthquakes

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS Soils, Rocks, and Landforms
IG: pp. 216, 253, 254
TR: pp. D10-D12, D28-D31

2. Interdependence of Science, Engineering and Technology

- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands.

FOSS Soils, Rocks, and Landforms
IG: pp. 232-235, 246 (Step 6), 265, 271, 282 (Steps 12-14), 290
SRB: pp. 50-54, 55-59
DOR: *Mt. St. Helens Impact*

Fifth Grade, Standard 1. Physical Science

SC.5.1.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Grade Level Expectation:

Matter exists as particles that are too small to be seen; measurements of a variety of observable properties can be used to identify particular materials.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Develop a model to describe that matter is made of particles too small to be seen. (5-PS1-1)
[Clarification Statement: Examples of evidence supporting a model could include adding air to expand a basketball, compressing air in a syringe, dissolving sugar in water, and evaporating salt water. Does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

FOSS Earth and Sun
IG: pp. 239, 241, 250, 259 (Step 10), 260 (Steps 13-14), 261, 262 (Step 17), 273 (Step 14), 286 (Step 19), 290
EA: *Notebook Entry*, IG p. 264 (Step 21)
EA: *Performance Assessment,* IG p. 258 (Step 7)
BM: pp. 12-13 (Item 8), pp. 38-39 (Items 1 and 2), pp. 40-41 (Items 3ab), pp. 42-43 (Items 5 and 6), pp. 44-45 (Items 7abc), pp. 48-49 (Items 2ab)
pp. 54-55 (Item 6)

FOSS Mixtures and Solutions
IG: pp. 111, 115 (Step 8), 116 (Step 9 and Teaching Note), 142, (Step 18), 156, 221-222 (Steps 19-21), 230, 258, 265 (Step 9), 268 (Step 16), 314-15, 330 (Step 6), 332 (Step 12), 341 (Steps 4 and 6)
EA: *Notebook Entry*, IG p. 111 (Step 20), IG p. 210 (Step 17), IG p. 239 (Step 11)
EA: *Performance Assessment,* IG p. 226 (Step 4), IG p. 284 (Step 7)
EA: *Response Sheet*, IG p. 219, SNM No. 12, IG p. 279SNM No. 15
BM: pp. 14-15 (Item 10), pp.16-17 (Items 1ab), pp. 18-19 (Item 3), pp. 22-23 (Items 6ab), pp. 24-25 (Items 7 and 8), pp. 34-35 (Item 1a),
pp. 40-41 (Item 2)
IA: *Physical Science Task 1—The Science of Party Planning*

Evidence Outcomes Cont'd

b. Make observations and measurements to identify materials based on their properties. (5-PS1-3)
[Clarification Statement: Examples of materials to be identified could include baking soda and other powders, metals, minerals, and liquids. Examples of properties could include color, hardness, reflectivity, electrical conductivity, thermal conductivity, response to magnetic forces, and solubility; density is not intended as an identifiable property.] [Boundary Statement: At this grade level, mass and weight are not distinguished, and no attempt is made to define the unseen particles or explain the atomic-scale mechanism of evaporation and condensation. distinguishing mass and weight.]

FOSS Mixtures and Solutions
IG: pp. 249, 258, 277 (Steps 9-10), 279 (Step 17), 284 (Step 5), 286 (Step 16), 329 (Step 3), 332 (Step 12)
EA: *Performance Assessment,* IG p. 226 (Step 4) IG p. 284 (Step 7)
EA: *Response Sheet,* IG p. 279, SNM No. 15
BM: pp. 6-7 (Item 5), pp. 8-9 (Item 7), pp. 10-11 (Item 8), pp. 40-41 (Item 3), pp. 44-45 (Item 7), pp. 48-49 (Item 3), pp. 52-53 (Items 6ab), pp. 54-55 (Items 7ab)

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a model to describe phenomena.

FOSS Earth and Sun
IG: p 239, 251, 258, 260, 264, 273 (Step 14), 286 (Step 19)
DOR: "Tutorial: Air and Atmosphere"

FOSS Mixtures and Solutions
IG: pp. 97, 115 (Step 8), 118 (Teaching Note), 147, 157, 163, 164, 166, 167, 168 (Steps 26-28), 179 (Step 13), 184 (Step 6), 186 (Step 10), 190, 209-210 (Steps 13-14), 211, 219 (Step 16), 279, 321 (Step 1), 344 (Step 14), 345 (Step 16, Teaching Note)
SRB: pp. 14-15, 26-27, 28-29, 30, 32, 47, 48
TR: pp. C11-C13, C36-C39

2. Planning and Carrying Out Investigations

- Make observations and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon.

FOSS Mixtures and Solutions
IG: pp. 259, 267, 277, 284, 285, 295, 321, 322, 329, 341
SRB: pp. 14-15
TR: pp. C14-C17, C46-C47

Elaboration on the GLE

1. PS1.A: Structure and Properties of Matter

- Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. Measurements of a variety of properties can be used to identify materials.

FOSS Earth and Sun
IG: pp. 239, 241, 250, 259 (Step 10), 260 (Steps 13-14), 261, 262 (Step 17), 273 (Step 14), 286 (Step 19), 290
SRB: pp. 105-108, 121
DOR: *"Tutorial: Air and Atmosphere"*

FOSS Mixtures and Solutions
IG: pp. 111, 115 (Step 8), 116 (Step 9 and Teaching Note), 142, (Step 18), 156, 221-222 (Steps 19-21), 230, 249, 258, 265 (Step 9), 268 (Step 16), 277, 279, 284, 286, 314-15, 329 330 (Step 6), 332 (Step 12), 341 (Steps 4 and 6)
SRB: pp. 7, 24, 26-27,32, 42-43, 75
DOR: *"Tutorial: Solutions"*
"Tutorial: Conservation of Mass"
Changes in Properties of Matter)
Chemical Reactions
EA: *Performance Assessment,* IG p. 226 (Step 4) IG p. 284 (Step 7)
EA: *Response Sheet,* IG p. 279, SNM No. 15
BM: pp. 6-7 (Item 5), pp. 8-9 (Item 7), pp. 10-11 (Item 8), pp. 40-41 (Item 3), pp. 44-45 (Item 7), pp. 48-49 (Item 3), pp. 52-53 (Items 6ab), pp. 54-55 (Items 7ab)

Cross Cutting Concepts

1. Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-3)

FOSS Mixtures and Solutions
IG: pp. 268 (Step 16), 277 (Step 8), 284, 342
SRB: pp. 18-20, 38-40
TR: pp. D13-D15, D32-D33

Fifth Grade, Standard 1. Physical Science

SC.5.1.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Grade Level Expectation:

Chemical reactions that occur when substances are mixed can be identified by the emergence of substances with different properties; the total mass remains the same.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (5-PS1-2)

[Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that forms new substances. Does not distinguish mass and weight.] [Boundary Statement: At this grade level, mass and weight are not distinguished.]

FOSS Mixtures and Solutions
IG: pp. 314-15, 334 (Step 18), 341 (Steps 4-6), 342 (Step 7), 344 (Step 15), 347 (Steps 20-21)
SRB: pp. 74-78

b. Conduct an investigation to determine whether the mixing of two or more substances results in new substances. (5-PS1-4)

FOSS Mixtures and Solutions
IG: pp. 307, 314-315, 325 (Step 20), 326 (Step 23), 330 (Step 7), 332 (Steps 12-13), 335 (Step 20), 341 (Step 6)
EA: *Notebook Entry,* IG p. 325 (Step 20)
EA: *Response Sheet,* IG p. 332**,** SNM No. 18
BM: pp. 4-5 (Item 3a)**,** pp. 6-7 (Item 4)**,** pp. 8-9 (Item 7)**,** pp. 12 -13 (Items 9ab)**,** pp. 14-15 (Item 12)
IA: *Physical Science Task 2—Mixing Matter*

Colorado Essential Skills and Science and Engineering Practices

1. Using Mathematics and Computational Thinking

- Measure and graph quantities such as weight to address scientific and engineering questions and problems.

FOSS Mixtures and Solutions
IG: pp. 97, 115 (Steps 6-7), 117, 188 (Step 14), 209-210 (Step 13), 239, 277 (Steps 8-9), 287
SRB: pp. 11, 14-15, 30-31
DOR: "Tutorial: Conservation of Mass"
TR: pp. C21-C22, C46-C47

Elaboration on the GLE

1. PS1.B: Chemical Reactions

- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary Statement: Mass and weight are not distinguished at this grade level.) When two or more different substances are mixed, a new substance with different properties may be formed.

FOSS Mixtures and Solutions
IG: pp. 314-15, 334 (Step 18), 341 (Steps 4-6), 342 (Step 7), 344 (Step 15), 347 (Steps 20-21)
SRB: pp. 74-78

Cross Cutting Concepts

1. Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume. (5-PS1-2)

FOSS Mixtures and Solutions
IG: pp. 114 (Step 2), 115 (Step 7), 190, 202, 217, 260, 301
SRB: pp. 11, 22, 40, 47, 81
TR: pp. D13-D15, D32-D33

2. Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems.

FOSS Mixtures and Solutions
IG: pp. 117 (Step 15), 178, 242 (Step 16)
SRB: pp. 18-20, 38-40

3. Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change.

FOSS Mixtures and Solutions
IG: pp. 316, 325, 332, 335, 341
SRB: pp. 79-80
TR: pp. D10-D12, D30-D31

Fifth Grade, Standard 1. Physical Science

SC.5.1.3

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Grade Level Expectation:

The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Support an argument that the gravitational force exerted by Earth on objects is directed down. (5-PS2-1)
[Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [*Boundary Statement: Does not include mathematical representation of gravitational force*.]

FOSS Earth and Sun
IG: pp. 3, 151, 155, 162, 170, 215 (Step 24), 217-218 (Steps 27-29), 219 (Step 32), 233 (Step 22
EA: *Response Sheet,* IG p. 218, SNM No.10
BM: pp. 12-13 (Item 9), pp. 32-33 (Item 4)

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Support an argument with evidence, data, or a model.

FOSS Earth and Sun
IG: pp. 167, 189, 217
TR: pp. C27-C32, C50-C53

Elaboration of the GLE

1. PS2.B: Types of Interactions

- The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

FOSS Earth and Sun
IG: pp. 3, 151, 155, 162, 170, 215 (Step 24), 217-218 (Steps 27-29), 219 (Step 32), 233 (Step 22)
SRB: pp. 62-65
DOR: *The Planets and the Solar System*

Cross Cutting Concepts

1. Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change.

FOSS Earth and Sun
IG: pp. 168, 219 (Step 32), 233 (Step 22)
TR: pp. D10-D12, D30-D31

Fifth Grade, Standard 1. Physical Science

SC.5.1.4

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties and interactions of matter.

Grade Level Expectation:

The energy released from food was once energy from the sun.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Use models to describe that energy in animals' food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun. (5-PS3-1)
[Clarification Statement: Examples of models could include diagrams, and flow charts.]

FOSS Living Systems
IG: pp. 83, 110 (Step 13), 115 (Step 26), 121 (Step 3), 123 (Step 14), 126 (Step 20), 150-151, 172 (Step 9), 173 (Step 11), 315 (Step 12)
EA: *Notebook Entry,* IG p. 175 (Step 16)
EA: *Response Sheet,* IG p. 123, SNM No. 4, IG p. 190, SNM No. 11
BM: pp. 4-5 (Item 1c), pp. 10-11 (Item 6), pp. 20-21 (Item 3), pp. 22-23 (Items 5ab), pp. 24-25 (Item 7), pp. 28-29 (Items 9 and 10), pp. 34-35 (Items 4 and 5), pp. 36-37 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Use models to describe phenomena.

FOSS Living Systems
IG: pp. 88, 115, 123, 151, 172, 176, 209, 224, 240, 242, 257
TR: pp. C11-C13, C36-C39

Elaboration on the GLE

1. PS3.D: Energy in Chemical Processes and Everyday Life

- The energy released [from] food was once energy from the sun that was captured by plants in the chemical process that forms plant matter (from air and water).

FOSS Living Systems
IG: pp. 83, 110 (Step 13), 115 (Step 26), 121 (Step 3), 123 (Step 14), 126 (Step 20), 150-151, 172 (Step 9), 173 (Step 11), 315 (Step 12)
SRB: pp. 7, 8, 24, 26
DOR: *Food Chains*
Web of Life: Life in the Sea

Cross Cutting Concepts

1. Energy and Matter

- Energy can be transferred in various ways and between objects.

FOSS Living Systems
IG: pp. 89, 111 (Step 14), 112, 115, 123, 126 (Step 20), 137, 152, 160, 172, 173, 193, 210, 229, 311, 313
TR: pp. D19-D21, D38-D4

Fifth Grade, Standard 2. Life Science

SC.5.2.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

Grade Level Expectation:

Plants acquire their material from growth chiefly from air and water.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Support an argument that plants get the materials they need for growth chiefly from air and water. (5-LS1-1)
[Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.]

FOSS Living Systems
IG: pp. 171-173 (Steps 7-9), 173 (Step 11), 223 (Step 28), 225-226 (Steps 30-33)
BM: pp. 2-3 (Item 1a), pp. 12-13 (Item 7), pp. 30-31 (Item 1), pp. 32-33 (Item 2), pp. 40-41 (Item 9), pp. 42-43 (Item 1a) , pp. 44-45 (Item 1b)
pp. 46-47 (Item 3), pp. 50 -51 (Item 5)
IA: *Life Science Task 1—Plant Growth*

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Support an argument with evidence, data, or a model.

FOSS Living Systems
IG: pp. 172, 190, 193
TR: pp. C27-C32, C50-C53

Elaboration on the GLE

1. LS1.C: Organization for Matter and Energy Flow in Organisms

- Plants acquire their material for growth chiefly from air and water.

FOSS Living Systems
IG: pp. 171-173 (Steps 7-9), 173 (Step 11), 223 (Step 28), 225-226 (Steps 30-33)
SRB: pp. 23-26, 40-42, 74, 77
DOR: *Plant Structure and Growth*
"Plant Vascular System"

Cross Cutting Concepts

1. Energy and Matter

- Matter is transported into, out of, and within systems.

FOSS Living Systems
IG: pp. 172, 173 193, 210, 229, 257, 272, 313
SRB: pp. 23 and 26

TR: pp. D19-D21, D38-D41

Fifth Grade, Standard 2. Life Science

SC.5.2.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.

Grade Level Expectation:

Matter cycles between air and soil and among plants, animals and microbes as these organisms live and die.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment. (5-LS2-1)
[Clarification Statement: Emphasis is on the idea that matter that is not food (air, water, decomposed materials in soil) is changed by plants into matter that is food. Examples of systems could include organisms, ecosystems, and the Earth.] [Boundary Statement: Does not include molecular explanations.]

FOSS Living Systems
IG: pp. 79, 81, 83-84, 90-91, 110-113,121 (Step 4), 122, 123, 125 (Step 17), 126 (Step 20), 130, 137, 150-151, 161 (Step 15), 162 (Step 19), 172 (Step 9), 192 (Step 24), 208-209, 223 (Step 28), 224 (Step 29), 254 (Steps 12 and 15), 311 (Step 1), 312 (Step 4)
EA: *Notebook Entry,* IG p. 102 (Step 13), IG p. 116 (Step 29), IG p. 230 (Step 40)
EA: *Performance Assessment*, IG p. 132 (Step 6), IG p. 249 (Step 4)
EA: *Response Sheet,* IG p. 123, SNM No. 4, IG p. 243, SNM No. 16
BM: pp. 4-5 (Items 1bd), pp. 6-7 (Item 3), pp. 8-9 (Items 4 and 5), pp. 14-15 (Item 10), pp. 18-19 (Items 1ab and 2), pp. 20-21 (Item 4), pp. 22-23 (Items 5ab), pp. 26-27 (Items 8ab), pp. 32-33 (Item 3), pp. 34-35 (Item 4), pp. 36-37 (Item 7), pp. 38-39 (Item 8), pp. 44-45 (Item 2), pp. 48-49 (Item 4), pp. 50-51 (Items 6 and 7), pp. 52-53 (Item 8)
IA: *Life Science Task 2—Penguins*

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a model to describe phenomena.

FOSS Living Systems
IG: pp. 88, 113, 115, 122, 123, 137, 151, 165, 176, 193, 209, 237, 240, 242, 257
TR: pp. C11-C13, C36-C39

2. Connections to the Nature of Science

- Science explanations describe the mechanisms for natural events.

FOSS Living Systems
IG: pp. 114-115 (Step 26), 122, 172, 224, 241, 244, 265, 269
SRB: pp. 78-80

Elaboration on the GLE

1. LS2.A: Interdependent Relationships in Ecosystems

- The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms (both plants or plants parts and animals) and therefore operate as "decomposers." Decomposition eventually restores (recycles) some materials back to the soil. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem.

FOSS Living Systems
IG: pp. 79, 81, 83-84, 90-91, 110-113,121 (Step 4), 122, 123, 125 (Step 17), 126 (Step 20), 130, 150-151, 162 (Step 19), 192 (Step 24), 312 (Step 4)
SRB: pp. 7-10, 14-15,16, 17, 18-20, 26, 27, 29-31, 71, 74-77
DOR: *Food Chains*
Marine Ecosystems
Web of Life: Life in the Sea
"Food Webs"

2. LS2.B: Cycles of Matter and Energy Transfer in Ecosystems

- Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. Organisms obtain gases, and water, from the environment, and release waste matter (gas, liquid, or solid) back into the environment.

FOSS Living Systems
IG: pp. 79, 81, 83, 125 (Step 17), 137, 150-151, 157 (Step 3), 161 (Step 15), 172 (Step 9), 208-209, 223 (Step 28), 224 (Step 29), 254 (Steps 12 and 15), 311 (Step 1), 312 (Step 4), 315, 316
SRB: pp. 17, 18-20, 24-25, 28, 36, 40-41, 48-53, 54-55, 56-57
DOR: *Circulatory and Respiratory Systems*
"Plant Vascular System"

Cross Cutting Concepts

1. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Living Systems
Module driving question: How can we describe Earth's biosphere as a system of interacting parts? (p.317)
IG: pp. 99, 102, 122, 132, 162, 173, 184, 229, 230, 240, 242, 311, 312, 313, 316
SRB: pp. 3-4, 5-6, 11, 40, 42, 50, 54-55, 56-57, 62-63
DOR: *Circulatory and Respiratory Systems*
Digestive and Excretory System
The Brain and the Nervous System
TR: pp. D16-D18, D34-D37

Fifth Grade, Standard 3. Earth and Space Science

SC.5.3.1

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.

Grade Level Expectation:

Stars range in size and distance from Earth, and this can explain their relative brightness.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth. (5-ESS1-1)
[Clarification Statement: Limited to relative distances, not sizes, of stars. Does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]

FOSS Earth and Sun
IG pp. 151, 154, 155, 165-166, 169-70, 177-178 (Step 9), 181 (Step 16), 182, 185, 190-191 (Step 8), 194 (Step 15), 223 (Step 2), 228 (Step 13), 230 (Step 17), 231 (Step 20), 233
EA: *Notebook Entry,* IG p. 182 (Step 18) IG 229 (Step 15)
BM: pp. 4-5 (Items 3ab), pp. 32-33 (Item 5), pp. 34-35 (Item 6)
IA: *Earth Science Task 1—Star Brightness*

Colorado Essential Skills and Science and Engineering Practices

1. Engaging in Argument from Evidence

- Support an argument with evidence, data, or a model.

FOSS Earth and Sun
IG: pp. 167, 177, 189, 217

FOSS Earth and Sun
SRB: pp. 20-24
TR: pp. C27-C32, C50-C53

Elaboration on the GLE

1. ESS1.A: The Universe and its Stars

- The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth.

FOSS Earth and Sun
IG: pp. 151, 154, 155, 165-166, 169-70, 177-178 (Step 9), 181 (Step 16), 182, 185, 190-191 (Step 8), 194 (Step 15), 223 (Step 2), 228 (Step 13), 230 (Step 17), 231 (Step 20), 233
SRB: pp. 15, 22, 48-49, 66-67, 70, 78
DOR: *All about the Stars*

Cross Cutting Concepts

1. Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large.

FOSS Earth and Sun
IG: pp. 168, 181, 188, 189, 190, 191, 194, 233
TR: pp. D13-D15, D32-D33

Fifth Grade, Standard 3. Earth and Space Science

SC.5.3.2

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.

Grade Level Expectation:

Earth's orbit and rotation and the orbit of the moon around earth cause observable patterns.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (5-ESS1-2)
[Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.] [Boundary Statement: Does not include causes of seasons.]

FOSS Earth and Sun
IG: pp. 57, 93, 95 100-101, 111, 113 (Step 12), 115, 122 (Step 13), 124 (Step 19), 126 (Step 22), 128 (Step 25), 132, 133-139 (Steps 5-20), 142 (Steps 26-27), 144, 145 (Step 31), 155, 165-166, 177 (Step 9), 185, 228-229, 234 (Step 22)
EA: *Notebook Entry*, IG pp. 142-143 (Steps 27-29), IG p. 182 (Step 18) IG p. 229 (Step 15)
EA: *Response Sheet*, IG p. 127, SNM No. 3
BM: pp. 2-3 (Items 1ab), pp. 4-5 (Item 2), pp. 16-17 (Items 12 and 13), pp. 18-19 (Items 1ab), pp. 20-21 (Items 3 and 4), pp. 22-23 (Items 5ab)
pp. 24-25 (Item 6), pp. 26-27 (Items 7ab), pp. 28-29 (Item 2), pp. 30-31 (Items 3abc), pp. 34-35 (Items 7ab), pp. 36-37 (Item 8)
IA: *Earth Science Task 2—Shadows*

Colorado Essential Skills and Science and Engineering Practices

1. Analyzing and Interpreting Data

- Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships.

FOSS Earth and Sun
IG: pp. 101, 112, 122, 124, 136, 143, 178, 181, 199, 209
TR: pp. C18-C20, C44-C45

Elaboration on the GLE

1. ESS1.B: Earth and the Solar System

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.

FOSS Earth and Sun
IG: pp. 57, 93, 95 100-101, 111, 113 (Step 12), 115, 122 (Step 13), 124 (Step 19), 126 (Step 22), 128 (Step 25), 132, 133-139 (Steps 5-20), 142 (Steps 26-27), 144, 145 (Step 31), 155, 165-166, 177 (Step 9), 185, 228-229, 234 (Step 22)
SRB: pp. 3-7, 10-13, 34-35
DOR: *"Tutorial: Sun Tracking"*
Shadow Tracker

Cross Cutting Concepts

1. Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena.

FOSS Earth and Sun
IG: pp. 102, 113, 122, 124, 143, 178, 185, 199, 211, 229, 233
SRB: p.13
TR: pp. D6-D9, D28-D29

Fifth Grade, Standard 3. Earth and Space Science

SC.5.3.3

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why the Earth is constantly changing.

Grade Level Expectation:

Earth's major systems interact in multiple ways to affect Earth's surface materials and processes.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (5-ESS2-1)
[Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shape, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.] [*Boundary Statement: Limited to the interactions of two systems at a time.*]

FOSS Living Systems
IG: 79, 87, 106, 107 (Step 6), 108, 114 (Step 26), 115, 126 (Step 20), 137, 261, 269, 313 (Step 8), 3165
EA: *Notebook Entry*, IG p. 102 (Step 13) IG p. 116 (Step 29)
EA: *Performance Assessment*, IG p. 132 (Step 6)
BM: pp. 14-15 (Items 9ab), pp. 24-25 (Item 6)

FOSS Earth and Sun
IG: 239, 250, 272 (Step 11), 286, 287, 304-305, 345, 367, 376-377, 379, 386-387 (Steps 14-15), 405 (Steps 14, 17), 410 (Step 27), 411, 422 (Step 21), 423 (Step 24)
EA: *Notebook Entry*, IG p. 273 (Step 12), IG p. 333 (Step 28)
EA: *Performance Assessment,* IG p. 386 (Step 12)
EA: *Response Sheet,* IG p. 353, SNM No. 22
BM: pp. 6-7 (Item 4), pp. 8-9 (Item 5), pp. 12-13 (Item 8), pp. 14-15 (Items 10 and 11), pp. 28-29 (Item 1), pp. 42-43 (Item 4), pp. 44-45 (Items 7abc)
pp. 46-47 (Items 1ab), pp. 48-49 (Items 2ab and 3), pp. 50-51 (Item 4), pp. 52-53 (Item 5), pp. 54-55 (Item 6)

Colorado Essential Skills and Science and Engineering Practices

1. Developing and Using Models

- Develop a model using an example to describe a scientific principle.

FOSS Living Systems
IG: pp. 88, 113, 122, 130, 137

FOSS Earth and Sun
IG: pp. 258, 260, 361, 377, 386-387, 401, 404, 422 (Step 21)
TR: pp. C11-C13, C36-C39

Elaboration on the GLE

1. ESS2.A: Earth Materials and Systems

- Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, and influences climate. Winds and clouds in the atmosphere interact with the landforms to determine patterns of weather.

FOSS Living Systems
IG: 79, 87, 106, 107 (Step 6), 108, 114 (Step 26), 115, 126 (Step 20), 137, 261, 269, 313 (Step 8), 316
SRB: pp. 7-11, 74-78
DOR: *Marine Ecosystems*

FOSS Earth and Sun
IG: pp. 239, 250, 272 (Step 11), 286, 287, 304-305, 345, 367, 376-377, 379, 386-387 (Steps 14-15), 405 (Steps 14, 17), 410 (Step 27), 411, 422 (Step 21), 423 (Step 24)
SRB: pp. 81-84, 85-91, 105-109, 120-123 125-129, 130-138, 139-143
DOR: *All about Meteorology*
Water Cycle
"Water Cycle Game"

Cross Cutting Concepts

1. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Living Systems
IG: pp. 79, 81, 82-83, 87, 90-91, 97, 99, 102, 122, 132, 137, 261, 311, 312, 313, 316
SRB: pp. 3-4
DOR: *Geography for Students - Physical Systems*

FOSS Earth and Sun
IG: pp. 252, 258, 259, 261, 268, 286, 378, 386-387 (Steps 14-15), 395, 402, 405, 417, 419, 422 (Step 21)
TR: pp. D16-D18, D34-D37

Fifth Grade, Standard 3. Earth and Space Science

SC.5.3.4

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why the Earth is constantly changing.

Grade Level Expectation:

Most of Earths water is in the ocean and much of earth's freshwater in glaciers or underground.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth. (5-ESS2-2)
[Boundary Statement: Limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

FOSS Earth and Sun
IG: pp. 367, 376-377, 379, 400, 401-402, 404 (Step 14), 406 (Step 20), 422
EA: *Notebook Entry*, IG p. 406 (Step 20)
BM: pp.10-11 (Items 7ab)

Colorado Essential Skills and Science and Engineering Practices

1. Using Mathematics and Computational Thinking.

- Describe and graph quantities such as area and volume to address scientific questions.

FOSS Earth and Sun
IG: pp. 377, 394, 400 401-402, 403-404
SRB: p. 124
TR: pp. C21-C22, C46-C47

Elaboration on the GLE

1. ESS2.C: The Roles of Water in Earth's Surface Processes

- Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere.

FOSS Earth and Sun
IG: pp. 367, 376-377, 379, 400, 401-402, 404 (Step 14), 406 (Step 20), 422
SRB: p. 124
DOR: *"Water Cycle Game"*

Cross Cutting Concepts

1. Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume.

FOSS Earth and Sun
IG: pp. 402, 417, 419, 422
TR: pp. D13-D15, D32-D33

Fifth Grade, Standard 3. Earth and Space Science

SC.5.3.5

Prepared Graduates:

Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why the Earth is constantly changing.

Grade Level Expectation:

Societal activities have had major effects on land, ocean, atmosphere and even outer space.

The following FOSS program elements address the performance expectations, science and engineering practices, disciplinary core ideas, and crosscutting concepts indicated below. References are selected and do not reflect every possible alignment to a standard.

Evidence Outcomes

a. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment. (5-ESS3-1)

FOSS Living Systems
IG: pp. 108 (Step 6), 270, 307, 309 (Step 4), 316
SRB: pp. 73, 74-80
BM: pp. 16-17 (Item 11)

FOSS Earth and Sun
IG:: pp. 295, 346, 359-360 (Steps 26-27), 361, 376-377, 421 (Step 20), 422
EA: *Notebook Entry*, IG p. 421 (Step 20)
BM: pp. 8-9 (Item 6), pp. 14-15 (Item 10), pp. 56-57 (Item 7)

Colorado Essential Skills and Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

FOSS Living Systems
IG: pp. 271, 296, 304, 307, 315, 316

FOSS Earth and Sun
IG: pp. 331, 332, 355, 359, 360, 361 (Step 28), 408, 416, 419, 422 (Step 21)
TR: pp. C33-C35, C52-C55

Elaboration on the GLE

1. ESS3.C: Human Impacts on Earth Systems

- Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments.

FOSS Living Systems
IG: pp. 108 (Step 6), 270, 307, 309 (Step 4), 316
SRB: pp. 73, 74-80
DOR: *Marine Ecosystems*

FOSS Earth and Sun
IG: pp. 295, 346, 359-360 (Steps 26-27), 361, 376-377, 421 (Step 20), 422
SRB: pp. 144-151
DOR: *Climate and Seasons*

Cross Cutting Concepts

1. Systems and System Models

- A system can be described in terms of its components and their interactions.

FOSS Living Systems
IG: pp. 272, 278, 280, 297, 311, 312, 313, 316
SRB: pp. 3-4, 5-6

FOSS Earth and Sun
IG: pp. 386, 387, 388, 395, 402, 405, 417, 419, 422 (Step 21)
TR: pp. D16-D18, D34-D37

2. Science Addresses Questions About the Natural and Material World

- Science findings are limited to questions that can be answered with empirical evidence.

FOSS Living Systems
IG: pp. 2, 4, 39, 248
SRB: pp. 74-80

FOSS Earth and Sun
IG: pp. 316 (Step 16), 417 (Step 11), 421 (Step 18)

FOSS and Colorado Essential Skills:

Every child comes to school with unique experiences, cultural and linguistic backgrounds, and a range of cognitive and physical attributes. To access and leverage students' strengths, FOSS contains evidence-based, student talk supports that facilitate science learning for all. The talk structures and learning strategies embedded in FOSS ensure that students are effective communicators with their peers and adults. Additionally, the FOSS instructional design also supports students in explaining local and relevant phenomena as well as designing solutions to local problems. In this way, FOSS is empowering students to address the challenges of tomorrow in their communities. In addition to hitting all your standards for science, you can be sure that FOSS is also building the Colorado Essential Skills for all students.

Colorado Essential Skill	Evidence
Communicator	
Media Literacy	Opportunities for students to conduct research, validate sources, and report findings ethically can be found throughout FOSS modules. Students develop these skills through brief informal research opportunities during each investigation. Students conduct hands-on activities and validate their findings through text or video resources. At the conclusion of the research, they write an answer to the focus question that includes a claim and evidence from the hands-on activity, text, video, and/or other resources. ***Water and Climate*** **Investigation Guide**, Investigation 2, Part 3 – *Sinking and Floating Water,* Students conduct an investigation about cold and hot water and learn about density. Then, they read an article in the ***Water and Climate*** **Science Resources,** *Water: Hot and Cold,* pages 21-23 to begin to validate research findings from the hands-on activity, Next, students use Digital Resource Tutorial – *Density of Hot and Cold Water*, to gather more evidence. Finally, students answer the focus question communicating their understanding with evidence. • ***Structures of Life*** **Investigation Guide**, Investigation 2, Part 2 – *Life Cycle of the Bean* • ***Structures of Life*** **Investigation Guide**, Investigation 3, Part 3 – *Crayfish Territory– Research social behavior.*
Digital Literacy	Technology tools are used as an extension of first-hand experiences to support students in gathering information and evidence to justify solutions and to individualize instruction. Enter FOSSWEB on ThinkLink using the username and password for grade one science http://thinklink.schoolspecialty.com/login Digital tools include interactive eBooks, Streaming Videos, Multimedia Activities and Virtual Investigations. In the Investigation Guide, teachers are directed to the variety of technology tools at the point-of-use. For example, see ***Air and Weather*** **Investigation Guide** Investigation 1, Part 2 - *Parachutes,* Streaming Video Investigation 3, Part 3, procedure 17, Multimedia Activity-*Watching Clouds*

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

	FOSSweb on ThinkLink http://thinklink.schoolspecialty.com/login **- Air and Weather** Enter FOSSWEB on ThinkLink using the username and password for grade one science. Open the ***Air and Weather*** Module Detail, by clicking on the title of the unit. Scroll down to *Online Activities* select *Watching Clouds* ***Sound and Light*** **Investigation Guide**, Investigation 1, Part 3 - *Outdoor Sounds,* online Multimedia Activity, *Sorting Sounds.* FOSSweb on ThinkLink http://thinklink.schoolspecialty.com/login **- *Sound and Light*** Enter FOSSWEB on ThinkLink using the username and password for grade one science. Open ***Sound and Light*** by clicking on the title of the unit. Scroll Down to *Online Activities* and select *Sorting Sounds*
Data Literacy	FOSS provides frequent opportunities for students to develop and apply data literacy. During and after an investigation, students record observations and organize data in grade-appropriate tables, graphs and charts in their notebooks. For other investigations, they create diagrams and models in their notebooks to record and make sense of their observations. The student-generated recorded visual information is then utilized in small and large group sense-making discussions to interpret and make meaning of the collected data. For example, students complete a data table recording 3 trials of the distance their carts travel from different slope heights ***Motion and Matter***, Investigation 3, Part 3 *Investigating Start Position* Students have opportunities to interpret visual information when active investigation is followed by reading in the student ***Science Resource*** Book. For example, students have multiple opportunities to engage with visual expressions of information in the ***Water and Climate*** student ***Science Resources*** book: • Bar graph- *A Report from the Blue Planet* • Data Table-*Opinion and Evidence* • Diagram-*Water: Hot and Cold* • 2-D Model-*The Water Cycle*
Interpersonal Communication	All investigations provide opportunities for student collaboration to manage science equipment, plan and conduct investigations, organize and record observations and data, discuss science core ideas and practices, and reflect on learning. The FOSS equipment kits provide enough materials for eight groups of four students to conduct collaborative investigations. Collaboration roles are used to effectively and efficiently develop a community of science learners. **Program Resources**

	Mixtures and Solutions* Investigation Guide**, Overview Tab, *Working in Collaborative Groups* Collaborative roles, such as *Getter*, *Starter*, and *Recorder*, are written into the investigation procedures to help teachers manage the class and to help students understand their role in the lesson ***Mixtures and Solutions* Teacher Resources**, Science-Centered Language Development, Speaking and Listening Domain, Discussion Protocols, **Examples of Collaborative Investigations** • ***Mixtures and Solutions* Investigation Guide**, Investigation 1, Part 1 • ***Weather on Earth Investigation Guide, Investigation 1, Part 2, *Sun Tracking* **Examples of Collaborative Reading** Students engage in small group and partner strategies to discuss articles in the Science Resources books. Strategies in the **Teacher Resources** book, *Science-Centered Language Development* sections can be utilized. *Speaking and Listening Domain*, *Reading Domain* ***Mixtures and Solutions* Investigations Guide**, Investigation 1, Part 3, *Taking Mixtures Apart* ***Earth and Sun Investigations Guide*** Investigation 2, Part 4 *Exploring the Solar System* **Examples of Collaborative Reflection** *Wrap-up/Warm-up* procedures at the conclusion of every part of an investigation provide pairs of students with the opportunity to discuss the focus question, share their answers and ideas, and add new information about what they learned from reading and discussion. For example, see: • ***Mixtures and Solutions* Investigation Guide**, Investigation 1, Part 1, • ***Living Systems,*** Investigation 1, Part 1,
Problem Solver	
Critical Thinking and Analysis	All investigations provide opportunities for student collaboration as a whole class, small group, or pairs to manage science equipment, plan and conduct investigations, organize and record observations and data, discuss science core ideas and practices, and reflect on learning. The FOSS equipment kits provide enough materials for up to 32 students. Primary students are provided their own materials for many investigations, but are expected to make observations and discuss their ideas with others. **Examples of Program Resources** ***Sound and Light,* Investigation Guide**, Overview Tab> *Managing the Classroom: Managing Materials*

IG: Investigations Guide • TR: Teacher Resources • SRB: Student *Science Resources* Book • DOR: Digital-Only Resources
EA: Embedded Assessment • BM: Benchmark Assessment • IA: Interim Assessment

	FOSS recommends that a teacher use a central materials distribution system. One member of the group gets materials as they are needed, and another returns the materials to the materials station. Students can also help with cleanup and organizing. ***Sound and Light*** **Teacher Resources**, Science-Centered Language Development, Speaking and Listening Domain, Discussion Protocols, **Examples of Collaborative Investigations** • ***Air and Weather*** **Investigation Guide**, Investigation 1, Part 1 - *Air is There* • ***Sound and Light*** **Investigation Guide**, , Investigation 2, Part 2, *Changing Pitch,* **Examples of Collaborative Reading** Students engage in small group and partner strategies to discuss articles in the Science Resources student books. Instructions and suggestions for strategies are embedded in the Investigation procedures, *Reading in Science Resources*. • ***Sound and Energy*** **Investigation Guide**, Investigation 1 - *Sound and Vibrations,* Part 1 - *Making Sounds* • ***Air and Weather*** **Investigation Guide**, Investigation 1, Part 2 – *Parachutes* **Examples of Collaborative Reflection** *Wrap-up/Warm-up* procedures at the conclusion of every part of an investigation provide pairs of students with the opportunity to discuss the focus question, share their answers and ideas, and add new information about what they learned from reading and discussion. For example, see • **Sound and Light Investigation Guide**, Investigation 1, Part 1, • **Air and Weather, Investigation Guide,** Investigation 1, Part 2 - *Parachutes*
Collaboration and Teamwork	Throughout all investigations, groups or pairs of students work cooperatively to plan and/or conduct investigations All investigations provide opportunities for student collaboration as a whole class, small group, or pairs to manage science equipment, plan and conduct investigations, organize and record observations and data, discuss science core ideas and practices, and reflect on learning. Primary students usually work together independently, but sometimes they will share materials and equipment and make observations together. Students are expected to work cooperatively to make observations and have discussions about the materials/hands-on activity. **Program Resources** Collaboration roles for group work are outlined in each FOSS **Investigation Guide**, Overview Tab, *Managing the Classroom.*
Creativity and Innovation	The FOSS instructional design aligns to the Universal Design for Learning Principles and is organized through a systematic learning cycle model that leverages students' creativity and divergent thinking. See ***Soils, Rocks, and***

	***Landforms* Investigation Guide**, Overview tab, *FOSS Instructional Design*, *Differentiated Instruction,* for more information. The instructional design provides opportunities to address a variety of learning modalities in each FOSS investigation. They include • Hands-on activities/investigations (concrete/kinesthetic experiences) • Drawing illustrations in notebook, conducting virtual simulations, and viewing videos and photographs (representational/visual experiences) • Listening and speaking discourse routines/discussion (auditory/verbal experiences) • Reading and writing about science (abstract thinking and communication experiences
Adaptability and Flexibility	Each part of an investigation is driven by a focus question in which students set out on an active learning inquiry in which they gather evidence to answer the focus question. Students gather evidence through hands-on activities, discourse, online simulations, videos, excursions in the schoolyard, and text. Sometimes, the evidence results in a single solution, while other times, students and or groups of students may offer unique solutions to the focus question. The FOSS Focus Question for each part of an investigation is embedded into the procedures of the lesson and is highlighted for the teacher in red font. For example, ***Living Systems***, Investigation 1, Part 2, *The Earth System*
Community Member	
Civic Engagement	FOSS modules are created to engage students in storylines that provide real-world context to age-relevant and engaging anchor phenomena. See the front matter in the grade five Investigations Guides: ***Mixtures and Solutions, Earth and Sun and Living Systems*** There are three story lines in the front matter of ***Earth and Sun*** each applying real-world context to an Anchor Phenomena. The first storyline explores the Sun/Earth relationship that results in day and night and the length and direction of shadows. Students plan and carry out investigations to examine shadows over time and create models to construct an explanation for the change in direction and length of shadows.
Global and Cultural Awareness	The instructional materials provide students an opportunity to connect science concepts to understand the impact of global issues and events through hands-on activities, excursions in the schoolyard, reading articles, and videos. For example, see ***Pebbles, Sand and Silt* Science Resources** book, *Erosion* Enter FOSSweb on ThinkLink http://thinklink.schoolspecialty.com/login using the username and password for grade two science.

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	View ***Pebbles, Sand, and Silt*** **,** scroll to *Streaming Videos - All About Volcanoes*
Social Awareness	The instructional materials provide students an opportunity to discuss their observations, thinking, and solutions to problems. Questions, along with strategies for engaging in argumentation are two features that allow varying viewpoints to be exposed. For example, see • ***Solids and Liquids*** **Investigation Guide**, Investigation 4, Part 3 - *Toothpaste Investigation,* pages • ***Solids and Liquids*** **Teacher Resources**, Science-Centered Language Development, Speaking and Listening Domain, Discussion Protocols
Empowered Individual	
Self-Awareness	A science notebook is a critical feature of every part of every investigation. The science notebook serves as a record of personal learning, exposing student thinking and understand of scientific practices and core ideas. At the end of each part of an investigation, students discuss with partners or small groups their answer to the Focus Question. Then, they write their answer to the Focus Question with words and illustrations. For sample notebook entry, see ***Sound and Light***, **Investigation Guide**, Investigation 1, Part 1 - *Making Sounds* **Teacher Resources** Science Notebooks in Grades K-2, ***Sound and Light*** **Teacher Resources** book, includes additional information on the purpose, set-up, and strategies for science notebooks. Science-Centered Language Development, ***Sound and Light*** **Teacher Resources** book, includes additional information and strategies to provide students with opportunities to articulate thoughts and ideas through oral, written, and multimedia communications.
Self-Management	The responsibility of the Starter, one of the FOSS Collaborative roles, is to manage the group as they proceed through an investigation. They monitor materials, ensure group partners are completing appropriate duties, and help manage time. It is intended that the role of Starter is rotated through the group on a regular basis, so all students have the opportunity to manage people, projects, and time to meet a goal. At the end of each investigation, students reflect on what they learned and how they learned in the Warm-up/Wrap-up section. Students also reflect on their academic progress by taking the Investigation I-Check (see Teacher Resources booklet, Assessment Masters) to monitor their learning and identify what they still need to learn. For example, see • ***Soils, Rocks, and Landforms*** Investigation Guide, Investigation 1, Part 4, *Schoolyard Soils,* • ***Energy***, **Investigation Guide**, Investigation 1, Part 4, *Solving the String of Lights Problem*

Perseverance and Resilience	FOSS provides students with opportunities to solve problems, try different ideas, and persevere to complete a task. Within the procedures of lessons where students are exploring new concepts or designing an investigation, teachers are directed to "let students" plan and conduct. For example, see ***Solids and Liquids Investigation Guide*** Investigation 1 - *Solids*, Part 2 - *Construct with Solids,* Investigation 3 - *Bits and Pieces*, Part 2 - *Separating Soup Mix*
Self-advocacy and Initiative	Throughout all investigations, groups or pairs of students work cooperatively to plan and/or conduct investigations. Collaboration roles for group work are outlined in each FOSS Investigation Guide, Overview Tab. For example, see ***Energy* Investigation Guide,** *Managing the Classroom.* The responsibilities of each role are described in the procedures for each investigation and in the Interactive Whiteboard presentation for each part of an investigation. The roles should be rotated through the group regularly to give each student a chance to develop the different practices of science and engineering.
Career Awareness	Students are exposed to science careers through video and text. For example, see ***Motion and Matter* Science Resources** (student edition) • *What Engineers Do* • *Careers You Can Count On*, ***Water and Climate* Science Resources** (student edition) • *Studying Weather,* • *Ellen Swallow Richards: An Early Ecologist* • *Making Drinking Water Safe,* • *Using the Energy of Water* ***Structures of Life* Science Resources** (student edition) • *Barbara McClintock* • *Fossils* Enter FOSSWEB on ThinkLink using the username and password for grade three science http://thinklink.schoolspecialty.com/login Open the ***Water and Climate*** module/course. Scroll to *Module Resources> Teaching Resources>Streaming Videos> All About Meteorology*