GRADE K-LS1-1

Interdependent Relationships in Ecosystems: Animals, Plants, and 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.

Performance Expectation K-LS1-1

Students who demonstrate understanding can:
Use observations to describe patterns of what plants and animals (including humans) need to survive.
[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, 39, 41
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, 43, 45
EA: *Performance Assessment*, IG p. 116 (Step 11), IG p. 121 (Step 9)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
▪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

Disciplinary Core Ideas

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. (K-LS1-1)

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

Crosscutting Concepts

Patterns
- Patterns in the natural and human designed world can be observed and used as evidence. (K-LS1-1)

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

Connections to the Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Scientists look for patterns and order when making observations about the world. (K-LS1-1)

FOSS Animals Two by Two
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

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

GRADE K-ESS2-1

Weather and Climate

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 K-ESS2-1

Students who demonstrate understanding can:
Use and share observations of local weather conditions to describe patterns over time.
[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. 41, 43, 45
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (K-ESS2-1)

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

Disciplinary Core Ideas

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. (K-ESS2-1)

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

Crosscutting Concepts

Patterns
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (K-ESS2-1)

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

Connections to the Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Scientists look for patterns and order when making observations about the world. (K-ESS2-1)

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

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

GRADE K-ESS2-2

Interdependent Relationships in Ecosystems: Animals, Plants, and 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.

Performance Expectation K-ESS2-2.

Students who demonstrate understanding can:
Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
[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, 39, 41
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, 43, 45
EA: *Performance Assessment***,** IG p. 85 (Step 14), IG p. 91 (Step 16)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(S).

- Construct an argument with evidence to support a claim. (K-ESS2-2)

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

Disciplinary Core Ideas

ESS2.E: Biogeology

- Plants and animals can change their environment. (K-ESS2-2)

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*

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. (Secondary to K-ESS2-2)

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"

Crosscutting Concepts

Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS2-2)

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

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

GRADE K-ESS3-1

Interdependent Relationships in Ecosystems: Animals, Plants, and 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.

Performance Expectation K-ESS3-1

Students who demonstrate understanding can:
Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.
[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, 39, 41
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. 41, 43, 45
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)

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, storyboard) that represent concrete events or design solutions.

- Use a model to represent relationships in the natural world. (K-ESS3-1)

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

Disciplinary Core Ideas

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. (K-ESS3-1)

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

Crosscutting Concepts

Systems and System Models

- Systems in the natural and designed world have parts that work together. (K-ESS3-1)

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

GRADE K-ESS3-2

Weather and Climate

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 K-ESS3-2

Students who demonstrate understanding can:
Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather. *
[Clarification Statement: Emphasis is on local forms of severe weather.]

FOSS Trees and Weather
IG: pp. 41, 43, 45
EA: *Performance Assessment*, IG p. 198 (Step 10), IG p. 200 (Step 14), IG p. 202 (Steps 20-21)

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.
- Ask questions based on observations to find more information about the designed world. (K-ESS3-2)

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

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.
- Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. (K-ESS3-2)

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

Disciplinary Core Ideas

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. (K-ESS3-2)

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

ETS1.A: Defining and Delimiting an Engineering Problem
- Asking questions, making observations, and gathering information are helpful in thinking about problems. (Secondary to K-ESS3-2)

FOSS Trees and Weather
IG: pp. 44-45, 173, 200 (Steps 13-14)

Crosscutting Concepts

Cause and Effect
- Events have causes that generate observable patterns. (K-ESS3-2)

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- People encounter questions about the natural world every day. (K-ESS3-2)

FOSS Trees and Weather
IG: pp. 175, 198, 199
SRB: pp. 41 and 44
TR: pp. D9-D11, D24-D27

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

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. (K-ESS3-2)

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

GRADE K-ESS3-3

Interdependent Relationships in Ecosystems: Animals, Plants, and 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.

Performance Expectation K-ESS3-3

Students who demonstrate understanding can:
Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment. *
[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. 45, 49
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)

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Communicate solutions with others in oral and/or written forms using models and/or drawings that provide detail about scientific ideas. (K-ESS3-3)

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

Disciplinary Core Ideas

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. (K-ESS3-3)

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

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (Secondary to K-ESS3-3)

FOSS Materials and Motion
IG: pp. 31, 46-47, 48-49, 85, 143, 161, 195, 198, 249 (Step 10), 250 (Step 14), 316
DOR: "Recycling Center"

Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (K-ESS3-3)

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

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

GRADE K-PS2-1

Forces and Interactions: Pushes and Pulls

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 K-PS2-1

Students who demonstrate understanding can:
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.
[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. 45 and 49
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.
- With guidance, plan and conduct an investigation in collaboration with peers. (K-PS2-1)

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

Disciplinary Core Ideas

PS2.A: Forces and Motion
- Pushes and pulls can have different strengths and directions. (K-PS2-1)
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-1)

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

PS2.B: Types of Interactions
- When objects touch or collide, they push on one another and can change motion. (K-PS2-1)

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

PS3.C: Relationship Between Energy and Forces
- A bigger push or pull makes things speed up or slow down more quickly. (Secondary to K-PS2-1)

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"

Crosscutting Concepts

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

Connections to the Nature of Science

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

Scientific Investigations Use a Variety of Methods

- Scientists use different ways to study the world. (K-PS2-1)

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

GRADE K-PS2-2

Forces and Interactions: Pushes and Pulls

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 K-PS2-2

Students who demonstrate understanding can:
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. *
[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.]
[Assessment Boundary: Assessment does not include friction as a mechanism for change in speed.]

FOSS Materials and Motion
IG: pp. 45 and 49
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.
- Analyze data from tests of an object or tool to determine if it works as intended. (K-PS2-2)

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

Disciplinary Core Ideas

PS2.A: Forces and Motion
- Pushes and pulls can have different strengths and directions. (K-PS2-2)
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it. (K-PS2-2)

FOSS Materials and Motion
IG: pp. 48-49, 270, 273, 276, 295, 297 (Step 6), 299 (Step 10), 302, 316
SRB: pp. 47-59
DOR: "Roller Coaster Builder*"*

ETS1.A: Defining Engineering Problems
- A situation that people want to change or create can be approached as a problem to be solved through engineering. Such problems may have many acceptable solutions. (Secondary to K-PS2-2)

FOSS Materials and Motion
IG: pp. 48-49, 270, 285, 289-290 (Steps 12-13), 316
SRB: pp. 9-12, 66-67

Crosscutting Concepts

Cause and Effect
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (K-PS2-2)

FOSS Materials and Motion
IG: pp. 272, 278, 297, 304, 317
TR: pp. D9-D11, D24-D27

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

GRADE K-PS3-1

Weather and Climate

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 K-PS3-1

Students who demonstrate understanding can:
Make observations to determine the effect of sunlight on Earth's surface.
[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. 45 and 49
EA: *Performance Assessment*, IG p. 256 (Steps 10-12)

FOSS Trees and Weather
IG: pp. 41, 43, 45
EA: *Performance Assessment*, IG p. 185 (Step 7), IG p. 188 (Steps 9-11)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (K-PS3-1)

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

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer
- Sunlight warms Earth's surface. (K-PS3-1)

FOSS Materials and Motion
IG: pp. 43, 48-49, 209, 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

Crosscutting Concepts

Cause and Effect
- Events have causes that generate observable patterns. (K-PS3-1)

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

Connections to the Nature of Science

Scientific Investigations Use a Variety of Methods
- Scientists use different ways to study the world. (K-PS3-1)

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

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

GRADE K-PS3-2

Weather and Climate

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 K-PS3-2

Students who demonstrate understanding can:
Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.*
[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. 45 and 49
EA: *Performance Assessment***,** IG: p. 253 (Step 9)**,** IG: p. 257 (Steps 17-18)**,** IG: p. 260 (Step 26)

Science and Engineering Practices

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 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. (K-PS3-2)

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

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer

- Sunlight warms Earth's surface. (K-PS3-2)

FOSS Materials and Motion
IG: pp. 43, 48-49, 209, 212-213, 217, 219, 316

Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (K-PS3-2)

FOSS Materials and Motion
IG: pp. 218, 255, 256 (Steps 9-10), 259, 317
TR: pp. D9-D11, D24-D27

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

GRADE K-2-ETS1-1

Engineering Design

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 K–2-ETS1-1

Students who demonstrate understanding can:
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

FOSS Materials and Motion
IG: pp. 45, 47, 49
EA: *Performance Assessment*, IG p. 143 (Step 6), IG p. 147 (Step 12), IG p. 175 (Step 6), IG p. 176 (Steps 1 and 5)

Science and Engineering Practices	Disciplinary Core Ideas	
Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. • Ask questions based on observations to find more information about the natural and/or designed world(S). (K–2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K–2-ETS1-1) ***FOSS Materials and Motion*** **IG:** pp. 85, 162, 175, 177, 191, 217, 247 (Step 2), 259 (Step 24), 271, 317 **SRB:** p. 9 **TR:** pp. C7-C10, C30-C31	**ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K–2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K–2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K–2-ETS1-1) ***FOSS Materials and Motion*** **IG:** pp. 85, 161, 175, 217, 219, 250 (Step 14), 253 (Step 9), 257, 270, 285, 289 (Step 11), 316 **SRB:** pp. 9-12, 41-42	

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

GRADE K–2-ETS1-2

Engineering Design

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 K–2-ETS1-2

Students who demonstrate understanding can:
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

FOSS Materials and Motion
IG: pp. 45, 47, 49
EA: *Performance Assessment*, IG p. 198 (Step 8), IG p. 200 (Steps 5-6), IG p. 201 (Step 11), IG p. 202 (Step 14), IG p. 253 (Step 9), IG p. 257 (Step 13)

FOSS Trees and Weather
IG: pp. 41, 43, 45
EA: *Performance Assessment*, IG p. 193 (Step 13), IG p. 197 (Step 8)

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K–2-ETS1-2)

FOSS Materials and Motion
IG: pp. 85, 144, 162, 190, 194, 202 (Step 13), 217, 228, 230, 260 (Step 26), 290 (Step 15), 317

FOSS Trees and Weather
IG: pp. 197 and 266
TR: pp. C11-C13, C30-C31

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K–2-ETS1-2)

FOSS Materials and Motion
IG: pp. 46-47, 48-49, 85, 114 (Step 7), 119, 130, 147 (Step 12), 161,198, 217, 253 (Step 9), 270, 285, 316

FOSS Trees and Weather
IG: pp. 173, 193 (Step 13), 197, 266
SRB: p. 40

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(S). (K–2-ETS1-2)

FOSS Materials and Motion
IG: pp. 86, 139, 141 (Step 14), 145, 162, 167 (Step 10), 201, 218, 231, 239 (Step 6), 241, 317
SRB: pp. 19-31, 32-40

FOSS Trees and Weather
IG: pp. 197 and 266
SRB: p. 40
TR: pp. D18-D19, D30-D31

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

GRADE K–2-ETS1-3

Engineering Design

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 K–2-ETS1-3

Students who demonstrate understanding can:
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

FOSS Materials and Motion
IG: pp. 45, 49
EA: *Performance Assessment,* IG p. 253 (Step 9), IG p. 259 (Steps 23-24), IG p. 260 (Step 26)

Science and Engineering Practices	Disciplinary Core Ideas	
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Analyze data from tests of an object or tool to determine if it works as intended. (K–2-ETS1-3) ***FOSS Materials and Motion*** **IG:** pp. 217, 222 (Step 8), 240 (Step 5), 256, 317 ***FOSS Trees and Weather*** **IG:** pp. 197 and 266 **TR:** pp. C17-C19, C34-C37	**ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K–2-ETS1-3) ***FOSS Materials and Motion*** **IG:** pp. 217, 253 (Step 9), 316 **SRB:** pp. 10-11	

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

GRADE 1-LS1-1

Structure, Function, and Information Processing

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 1-LS1-1

Students who demonstrate understanding can:
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*
[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. 45, 47, 49
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)

Science and Engineering Practices

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 and designing solutions.

- Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)

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

Disciplinary Core Ideas

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. (1-LS1-1)

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"

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. (1-LS1-1)

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

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)

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

Connections to Engineering, Technology, and Applications of Science

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

Scientific Influence of Science, Engineering, and Technology on Society and the Natural World
- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. (1-LS1-1)

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

GRADE 1-LS1-2

Structure, Function, and Information Processing

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 1-LS1-2

Students who demonstrate understanding can:
Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
[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. 45, 49
EA: *Notebook Entry*, IG p. 255 (Step 19)
EA: *Performance Assessment,* IG p. 254 (Step 16)
BM: pp. 21-22 (Item 4)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. • Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2) ***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	**LS1.B: Growth and Development of Organisms** • 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. (1-LS1-2) ***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*	**Patterns** • Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2) ***FOSS Plants and Animals*** **IG:** pp. 230, 253 (Step 14), 255 (Steps 20 and 21) **TR:** pp. D6-D9, D26-D27

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Scientists look for patterns and order when making observations about the world. (1-LS1-2)

FOSS Plants and Animals
IG: pp. 230, 247, 253

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

GRADE 1-LS3-1

Structure, Function, and Information Processing

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 1-LS3-1

Students who demonstrate understanding can:
Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
[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.]
[Assessment Boundary: Assessment does not include inheritance or animals that undergo metamorphosis or hybrids.]

FOSS Plants and Animals
IG: pp. 45, 47, 49
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)

Science and Engineering Practices

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 and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-LS3-1)

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

Disciplinary Core Ideas

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

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

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS3-1)

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

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

GRADE 1-ESS1-1

Space Systems: Patterns and 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.

Performance Expectation 1-ESS1-1

Students who demonstrate understanding can:
Use observations of the sun, moon, and stars to describe patterns that can be predicted
[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.]
[Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]

FOSS Air and Weather
IG: pp. 49, 51, 53
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

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

Disciplinary Core Ideas

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. (1-ESS1-1)

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*

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1)

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

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
- Many events are repeated. (1-ESS1-1)

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

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

GRADE 1-ESS1-2

Space Systems: Patterns and 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.

Performance Expectation 1-ESS1-2

Students who demonstrate understanding can:
Make observations at different times of year to relate the amount of daylight to the time of year.
[Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.]
[Assessment Boundary: Assessment is limited to relative amounts of daylight, not quantifying the hours or time of daylight.]

FOSS Air and Weather
IG: pp. 49, 51, 53
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

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

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System

- Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)

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

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-2)

FOSS Air and Weather
IG: pp. 244, 255, 263, 264 (Step 10), 265, 266 (Step 13)
TR: pp. D6-D9, D26-D27

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

GRADE 1-PS4-1

Waves: Light and 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.

Performance Expectation 1-PS4-1

Students who demonstrate understanding can:
Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
[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. 47, 49
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-1)

FOSS Sound and Light
IG: pp. 81, 91, 95, 105, 106, 115, 129, 136, 153
SRB: pp. 7, 32
TR: pp. C14-C17, C36-C39

Disciplinary Core Ideas

PS4.A: Wave Properties

- Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)

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*

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1)

FOSS Sound and Light
IG: pp. 82, 92, 95, 106, 109, 130, 137
TR: pp. D6-D9, D10-D12

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations begin with a question. (1-PS4-1)
- Scientists use different ways to study the world. (1-PS4-1)

FOSS Sound and Light
IG: pp. 82, 90, 92, 93, 110, 147, 152-153, 163
SRB: pp. 8-14

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

GRADE 1-PS4-2

Waves: Light and 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.

Performance Expectation 1-PS4-2

Students who demonstrate understanding can:
Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated.
[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. 47, 51
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)

Science and Engineering Practices

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 and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)

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

Disciplinary Core Ideas

PS4.B: Electromagnetic Radiation

- Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2

FOSS Sound and Light
***IG:** pp. 50. 50-51, 213, 215, 236-237 (Step 10), 234, 240 (Step 16), 246, 248, 254 (Step 2)*
***SRB:** p. 57*
***DOR:** Light and Darkness*

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-2),

FOSS Sound and Light
IG: pp. 214, 236, 244
TR: pp. D6-D9, D10-D12

GRADE 1-PS4-3

Waves: Light and 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.

Performance Expectation 1-PS4-3

Students who demonstrate understanding can:
Plan and conduct an investigation to determine the effect of placing objects made with different materials in the path of a beam of light.
[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. 47, 51
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct investigations collaboratively to produce data to serve as the basis for evidence to answer a question. (1-PS4-3)

FOSS Sound and Light
IG: pp. 175, 181, 186, 188, 198, 213, 220, 222, 227
SRB: pp. 44-45
TR: pp. C14-C17, C36-C39

Disciplinary Core Ideas

PS4.B: Electromagnetic Radiation

- Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)

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
SRB: p. 43
DOR: Light and Shadows
All about Light My Shadow

Crosscutting Concepts

Cause and Effect

- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-3)

FOSS Sound and Light
IG: pp. 176, 181, 188, 196, 214, 220, 221, 222, 230,
SRB: pp. 41, 42
TR: pp. D6-D9, D10-D12

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

GRADE 1-PS4-4

Waves: Light and 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.

Performance Expectation 1-PS4-4

Students who demonstrate understanding can:
Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.*
[Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string "telephones," and a pattern of drum beats.]
[Assessment Boundary: Assessment does not include technological details for how communication devices work.]

FOSS Sound and Light
IG: pp. 47, 49, 51
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)

Science and Engineering Practices

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 and designing solutions.

- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)

FOSS Sound and Light
IG: pp. 129, 161, 162, 163, 164, 213, 247
TR: pp. C23-C26, C44-C45

Disciplinary Core Ideas

PS4.C: Information Technologies and Instrumentation

- People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)

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

Crosscutting Concepts

Connections to Engineering, Technology, and Applications of Science
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. (1-PS4-4)

FOSS Sound and Light
IG: pp. 249 (Step 22)
SRB: p. 76

GRADE K-2-ETS1-1

Engineering Design

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 K–2-ETS1-1

Students who demonstrate understanding can:
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

FOSS Sound and Light
IG: pp. 49, 51

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)

FOSS Air and Weather
IG: p. 51
EA: *Notebook Entry,* IG p. 109 (Step 27)
EA: *Performance Assessment,* IG p. 108 (Step 23), IG p. 109 (Step 25)
BM: pp. 8-9 (Item 6)

Science and Engineering Practices	Disciplinary Core Ideas	
Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. • Ask questions based on observations to find more information about the natural and/or designed world(s). (K–2-ETS1-1) ***FOSS Sound and Light*** **IG:** pp. 129, 161, 164, 213, 246, 247 (Step 13) **SRB:** pp. 70-73 ***FOSS Air and Weather*** **IG:** pp. 84, 100, 101, 109 **SRB:** p. 6 **TR:** pp. C7-C10, C34-C35	**ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K–2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K–2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K–2-ETS1-1) ***FOSS Sound and Light*** **IG:** pp. 160 (Step 4), 163 (Steps 8-9), 164 (Steps 11-13), 165, 243 (Step 5), 245 (Step 5), 246 (Step 1), 249 (Step 22) **SRB:** p. 76 ***FOSS Air and Weather*** **IG:** pp. 84, 100, (Step 3), 101 (Step 5), 104, 109 **DOR:** Friction and Air Resistance	

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

GRADE K-2-ETS1-2

Engineering Design

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 K–2-ETS1-2

Students who demonstrate understanding can:
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

FOSS Sound and Light
IG: pp. 49, 51
EA: *Notebook Entry*, IG p. 164 (Step 12) IG p. 247 (Step 15)
EA: *Performance Assessment,* IG p. 164 (Step 11), IG p. 246 (Step 8)

FOSS Air and Weather
IG: p. 51
EA: *Notebook Entry*, IG p. 109 (Step 26)
EA: *Performance Assessment*, IG p. 109 (Steps 24-25)
BM: pp. 8-9 (Item 6)

FOSS Plants and Animals
IG: p. 49
EA: *Notebook Entry*, IG p. 217 (Step 19)
EA: *Performance Assessment*, IG p. 181 (Step 12)
BM: pp. 278-279 (Item 1), pp. 282-283 (Item 4

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K–2-ETS1-2)

FOSS Sound and Light
IG: pp. 93 (Step 9), 110 (Step 22), 139 (Step 18), 161 (Step 2), 162, 163, 245, 246,247 (Step 15)
SRB: pp. 6, 9

FOSS Air and Weather
IG: pp. 84, 105 (Step 17), 109

FOSS Plants and Animals
IG: pp. 173, 181, 217 (Step 19)
TR: pp. C11-C13, C34-C37

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K–2-ETS1-2)

FOSS Sound and Light
IG: pp. 161 (Step 1), 162 (Step 5), 164 (Step 12), 243, 247 (Steps 15 and 19)

FOSS Air and Weather
IG: pp. 50-51, 109
SRB: p. 6

FOSS Plants and Animals
IG: pp. 172, 180 (Step 9), 181, 217

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (K–2-ETS1-2)

FOSS Sound and Light
IG: p. 140 (Step 19)

FOSS Air and Weather
IG: pp. 85, 109

FOSS Plants and Animals
IG: pp. 174, 215
TR: pp. D19-D21, D30-D31

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

GRADE K–2-ETS1-3

Engineering Design

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 K–2-ETS1-3

Students who demonstrate understanding can:
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

FOSS Sound and Light
IG: pp. 49, 51
EA: *Notebook Entry***,** IG p. 164 (Step 15)**,** IG p. 247 (Step 16)
EA: *Performance Assessment,* IG p. 164 (Step 13), IG p. 246 (Step 8)
BM: pp. 30-31 (Item 6)

FOSS Air and Weather
IG: p. 51
EA: *Notebook Entry***,** IG p. 109 (Step 27)
EA: *Performance Assessment,* IG p. 109 (Step 25)
BM: pp. 8-9 (Item 6)

Science and Engineering Practices	Disciplinary Core Ideas	
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Analyze data from tests of an object or tool to determine if it works as intended. (K–2-ETS1-3) ***FOSS Sound and Light*** **IG:** pp. 164 (Step 13), 246, 247 (Step 16), 248 ***FOSS Air and Weather*** **IG:** pp. 84, 105 (Step 16), 109 **TR:** pp. C18-C20, C40-C43	**ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K–2-ETS1-3) ***FOSS Sound and Light*** **IG:** pp. 164 (Step 13), 247 (Step 16) ***FOSS Air and Weather*** **IG:** pp. 83, 101, 102, 108,109	

GRADE 2-LS2-1

Interdependent Relationships in Ecosystems

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 2-LS2-1

Students who demonstrate understanding can:
Plan and conduct an investigation to determine if plants need sunlight and water to grow.
[Assessment Boundary: Assessment is limited to testing one variable at a time.]

FOSS Insects and Plants
IG: pp. 45 and 47
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)

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

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Plants depend on water and light to grow. (2-LS2-1)

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)
SRB: pp. 6-8
DOR: *How Plants Grow*

Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (2-LS2-1)

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

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

GRADE 2-LS2-2

Interdependent Relationships in Ecosystems

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 2-LS2-2

Students who demonstrate understanding can:
Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.*

FOSS Insects and Plants
IG: pp. 45, 47, 49
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)

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2)

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

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)

FOSS Insects and Plants
IG: pp. 157, 158 (Steps 19-22), 165, 177, 178 (Step 21)
SRB: pp. 27-34, 39
DOR: *How Seeds get Here … and There*
What Is Pollination?

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (secondary to 2-LS2-2)

FOSS Insects and Plants
IG: pp. 178, 287, 315, 317, 318

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

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

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

GRADE 2-LS4-1

Interdependent Relationships in Ecosystems

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 2-LS4-1

Students who demonstrate understanding can:
Make observations of plants and animals to compare the diversity of life in different habitats
[Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.]
[Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.]

FOSS Insects and Plants
IG: pp. 45, 47, 49
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)

Science and Engineering Practices	Disciplinary Core Ideas	
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. • Make observations (firsthand or from media) to collect data, which can be used to make comparisons. (2-LS4-1) ***FOSS Insects and Plants*** **IG:** pp. 107, 176, 189, 201, 219, 237, 245, 251, 271, 315 **TR:** pp. C14-C16, C34-C37	**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. (2-LS4-1) ***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?*	

Connections to the Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Scientists look for patterns and order when making observations about the world. (2-LS4-1)

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

GRADE 2-ESS1-1

Earth's Systems: Processes that Shape the 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.

Performance Expectation 2-ESS1-1

Students who demonstrate understanding can:
Use information from several sources to provide evidence that Earth events can occur quickly or slowly.
[Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.] [Assessment Boundary: Assessment does not include quantitative measurements of timescales.]

FOSS Pebbles, Sand, and Silt
IG: pp. 45, 47, 49
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)

Science and Engineering Practices

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 and designing solutions.

- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-ESS1-1)

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

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)

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

Crosscutting Concepts

Stability and Change

- Things may change slowly or rapidly. (2-ESS1-1)

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

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

GRADE 2-ESS2-1

Earth's Systems: Processes that Shape the 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.

Performance Expectation 2-ESS2-1

Students who demonstrate understanding can:
Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.*
[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. 45, 47, 49
EA: *Notebook Entry*, IG p. 259 (Step 7)
BM: pp. 12-13 (Items 4ab), pp. 22-23 (Item 4)

Science and Engineering Practices

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 and designing solutions.

- Compare multiple solutions to a problem. (2-ESS2-1)

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

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Wind and water can change the shape of the land. (2-ESS2-1)

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*

ETS1.C: Optimizing the Design Solution

- Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)

FOSS Pebbles, Sand, and Silt
IG: pp. 49, 142, 219, 220, 221, 227, 256
SRB: pp. 68-78

Crosscutting Concepts

Stability and Change

- Things may change slowly or rapidly. (2-ESS2-1)

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

Connections to the Nature of Science

Scientific Addresses Questions About the Natural and Material World

- Scientists study the natural and material world. (2-ESS2-1)

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

Connections to Engineering, Technology, and Applications of Science

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

- Developing and using technology has impacts on the natural world. (2-ESS2-1)

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

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

GRADE 2-ESS2-2

Earth's Systems: Processes that Shape the 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.

Performance Expectation 2-ESS2-2

Students who demonstrate understanding can:
Develop a model to represent the shapes and kinds of land and bodies of water in an area.
[Assessment Boundary: Assessment does not include quantitative scaling in models.]

FOSS Pebbles, Sand, and Silt
IG: pp. 45, 47, 49
EA: *Notebook Entry*, IG p. 259 (Step 7)
BM: pp. 24-25 (Item 6)

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a model to represent patterns in the natural world. (2-ESS2-2)

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

Disciplinary Core Ideas

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

- Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2-2)

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

Crosscutting Concepts

Patterns

- Patterns in the natural world can be observed. (2-ESS2-2)

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

GRADE 2-ESS2-3

Earth's Systems: Processes that Shape the 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.

Performance Expectation 2-ESS2-3

Students who demonstrate understanding can:
Obtain information to identify where water is found on Earth and that it can be solid or liquid.

FOSS Pebbles, Sand, and Silt
IG: pp. 45, 47, 49
EA: *Notebook Entry***,** IG p. 253 (Step 12)
BM: pp. 20-21 (Item 3)**,** pp. 22-23 (Item 5)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new 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. (2-ESS2-3) ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 228, 251, 252, 256, 258 **TR:** pp. D30-D31, D44-D47	**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. (2-ESS2-3) ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 227, 250, 251, 252, 253 **SRB***:* pp. 50-60, 61-67	**Patterns** • Patterns in the natural world can be observed. (2-ESS2-3) ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 251 (Step 4), 251 (Step 6), 252 (Step 9) **TR:** pp. D6-D8, D26-D27

GRADE 2-PS1-1

Structure and Properties of Matter

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 2-PS1-1

Students who demonstrate understanding can:
Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.
[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. 43, 45, 47
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1)

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

Disciplinary Core Ideas

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. (2-PS1-1)

FOSS Solids and Liquids
IG: pp. 94, 101 (Step 11), 108, 109, 123, 128, 147, 155, 156, 183, 193
SRB: pp. 10, 14-19, 31-32, 40-42, 46-47, 49, 50
DOR: *All About the Properties of Matter*
Properties of Materials
Clothing and Building Materials

Crosscutting Concepts

Patterns

- Patterns in the natural and human designed world can be observed. (2-PS1-1)

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

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

GRADE 2-PS1-2

Structure and Properties of Matter

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 2-PS1-2

Students who demonstrate understanding can:
Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.* *[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. 43, 45, 47
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2)

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

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Different properties are suited to different purposes. (2-PS1-2)

FOSS Solids and Liquids
IG: pp. 77, 102 (Step 15), 113 (Step 1), 117 (Step 15), 118, 119 (Step 24), 277 (Step 10)
SRB: pp. 18, 19, 22-25, 26-30
DOR: *Properties of Materials*
Clothing and Building Materials

Crosscutting Concepts

Cause and Effect
- Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2)

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

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Every human-made product is designed by applying some knowledge of the natural world and is built by using natural materials. (2-PS1-2)

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

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

GRADE 2-PS1-3

Structure and Properties of Matter

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 2-PS1-3

Students who demonstrate understanding can:
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. 43, 45, 47
EA: *Performance Assessment*, IG p. 115 (Step 8), IG p. 118 (Step 21)
BM: pp. 6-7 (Item 4)

Science and Engineering Practices

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 and designing solutions.
- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)

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

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Different properties are suited to different purposes. (2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

FOSS Solids and Liquids
IG: pp. 77, 113, 115, 116, 118, 119, 217,
SRB: pp. 12, 13, 17, 20

Crosscutting Concepts

Energy and Matter
- Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)

FOSS Solids and Liquids
IG: pp. 102, 103, 114 (Step 7), 234, 266
TR: pp. D16-D17, D28-D29

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

GRADE 2-PS1-4

Structure and Properties of Matter

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 2-PS1-4

Students who demonstrate understanding can:
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: pp. 43, 47
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)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s)

- 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

Disciplinary Core Ideas

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. (2-PS1-4)

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!*

Crosscutting Concepts

Cause and Effect

- Events have causes that generate observable patterns. (2-PS1-4)

FOSS Solids and Liquids
IG: pp. 234, 244, 245, 258, 259, 265, 266, 267, 268, 270
TR: pp. D9-D11, D26-D27

Connections to Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- 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

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

GRADE K-2-ETS1-1

Engineering Design

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 K–2-ETS1-1

Students who demonstrate understanding can:
Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.

FOSS Insects and Plants
IG: p. 49
EA: *Notebook Entry,* IG p. 204 (Step 18), IG p. 222 (Steps 17-20)
EA: *Performance Assessment***,** IG p. 250 (Step 4)

FOSS Pebbles, Sand, and Silt
IG: p. 49
EA: *Notebook Entry***,** IG p. 190 (Step 14), IG p. 195 (Step 15), IG p. 257 (Step 4)

FOSS Solids and Liquids
IG: p. 45
EA: *Notebook Entry***,** IG p. 116 (Step 13), IG p. 119 (Step 23)
EA: *Performance Assessment***,** IG p. 115 (Step 8)
BM: pp. 6-7 (Item 4)

Science and Engineering Practices	Disciplinary Core Ideas	
Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. • Ask questions based on observations to find more information about the natural and/or designed world(s). (K–2-ETS1-1) • Define a simple problem that can be solved through the development of a new or improved object or tool. (K–2-ETS1-1) ***FOSS Insects and Plants*** **IG:** pp. 189, 201 (Step 4), 203, 221 (Step 13), 299 (Step 1), 304 (Step 3) ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 181, 195, 211, 212, 214, 227, 229, 233, 243 ***FOSS Solids and Liquids*** **IG:** pp. 114 (Step 5), 117 (Step 16) **TR:** pp. C7-C10, C32-C33	**ETS1.A: Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved through engineering. (K–2-ETS1-1) • Asking questions, making observations, and gathering information are helpful in thinking about problems. (K–2-ETS1-1) • Before beginning to design a solution, it is important to clearly understand the problem. (K–2-ETS1-1) ***FOSS Insects and Plants*** **IG:** pp. 221, 250, 299, 304 ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 180, 186-188, 189, 190, 194, 195, 200, 201, 206, 207, 211, 212 **SRB:** p. 71 ***FOSS Solids and Liquids*** **IG:** pp. 113, 114, 117 **SRB:** pp. 21 and 30	

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

GRADE K–2-ETS1-2

Engineering Design

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 K–2-ETS1-2

Students who demonstrate understanding can:
Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.

FOSS Insects and Plants
IG: pp. 47, 49
EA: *Notebook Entry*, IG p. 317 (Step 15)

FOSS Pebbles, Sand, and Silt
IG: pp. 49
EA: *Notebook Entry*, IG p. 259 (Step 7)

FOSS Solids and Liquids
IG: pp. 45
EA: *Notebook Entry*, IG p. 116 (Step 13), IG p. 119 (Step 23)
EA: *Performance Assessment*, IG p. 115 (Step 8)
BM: pp. 6-7 (Item 4)

Science and Engineering Practices

Developing and Using Models
Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.

- Develop a simple model based on evidence to represent a proposed object or tool. (K–2-ETS1-2)

FOSS Insects and Plants
IG: pp. 189, 221, 222, 315, 317

FOSS Pebbles, Sand, and Silt
IG: pp. 143, 173, 227, 258

FOSS Solids and Liquids
IG: pp. 77, 117, 118
TR: pp. C11-C13, C32-C33

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. (K–2-ETS1-2)

FOSS Insects and Plants
IG: pp. 189, 221, 222, 315, 317

FOSS Pebbles, Sand, and Silt
IG: pp. 174, 175, 214, 227, 233
SRB: pp. 38-39

FOSS Solids and Liquids
IG: pp. 77, 117, 118

Crosscutting Concepts

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (K–2-ETS1-2)

FOSS Insects and Plants
IG: pp. 315 and 317

FOSS Pebbles, Sand, and Silt
IG: pp. 194 (Step 10), 195 (Step 14)
SRB: pp. 34-35

FOSS Solids and Liquids
IG: pp. 78, 115, 116, 117, 119
SRB: pp. 22-25, 26-30
TR: pp. D18-D20, D30-D31

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

GRADE K–2-ETS1-3

Engineering Design

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 K–2-ETS1-3

Students who demonstrate understanding can:
Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

FOSS Insects and Plants
IG: p. 49
EA: *Performance Assessment*, IG p. 222 (Step 18), IG p. 317 (Step 15)

FOSS Pebbles, Sand, and Silt
IG: p. 49
EA: *Performance Assessment*, IG p. 200 (Step 8)

FOSS Solids and Liquids
IG: pp. 45
EA: *Notebook Entry*, IG p. 116 (Step 13), IG p. 119 (Step 23)
EA: *Performance Assessment,* IG p. 115 (Step 8)
BM: pp. 6-7 (Item 4)

Science and Engineering Practices	Disciplinary Core Ideas	
Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. • Analyze data from tests of an object or tool to determine if it works as intended. (K–2-ETS1-3) ***FOSS Insects and Plants*** **IG:** p. 317 (Step 15) **FOSS Pebbles, Sand, and Silt** **IG:** pp.181, 187, 194, 201 ***FOSS Solids and Liquids*** **IG:** pp. 78, 117 (Step 18),118 (Step 21) **SRB:** pp. 22-25, 26-30 **TR:** pp. C17-C19, C38-C41	**ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K–2-ETS1-3) ***FOSS Insects and Plants*** **IG:** pp. 188, 222 (Step 18), 317 (Step 15) ***FOSS Pebbles, Sand, and Silt*** **IG:** pp. 200, 206, 212 **SRB:** p. 71 ***FOSS Solids and Liquids*** **IG:** pp. 113 (Step 1), 116 (Step 13, 15), 117 (Step 18), 118 (Step 21) **SRB:** pp. 26-30	

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

GRADE 3-LS1-1

Inheritance and Variation of Traits: Life Cycles and Traits

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 3-LS1-1

Students who demonstrate understanding can:
Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death. *[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. Assessment does not include details of human reproduction.]*

FOSS Structures of Life
IG: pp. 47, 49
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*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Develop models to describe phenomena. (3-LS1-1)

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

Disciplinary Core Ideas

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. (3-LS1-1)

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

Crosscutting Concepts

Patterns
- Patterns of change can be used to make predictions. (3-LS1-1)

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

Connections to the Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Science findings are based on recognizing patterns. (3-LS1-1)

FOSS Structures of Life
IG: pp. 104, 117 (Step 20), 119 (Step 25), 162 (Step 17), 173
SRB: p. 12-15

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

GRADE 3-LS2-1

Interdependent Relationships in Ecosystems

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 3-LS2-1

Students who demonstrate understanding can:
Construct an argument that some animals form groups that help members survive.

FOSS Structures of Life
IG: pp. 47, 51
EA: Response Sheet IG: p. 257, SNM No. 23
BM: pp. 4-5 (Items 2-3)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model. (3-LS2-1)

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

Disciplinary Core Ideas

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. (Note: Moved from K–2.) (3-LS2-1)

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

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS2-1)

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

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

GRADE 3-LS3-1

Inheritance and Variation of Traits: Life Cycles and Traits

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 3-LS3-1

Students who demonstrate understanding can:
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.
[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.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.]

FOSS Structures of Life
IG: pp. 47, 49, 51
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.
- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)

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

Disciplinary Core Ideas

LS3.A: Inheritance of Traits
- Many characteristics of organisms are inherited from their parents. (3-LS3-1)

FOSS Structures of Life
IG: pp. 145, 147, 149, 151, 182, 272, 279, 281, 293, 309 (Step 9), 341

LS3.B: Variation of Traits
- Different organisms vary in how they look and function because they have different inherited information. (3-LS3-1)

FOSS Structures of Life
IG: p. 283-284, 272, 283, 309 (Step 9 and 10), 310 (Step 10), 336 (Step 11), 341

Crosscutting Concepts

Patterns
- Similarities and differences in patterns can be used to sort and classify natural phenomena. (3-LS3-1)

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

GRADE 3-LS3-2

Inheritance and Variation of Traits: Life Cycles and Traits

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 3-LS3-2

Students who demonstrate understanding can:
Use evidence to support the explanation that traits can be influenced by the environment.
[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. 47, 49, 51
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)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to support an explanation. (3-LS3-2)

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

Disciplinary Core Ideas

LS3.A: Inheritance of Traits

- Other characteristics result from individuals' interactions with the environment, which can range from diet to learning. Many characteristics involve both inheritance and environment. (3-LS3-2)

FOSS Structures of Life
IG: pp. 187, 189, 194-195, 201, 203, 232 (Step 24), 233 (Step 26), 237 (Step 38), 272
DOR: "Walking Stick Survival"

LS3.B: Variation of Traits

- The environment also affects the traits that an organism develops. (3-LS3-2)

FOSS Structures of Life
IG: pp. 187, 189, 194-195, 201, 203, 232 (Step 24), 233 (Step 26), 237 (Step 38), 272
DOR: "Walking Stick Survival"

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (3-LS3-2)

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

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

GRADE 3-LS4-1

Interdependent Relationships in Ecosystems

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 3-LS4-1

Students who demonstrate understanding can:
Analyze and interpret data from fossils to provide evidence of the organisms and the environments in which they lived long ago. *[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.] [Assessment Boundary: Assessment 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. 47, 51
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS4-1)

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

Disciplinary Core Ideas

LS4.A: Evidence of Common Ancestry and Diversity

- Some kinds of plants and animals that once lived on Earth are no longer found anywhere. (Note: Moved from K–2.) (3-LS4-1)
- Fossils provide evidence about the types of organisms that lived long ago and also about the nature of their environments. (3-LS4-1)

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

Crosscutting Concepts

Scale, Proportion, and Quantity

- Observable phenomena exist from very short to very long time periods. (3-LS4-1)

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

Connections to the Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (3-LS4-1)

FOSS Structures of Life
IG: pp. 117 (Step 20), 235 (Step 31), 243 (Step 8), 313
SRB: pp. 79-80, 81-88
SNM: Nos. 20, 21
DOR: *All About Fossils*

GRADE 3-LS4-2

Inheritance and Variation of Traits: Life Cycles and Traits

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 3-LS4-2

Students who demonstrate understanding can:
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. *[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. 47, 51
EA: Answer the Focus Question**,** IG p. 237 (Step 38)
BM: pp. 12-13 (Item 8ab)
IA: Life Science Task 2—Walking Sticks

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., observations, patterns) to construct an explanation. (3-LS4-2)

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

Disciplinary Core Ideas

LS4.B: Natural Selection
- Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. (3-LS4-2)

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

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-2)

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

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

GRADE 3-LS4-3

Interdependent Relationships in Ecosystems

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 3-LS4-3

Students who demonstrate understanding can:
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. *[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. 47, 51
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*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).
- Construct an argument with evidence. (3-LS4-3)

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

Disciplinary Core Ideas

LS4.C: Adaptation
- For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. (3-LS4-3)

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?"

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are routinely identified and used to explain change. (3-LS4-3)

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

GRADE 3-LS4-4

Interdependent Relationships in Ecosystems

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 3-LS4-4

Students who demonstrate understanding can:
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* *[Clarification Statement: Examples of environmental changes could include changes in land characteristics, water distribution, temperature, food, and other organisms.] [Assessment Boundary: Assessment is limited to a single environmental change. Assessment does not include the greenhouse effect or climate change.]*

FOSS Structures of Life
IG: pp. 47, 51
EA: IG p. 261 (Step 21)
BM: pp. 14-15 (Item 10)**,** pp. 16-17 (Item 11)**,** pp. 42-43 (Item 7)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s). • 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. (3-LS4-4) ***FOSS Structures of Life*** **IG:** pp. 188, 202, 244-245, 250, 268 (Step 14), 261 **TR:** pp. C27-C31, C44-C45	**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. (secondary to 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* **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*	**Systems and System Models** • A system can be described in terms of its components and their interactions. (3-LS4-4) ***FOSS Structures of Life*** **IG:** pp. 224, 267, 268, 270 **TR:** pp. D14-D16, D30-D31

Connections to Engineering, Technology, and Applications of Science

Interdependence of Engineering, Technology and Applications of Science on Society and the Natural World
- Knowledge of relevant scientific concepts and research findings is important in engineering. (3-LS4-4)

FOSS Structures of Life
IG: pp. 325-327

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

GRADE3-ESS2-1

Weather and Climate

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 3-ESS2-1

Students who demonstrate understanding can:
Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. *[Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]*

FOSS Water and Climate
IG: pp. 49, 51
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*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in tables and various graphical displays (bar graphs, pictographs) to reveal patterns that indicate relationships. (3-ESS2-1)

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

Disciplinary Core Ideas

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. (3-ESS2-1)

FOSS Water and Climate
IG: pp. 196, 200, 202-203, 207 (Step 9), 214-215 (Steps 18-19), 256, 259, 261
SRB: pp. 30-36
DOR: *"Weather Grapher"*

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-ESS2-1)

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

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

GRADE 3-ESS2-2

Weather and Climate

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 3-ESS2-2

Students who demonstrate understanding can:
Obtain and combine information to describe climates in different regions of the world.

FOSS Water and Climate
IG: pp. 47, 51
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*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods. • Obtain and combine information from books and other reliable media to explain phenomena. (3-ESS2-2) ***FOSS Water and Climate*** **IG:** pp. 254, 259, 276, 283, 284 **TR:** pp. C32-C33, C46-C47	**ESS2.D: Weather and Climate** • Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (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) **SRB:** pp. 48-54 **DOR:** *"Climate Regions Map"*	**Patterns** • Patterns of change can be used to make predictions. (3-ESS2-2) ***FOSS Water and Climate*** **IG:** pp. 260, 268, 269, 273, 277 **TR:** pp. D5-D8, D28-D29

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

GRADE 3-ESS3-1

Weather and Climate

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 3-ESS3-1

Students who demonstrate understanding can:
Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard. * *[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. 47, 51
EA: Notebook Entry**,** IG p. 285 (Step 16)
BM: pp. 58-59 (Item 3)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- 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. (3-ESS3-1)

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

Disciplinary Core Ideas

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. (3-ESS3-1) (Note: This Disciplinary Core Idea is also addressed by 4-ESS3-2.)

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

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-ESS3-1)

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Engineering, Technology and Applications of Science on Society and the Natural World

- Engineers improve existing technologies or develop new ones to increase their benefits (e.g., better artificial limbs), decrease known risks (e.g., seatbelts in cars), and meet societal demands (e.g., cell phones). (3-ESS3-1)

FOSS Water and Climate
IG: pp. 284-285, 318-319, 328
SRB: pp. 55-60, 61-62, 73-76, 77-84, 86-89

Connections to Nature of Science

Science is a Human Endeavor

- Science affects everyday life. (3-ESS3-1)

FOSS Water and Climate
IG: pp. 208, 260, 284-285, 300
SRB: pp. 55-60, 61-62, 68-72, 75-76, 77-82

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

GRADE 3-PS2-1

Forces and Interactions

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 3-PS2-1

Students who demonstrate understanding can:
Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.
[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.] [Assessment Boundary: Assessment is limited to one variable at a time: number, size, or direction of forces. Assessment does not include quantitative force size, only qualitative and relative. Assessment is limited to gravity being addressed as a force that pulls objects down.]

FOSS Motion and Matter
IG: pp. 49, 51
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)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3-PS2-1)

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

Disciplinary Core Ideas

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.) (3-PS2-1)

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
SRB: pp. 3, 10-15,
DOR: *All about Motion and Balance*

PS2.B: Types of Interactions

- Objects in contact exert forces on each other. (3-PS2-1)

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*

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified. (3-PS2-1)

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

Connections to Nature of Science

Scientific Investigations Use a Variety of Methods

- Science investigations use a variety of methods, tools, and techniques. (3-PS2-1)

FOSS Motion and Matter
IG: pp. 104-106, 136-138, 153-154 162-163, 182-184, 190-193, 227-229
SRB: pp. 8-9
SNM: No. 1

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

GRADE 3-PS2-2-2

Forces and Interactions

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 3-PS2-2

Students who demonstrate understanding can:
Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion. *[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.] [Assessment Boundary: Assessment does not include technical terms such as period and frequency.]*

FOSS Motion and Matter
IG: pp. 49, 51, 53
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*

Science and Engineering Practices

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 and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. (3-PS2-2)

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

Disciplinary Core Ideas

PS2.A: Forces and Motion

- The patterns of 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.) (3-PS2-2)

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
SRB: pp. 16-21
DOR: *"Roller Coaster Builder"*

Crosscutting Concepts

Patterns

- Patterns of change can be used to make predictions. (3-PS2-2)

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

Connections to Nature of Science

Science Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (3-PS2-2)

FOSS Motion and Matter
IG: pp. 138 (Step 13), 144 (Step 12), 202 (Step 11)

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

GRADE 3-PS2-3

Forces and Interactions

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 3-PS2-3

Students who demonstrate understanding can:
Ask questions to determine cause and effect relationships of electric or magnetic interactions between two objects not in contact with each other. *[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.] [Assessment Boundary: Assessment is 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. 49, 51
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*

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions that can be investigated based on patterns such as cause and effect relationships. (3-PS2-3)

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

Disciplinary Core Ideas

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. (3-PS2-3)

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

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (3-PS2-3)

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

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

GRADE 3-PS2-4

Forces and Interactions

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 3-PS2-4

Students who demonstrate understanding can:
Define a simple design problem that can be solved by applying scientific ideas about magnets.* *[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. 49, 51
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	Disciplinary Core Ideas	
Asking Questions and Defining Problems • Define a simple problem that can be solved through the development of a new or improved object or tool. (3-PS2-4) ***FOSS Motion and Matter*** **IG:** pp. 172, 175, 176, 177, 199, 209, 211 **SRB:** pp. 42-45 **TR:** pp. C7-C10, C34-C35	**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. (3-PS2-4) ***FOSS Motion and Matter*** **IG:** pp. 176, 177, 210 (Steps 11-12) **SRB:** pp. 42-45	

Connections to Engineering, Technology, and Applications of Science

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. (3-PS2-4)

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

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

GRADE 3–5-ETS1

Engineering Design

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 3–5-ETS1-1

Students who demonstrate understanding can:
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

FOSS Water and Climate
IG: p. 51
EA: *Performance Assessment*, IG p. 325 (Step 8)

FOSS Motion and Matter
IG: p. 53
BM: pp. 12-13 (Item 8ab), pp. 44-47 (Item 2abcd)

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3–5-ETS1-1)

FOSS Structures of Life
IG: p.136
FOSS Water and Climate
IG: pp. 325, 327
FOSS Motion and Matter
IG: pp. 172, 175, 176, 177, 199, 200, 209, 211
TR: pp. C7-C10, C34-C35

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3–5-ETS1-1)

FOSS Water and Climate
IG: pp. 281-285, 323-328
SRB: pp. 55-60, 61-62

FOSS Motion and Matter
IG: pp. 171, 173, 177, 179, 212
SRB: pp. 25-27, 28-33, 34-37

Crosscutting Concepts

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

- People's needs and wants change over time, as do their demands for new and improved technologies. (3–5-ETS1-1)

FOSS Water and Climate
IG: p. 329
SRB: pp. 86-89

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

GRADE 3–5-ETS1-2

Engineering Design

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 3–5-ETS1-2

Students who demonstrate understanding can:
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

FOSS Water and Climate
IG: p. 51

FOSS Water and Climate
IG: p. 51
EA: *Performance Assessment*, IG p. 325 (Step 26), IG p. 330 (Step 8)
BM: pp. 2-3 (Item 1), pp. 62-63 (Item 6)

FOSS Motion and Matter
IG: p. 53
EA: *Performance Assessment*, IG p. 184 (Step 11), IG p. 193 (Step 16)
BM: pp. 12-13 (Item 8ab), pp. 44-47 (Item 2abcd)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3–5-ETS1-2)

FOSS Structures of Life
IG: pp. 137, 138

FOSS Water and Climate
IG: p. 328

FOSS Motion and Matter
IG: pp. 172, 178, 184, 193, 200, 202, 209, 211
TR: pp. C23-C31, C42-C43

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)

FOSS Structures of Life
IG: pp. 135 (Step 4), 136 (Step 12)
DOR: *How Seed Get Here … and There*

FOSS Water and Climate
***IG:** pp. 324-328*

FOSS Motion and Matter
IG: pp. 171, 173, 177, 179, 212

Crosscutting Concepts

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

- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3–5-ETS1-2)

FOSS Structures of Life
IG: pp. 127, 338
SRB: pp. 12-15, 100-103

FOSS Water and Climate
IG: pp. 308, 318-319
SRB: pp. 63-67, 73-76, 77-82, 86-89

FOSS Motion and Matter
IG: p. 185
SRB: p. 24

GRADE 3–5-ETS1-3

Engineering Design

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 3–5-ETS1-3

Students who demonstrate understanding can:
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

FOSS Water and Climate
IG: p. 51
EA: *Performance Assessment*, IG p. 325 (Step 8)

FOSS Motion and Matter
IG: p. 53
BM: pp. 12-13 (Item 8ab), pp. 40-41 (Item 1), pp. 44-47 (Item 2abcd)

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions.

- Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3–5-ETS1-3)

FOSS Motion and Matter
IG: pp. 172, 178, 182, 191, 200, 209

FOSS Water and Climate
IG: pp. 225-227, 314-317
SRB: pp. 39-40

DOR: "Virtual Investigation: Water Retention in Water"

FOSS Structures of Life
IG: pp. 242-245
TR: pp. C14-C17, C38-C39

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3–5-ETS1-3)

FOSS Water and Climate
IG: pp. 291, 292, 299, 301, 325-328

FOSS Motion and Matter
IG: pp. 171, 173, 177, 179, 212

ETS1.C: Optimizing the Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3–5-ETS1-3)

FOSS Motion and Matter
IG: pp. 171, 173, 177, 179, 212

GRADE 4-LS1-1

Structure, Function, and Information Processing

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-LS1-1

Students who demonstrate understanding can:
Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.
*[Clarification Statement: Examples of structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, and skin. **Each structure has specific functions within its associated system.] [Assessment Boundary: Assessment is limited to macroscopic structures within plant and animal systems.]*

FOSS Environments
IG: pp. 47, 49, 51
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*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model. (4-LS1-1)

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

Disciplinary Core Ideas

LS1.A: Structure and Function

- Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1)

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"

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (4-LS1-1)

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

GRADE 4-LS1-2

Structure, Function, and Information Processing

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-LS1-2

Students who demonstrate understanding can:
Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.
[Clarification Statement: Emphasis is on systems of information transfer.] [Assessment Boundary: Assessment does not include the mechanisms by which the brain stores and recalls information or the mechanisms of how sensory receptors function.]

FOSS Environments
IG: pp. 47, 49, 51
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*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2)

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

Disciplinary Core Ideas

LS1.D: Information Processing

- Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)

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

Systems and System Models

Systems and System Models

- A system can be described in terms of its components and their interactions. (4-LS1-2)

FOSS Environments
IG: pp. 128, 141, 162, 170, 183, 186, 197
TR: pp. D15-D17, D32-D33

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

GRADE 4-ESS1-1

Earth's Systems: Processes that Shape the 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.

Performance Expectation 4-ESS1-1

Students who demonstrate understanding can:
Identify evidence from patterns in rock formations and fossils in rock formations and fossils in rock layers for changes in a landscape over time to support an explanation for changes in a landscape over time.
[Clarification Statement: Examples of evidence from patterns could include rock layers with shell fossils above rock layers with plant fossils and no shells, indicating a change from land to water over time; and a canyon with different rock layers in the walls and a river in the bottom, indicating that over time a river cut through the rock.] [Assessment Boundary: Assessment does not include specific knowledge of the mechanism of rock formation or memorization of specific rock formations and layers. Assessment is limited to relative time.]

FOSS Soils, Rocks, and Landforms
IG: pp. 51, 53, 55
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*

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Identify the evidence that supports particular points in an explanation. (4-ESS1-1)

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

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Local, regional, and global patterns of rock formations reveal changes over time due to earth forces, such as earthquakes. The presence and location of certain fossil types indicate the order in which rock layers were formed. (4-ESS1-1)

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"

Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation. (4-ESS1-1)

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

Connections to the Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes consistent patterns in natural systems. (4-ESS1-1)

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

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

GRADE 4-ESS2-1

Earth's Systems: Processes that Shape the 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.

Performance Expectation 4-ESS2-1

Students who demonstrate understanding can:
Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
[Clarification Statement: Examples of variables to test could include angle of slope in the downhill movement of water, amount of vegetation, speed of wind, relative rate of deposition, cycles of freezing and thawing of water, cycles of heating and cooling, and volume of water flow.] [Assessment Boundary: Assessment is limited to a single form of weathering or erosion.]

FOSS Soils, Rocks, and Landforms
IG: pp. 51, 53
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

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 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"

Disciplinary Core Ideas

ESS2.A: Earth Materials and Systems

- Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)

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"

ESS2.E: Biogeology

- Living things affect the physical characteristics of their regions. (4-ESS2-1)

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

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS2-1)

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

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

GRADE 4-ESS2-2

Earth's Systems: Processes that Shape the 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.

Performance Expectation 4-ESS2-2

Students who demonstrate understanding can:
Analyze and interpret data from maps to describe patterns of Earth's features.
[Clarification Statement: Maps can include topographic maps of Earth's land and ocean floor, as well as maps of the locations of mountains, continental boundaries, volcanoes, and earthquakes.]

FOSS Soils, Rocks, and Landforms
IG: pp. 51, 53
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)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Analyze and interpret data to make sense of phenomena using logical reasoning. (4-ESS2-2)

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

Disciplinary Core Ideas

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. (4-ESS2-2)

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"

Crosscutting Concepts

Patterns

- Patterns can be used as evidence to support an explanation. (4-ESS2-2)

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

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

GRADE 4-ESS3-1

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.

Performance Expectation 4-ESS3-1

Students who demonstrate understanding can:
Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment. *[Clarification Statement: Examples of renewable energy resources could include wind energy, water behind dams, and sunlight; non-renewable energy resources are fossil fuels and fissile materials. Examples of environmental effects could include loss of habitat due to dams, loss of habitat due to surface mining, and air pollution from burning of fossil fuels.]*

FOSS Soils, Rocks, and Landforms
IG: pp. 51, 55
EA: *Response Sheet***,** IG p. 280**,** SNM No. 18
EA: *Notebook Entry*, IG p. 291 (Step 15)
BM: pp. 8-9 (Item 6)

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluate the merit and accuracy of ideas and methods.
- Obtain and combine information from books and other reliable media to explain phenomena. (4-ESS3-1)

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

Disciplinary Core Ideas

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. (4-ESS3-1)

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"

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are routinely identified and used to explain change. (4-ESS3-1)

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology
- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-ESS3-1)

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

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

- Over time, people's needs and wants change, as do their demands for new and improved technologies. (4-ESS3-1)

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

GRADE 4-ESS3-2

Earth's Systems: Processes that Shape the 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.

Performance Expectation 4-ESS3-2

Students who demonstrate understanding can:
Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.*
[Clarification Statement: Examples of solutions could include designing an earthquake resistant building and improving monitoring of volcanic activity.] [Assessment Boundary: Assessment is limited to earthquakes, floods, tsunamis, and volcanic eruptions.]

FOSS Soils, Rocks, and Landforms
IG: pp. 51, 55
EA: *Notebook Entry*, IG p. 255 (Step 9)
BA: pp. 14-15 (Items 9-10)**,** pp. 50-51 (Items 7ab)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.
- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-ESS3-2)

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

Disciplinary Core Ideas

ESS3.B: Natural Hazards
- A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. (4-ESS3-2) (Note: This Disciplinary Core Idea can also be found in 3.WC.)

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

ETS1.B: Designing Solutions to Engineering Problems
- Testing a solution involves investigating how well it performs under a range of likely conditions. (secondary to 4-ESS3-2)

FOSS Soils, Rocks, and Landforms
IG: pp. 225, 232-235, 254-255 (Steps 6-9), 258

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships are routinely identified, tested, and used to explain change. (4-ESS3-2)

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

Connections to Engineering, Technology, and Applications of Science

Influence of Engineering, Technology, and Science on Society and the Natural World
- Engineers improve existing technologies or develop new ones to increase their benefits, to decrease known risks, and to meet societal demands. (4-ESS3-2)

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*

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

GRADE 4-PS3-1

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.

Performance Expectation 4-PS3-1

Students who demonstrate understanding can:
Use evidence to construct an explanation relating the speed of an object to the energy of that object.
*[**Clarification Statement: Examples of evidence relating speed and energy could include change of shape on impact or other results of collisions.] [Assessment Boundary: Assessment does not include quantitative measures of changes in the speed of an object or on any precise or quantitative definition of energy.]*

FOSS Energy
IG: pp. 59, 63
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*

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Use evidence (e.g., measurements, observations, patterns) to construct an explanation. (4-PS3-1)

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

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- The faster a given object is moving, the more energy it possesses. (4-PS3-1)

FOSS Energy
IG: pp. 301 (Step 5), 303 (Step 11), 304 (Step 15), 314 (Step 13), 320 (Step 26), 321

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (4-PS3-1)

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

GRADE 4-PS3-2

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.

Performance Expectation 4-PS3-2

Students who demonstrate understanding can:
Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
[Assessment Boundary: Assessment does not include quantitative measurements of energy.]

FOSS Energy
IG: pp. 59, 61, 63
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)pp. 62-63 (Item 9)

Science and Engineering Practices

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

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- Energy can be moved from place to place by moving objects or through sound, light, or electric currents. (4-PS3-2)

FOSS Energy
IG: pp. 123 (Step 10), 126 (Step 18), 164, 169, 271, 294-295 (Steps 13-15), 321
SRB: pp. 65-73
DOR: "Lighting a Bulb"
"Flow of Electric Current"

PS3.B: Conservation of Energy and Energy Transfer

- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-2)
- Light also transfers energy from place to place. (4-PS3-2)
- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-2)

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"

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (4-PS3-2)

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

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

GRADE 4-PS3-3

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.

Performance Expectation 4-PS3-3

Students who demonstrate understanding can:
Ask questions and predict outcomes about the changes in energy that occur when objects collide.
[Clarification Statement: Emphasis is on the change in the energy due to the change in speed, not on the forces, as objects interact.] [Assessment Boundary: Assessment does not include quantitative measurements of energy.]

FOSS Energy
IG: pp. 59, 63, 65
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*

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. (4-PS3-3)

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

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- 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. (4-ESS3-1)

FOSS Energy
IG: pp. 303 (Step 11), 318-319 (Steps 23-25), 321, 384
SRB: pp. 83-85

PS3.B: Conservation of Energy and Energy Transfer

- Energy is present whenever there are moving objects, sound, light, or heat. When objects collide, energy can be transferred from one object to another, thereby changing their motion. In such collisions, some energy is typically also transferred to the surrounding air; as a result, the air gets heated and sound is produced. (4-PS3-3)

FOSS Energy
IG: pp. 293, 314 (Step 13), 316 (Steps 17-19), 321, 384
SRB: p. 78

PS3.C: Relationship Between Energy and Forces

- When objects collide, the contact forces transfer energy so as to change the objects' motions. (4-PS3-3)

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*

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (4-PS3-3)

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

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

GRADE 4-PS3-4

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.

Performance Expectation 4-PS3-4

Students who demonstrate understanding can:
Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*
[Clarification Statement: Examples of devices could include electric circuits that convert electrical energy into motion energy of a vehicle, light, or sound; and a passive solar heater that converts light into heat. Examples of constraints could include the materials, cost, or time to design the device.] [Assessment Boundary: Devices should be limited to those that convert motion energy to electric energy or use stored energy to cause motion or produce light or sound.]

FOSS Energy
IG: pp. 59, 61, 63, 65
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)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Apply scientific ideas to solve design problems. (4-PS3-4)

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

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer

- Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. The currents may have been produced to begin with by transforming the energy of motion into electrical energy. (4-PS3-4)

FOSS Energy
IG: pp. 127-128 (Steps 19-21), 165 (Step 10), 169, 271, 293, 321, 384
SRB: pp. 3-7
DOR: "Conductor Detector"

PS3.D: Energy in Chemical Processes and Everyday Life

- The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. (4-PS3-4)

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

ETS1.A: Defining Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (4-PS3-4)

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

	well each takes the constraints into account. (secondary to 4-PS3-4) ***FOSS Energy*** **IG:** pp. 167 (Steps 13-14), 168 (Step 15), 169, 384 **SRB:** pp. 21-24, 25-29	

Connections to Engineering, Technology, and Applications of Science

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

- Engineers improve existing technologies or develop new ones. (4-PS3-4)

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

Connections to Nature of Science

World Science is a Human Endeavor

- Most scientists and engineers work in teams. (4-PS3-4)
- Science affects everyday life. (4-PS3-4)

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

GRADE 4-PS4-1

Waves: Waves and 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.

Performance Expectation 4-PS4-1

Students who demonstrate understanding can:
Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
[Clarification Statement: Examples of models could include diagrams, analogies, and physical models using wire to illustrate wavelength and amplitude of waves.] [Assessment Boundary: Assessment does not include interference effects, electromagnetic waves, non-periodic waves, or quantitative models of amplitude and wavelength.]

FOSS Energy
IG: pp. 59, 65
EA: *Notebook Entry*, IG p. 352 (Step 18)
BM: pp. 6-7 (Items 3ab)

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an analogy, example, or abstract representation to describe a scientific principle. (4-PS4-1)

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

Disciplinary Core Ideas

PS4.A: Wave Properties

- Waves, which are regular patterns of motion, can be made in water by disturbing the surface. When waves move across the surface of deep water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets the beach. (Note: This grade band endpoint was moved from K–2.) (4-PS4-1)
- Waves of the same type can differ in amplitude (height of the wave) and wavelength (spacing between wave peaks). (4-PS4-1)

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*

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort, classify and analyze simple rates of change for natural phenomena. (4-PS4-1)

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

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science findings are based on recognizing patterns. (4-PS4-1)

FOSS Energy
IG: pp. 346, 347, 351, 352, 357

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

GRADE 4-PS4-2

Structure, Function, and Information Processing

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-PS4-2

Students who demonstrate understanding can:
Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
[Assessment Boundary: Assessment does not include knowledge of specific colors reflected and seen, the cellular mechanisms of vision, or how the retina works.]

FOSS Energy
IG: pp. 59, 65
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*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Develop a model to describe phenomena. (4-PS4-2)

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

Disciplinary Core Ideas

PS4.B: Electromagnetic Radiation
- An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2)

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*

Crosscutting Concepts

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

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

GRADE 4-PS4-3

Waves: Waves and 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.

Performance Expectation 4-PS4-3

Students who demonstrate understanding can:
Generate and compare multiple solutions that use patterns to transfer information.*
[Clarification Statement: Examples of solutions could include drums sending coded information through sound waves, using a grid of 1's and 0's representing black and white to send information about a picture, and using Morse code to send text.]

FOSS Energy
IG: pp. 59, 63
EA: *Notebook Entry*, IG p. 20, SNM No. 21
BM: pp. 12-13 (Item 9), pp. 50-51 (Item 9)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. (4-PS4-3)

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

Disciplinary Core Ideas

PS4.C: Information Technologies and Instrumentation

- Digitized information can be transmitted over long distances without significant degradation. High-tech devices, such as computers or cell phones, can receive and decode information—convert it from digitized form to voice—and vice versa. (4-PS4-3)

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

ETS1.C: Optimizing the Design Solution

- Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (secondary to 4-PS4-3)

FOSS Energy
IG: pp. 169, 265 (Step 5), 270 (Step 19), 271, 384

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort and classify designed products. (4-PS4-3)

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

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Knowledge of relevant scientific concepts and research findings is important in engineering. (4-PS4-3)

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

GRADE 3–5-ETS1-1

Engineering Design

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 3–5-ETS1-1

Students who demonstrate understanding can:
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.
[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. 59, 61, 65
EA: *Performance Assessment*, IG p. 164 (Step 4), IG p. 381 (Step 18)
BM: pp. 46-47 (Item 7)

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3–5-ETS1-1)

FOSS Energy
IG: pp. 163, 164, 168, 381
TR: pp. C7-C10, C34-C35

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3–5-ETS1-1)

FOSS Energy
IG: pp. 163-164 (Step 3), 169, 379 (Step 13), 381, 384

Crosscutting Concepts

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

- People's needs and wants change over time, as do their demands for new and improved technologies. (3–5-ETS1-1)

FOSS Soils, Rocks, and Landforms
IG: pp. 289-290 (Steps 9-12)
SRB: pp. 60-64

FOSS Energy
IG: pp. 382-383 (Steps 22-24), 282 (Step 25)
SRB: pp. 114-119, 120-121

GRADE 3–5-ETS1-2

Engineering Design

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 3–5-ETS1-2

Students who demonstrate understanding can:
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

FOSS Energy
IG: pp. 59, 61, 65
EA: *Performance Assessment*, IG p. 381 (Step 18)
BM: pp. 18-19 (Item 2a)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3–5-ETS1-2)

FOSS Soils, Rocks, and Landforms
IG: pp. 248, 291, 296, 297

FOSS Energy
IG: p. 391
TR: pp. C23-C26, C46-C53

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)

FOSS Energy
IG: pp. 163-164 (Step 3),169, 380-381 (Step 17), 384

Crosscutting Concepts

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

- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3–5-ETS-2)

FOSS Energy
IG: pp. 246-249
SRB: pp. 58-64, 114-118

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

GRADE 3–5-ETS1-3

Engineering Design

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 3–5-ETS1-3

Students who demonstrate understanding can:
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

FOSS Energy
IG: pp. 59, 61, 63, 65
EA: *Performance Assessment*, IG p. 381 (Step 18)
BM: pp. 18-19 (Item 2a)

Science and Engineering Practices	Disciplinary Core Ideas	
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3–5-ETS1-3) ***FOSS Energy*** **IG:** pp. 163 (Step 3), 215-220, 254-256 **TR:** pp. C14-C17, C38-C41	**ETS1.B: Developing Possible Solutions** • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3–5-ETS1-3) ***FOSS Energy*** **IG:** pp. 163-166, 169, 377-381, 384 **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3–5-ETS1-3) ***FOSS Energy*** **IG:** pp. 163-166, 169, 246-249, 269-270, 271, 377-381, 384	

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

GRADE 5-LS1-1

Matter and Energy in Organisms and Ecosystems

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 5-LS1-1

Students who demonstrate understanding can:
Support an argument that plants get the materials they need for growth chiefly from air and water.
[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. 47, 51, 53
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*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-LS1-1)

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

Disciplinary Core Ideas

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

- Plants acquire their material for growth chiefly from air and water. (5-LS1-1)

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"

Crosscutting Concepts

Energy and Matter

- Matter is transported into, out of, and within systems. (5-LS1-1)

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

TR: pp. D19-D21, D38-D41

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

GRADE 5-LS2-1

Matter and Energy in Organisms and Ecosystems

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 5-LS2-1

Students who demonstrate understanding can:
Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.
[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.] [Assessment Boundary: Assessment does not include molecular explanations.]

FOSS Living Systems
IG: pp. 49, 51, 53, 55
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*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 models and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model to describe phenomena. (5-LS2-1)

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

Disciplinary Core Ideas

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. (5-LS2-1)

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"

Crosscutting Concepts

Systems and System Models
- A system can be described in terms of its components and their interactions. (5-LS2-1)

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

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

	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. (5-LS2-1) ***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"*	

Connections to the Nature of Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena

- Science explanations describe the mechanisms for natural events. (5-LS2-1)

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

GRADE 5-ESS1-1

Space Systems: Stars and the Solar System

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 5-ESS1-1

Students who demonstrate understanding can:
Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.
*[**Clarification Statement: Absolute brightness of stars is the result of a variety of factors. Relative distance from Earth is one factor that affects apparent brightness and is the one selected to be addressed by the performance expectation.] [Assessment Boundary: Assessment is limited to relative distances, not sizes, of stars. Assessment does not include other factors that affect apparent brightness (such as stellar masses, age, stage).]*

FOSS Earth and Sun
IG: pp. 57, 59
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*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-ESS1-1)

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

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

Disciplinary Core Ideas

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. (5-ESS1-1)

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*

Crosscutting Concepts

Scale, Proportion, and Quantity

- Natural objects exist from the very small to the immensely large. (5-ESS1-1)

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

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

GRADE 5-ESS1-2

Space Systems: Stars and the Solar System

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 5-ESS1-2

Students who demonstrate understanding can:
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.
[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.] [Assessment Boundary: Assessment does not include causes of seasons.]

FOSS Earth and Sun
IG: pp. 57, 59

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*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 3–5 builds on K–2 experiences and progresses to introducing quantitative approaches to collecting data and conducting multiple trials of qualitative observations. When possible and feasible, digital tools should be used.

- Represent data in graphical displays (bar graphs, pictographs and/or pie charts) to reveal patterns that indicate relationships. (5-ESS1-2)

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

Disciplinary Core Ideas

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. (5-ESS1-2)

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

Crosscutting Concepts

Patterns

- Similarities and differences in patterns can be used to sort, classify, communicate and analyze simple rates of change for natural phenomena. (5-ESS1-2)

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

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

GRADE 5-ESS2-1

Earth's Systems

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 5-ESS2-1

Students who demonstrate understanding can:
Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.
[Clarification Statement: **The geosphere, hydrosphere (including ice), atmosphere, and biosphere are each a system and each system is a part of the whole Earth System. 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.] [*Assessment Boundary: Assessment is limited to the interactions of two systems at a time.*]

FOSS Living Systems
IG: pp. 49, 55
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: pp. 57, 61
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)

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model using an example to describe a scientific principle. (5-ESS2-1)

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

Disciplinary Core Ideas

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. (5-ESS2-1)

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,

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-ESS2-1)

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

	130-138, 139-143 **DOR:** *All about Meteorology* *Water Cycle* *"Water Cycle Game"*	

GRADE 5-ESS2-2

Earth's Systems

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 5-ESS2-2

Students who demonstrate understanding can:
Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.
[Assessment Boundary: Assessment is limited to oceans, lakes, rivers, glaciers, ground water, and polar ice caps, and does not include the atmosphere.]

FOSS Earth and Sun
IG: pp. 57, 63
EA: *Notebook Entry*, IG p. 406 (Step 20)
BM: pp.10-11 (Items 7ab)

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Describe and graph quantities such as area and volume to address scientific questions. (5-ESS2-2)

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

Disciplinary Core Ideas

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. (5-ESS2-2)

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"*

Crosscutting Concepts

Scale, Proportion, and Quantity

- Standard units are used to measure and describe physical quantities such as weight and volume. (5-ESS2-2)

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

GRADE 5-ESS3-1

Earth's Systems

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 5-ESS3-1

Students who demonstrate understanding can:
Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

FOSS Living Systems
IG: pp. 47, 55
BM: pp. 16-17 (Item 11)

FOSS Earth and Sun
IG: pp. 57, 61, 63
EA: *Notebook Entry*, IG p. 421 (Step 20)
BM: pp. 8-9 (Item 6), pp. 14-15 (Item 10), pp. 56-57 (Item 7)

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 3–5 builds on K–2 experiences and progresses to evaluating the merit and accuracy of ideas and methods.

- Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. (5-ESS3-1)

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

Disciplinary Core Ideas

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. (5-ESS3-1)

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*

Crosscutting Concepts

Systems and System Models

- A system can be described in terms of its components and their interactions. (5-ESS3-1)

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

Connections to the Nature of Science

Science Addresses Questions About the Natural and Material World

- Science findings are limited to questions that can be answered with empirical evidence. (5-ESS3-1)

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)

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

GRADE 5-PS1-1

Structure and Properties of Matter

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 5-PS1-1

Students who demonstrate understanding can:
Develop a model to describe that matter is made of particles too small to be seen.
[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.] [Assessment Boundary: Assessment does not include the atomic-scale mechanism of evaporation and condensation or defining the unseen particles.]

FOSS Earth and Sun
IG: pp. 57, 61, 63
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. 49, 55
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*

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.
- Develop a model to describe phenomena. (5-PS1-1)

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

Disciplinary Core Ideas

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 shows 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. (5-PS1-1)

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, 258, 265 (Step 9), 268 (Step 16), 314-15, 330 (Step 6), 332 (Step 12), 341 (Steps 4 and 6)
SRB: pp. 7, 24, 26-27,32, 42-43, 75

Crosscutting Concepts

Scale, Proportion, and Quantity
- Natural objects exist from the very small to the immensely large. (5-PS1-1)

FOSS Earth and Sun
IG: pp. 252, 260 (Step 14), 268, 282

FOSS Mixtures and Solutions
IG: pp. 98, 109, 115 (Step 8), 127, 202, 208 (Step 9), 226, 227, 268, 316, 342
SRB: pp. 8, 26, 27
TR: pp. D13-D15, D32-D33

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

	DOR: *"Tutorial: Solutions"* *"Tutorial: Conservation of Mass"* *Changes in Properties of Matter)* *Chemical Reactions*	

GRADE 5-PS1-2

Structure and Properties of Matter

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 5-PS1-2

Students who demonstrate understanding can:
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. *[Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that forms new substances.] [Assessment Boundary: Assessment does not include distinguishing mass and weight.]*

FOSS Mixtures and Solutions
IG: pp. 49, 51, 53, 55
EA: *Notebook Entry,* IG p. 269 (Step 21)
EA: *Performance Assessment,* IG p. 226 (Step 4) IG p. 284 (Step 7)
EA: *Response Sheet,* IG p. 117**,** SNM No. 4**,** IG p. 188**,** SNM No. 8**,** IG p. 219**,** SNM No. 12**,** IG p. 279**,** SNM No. 15
BM: pp. 2-3 (Items 1 and 2)**,** pp. 8-9 (Items 6ab)**,** pp. 12-13 (Items 9ab)**,** pp. 14-15 (Items 11 and 12)**,** pp. 20-21 (Item 4)**,** pp. 22-23 (Items 6ab), pp. 34-35 (Item 1a), pp. 42-43 (Items 4ab), pp. 50-51 (Items 4 and 5)
IA: *Physical Science Task 1—The Science of Party Planning*

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 3–5 builds on K–2 experiences and progresses to extending quantitative measurements to a variety of physical properties and using computation and mathematics to analyze data and compare alternative design solutions.

- Measure and graph quantities such as weight to address scientific and engineering questions and problems. (5-PS1-2)

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

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. (5-PS1-2)

FOSS Mixtures and Solutions
IG: pp. 115 (Step 8), 116 (Step 9), 117 (Step 13), 184 (Step 5), 203, 222, 258, 278 (Step 12), 279 (Step 19), 286 (Step 16), 345 (Step 16)
SRB: pp. 10, 11, 30, 31
DOR: *"Tutorial: Concentration"*
"Tutorial: Solutions"
Changes in Properties of Matter

PS1.B: Chemical Reactions
- No matter what reaction or change in properties occurs, the total weight of the substances does not change. (Boundary: Mass and weight are not distinguished at this grade level.) (5-PS1-2)

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

Crosscutting Concepts

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

Connections to the Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems
- Science assumes consistent patterns in natural systems. (5-PS1-2)

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

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

GRADE 5-PS1-3

Structure and Properties of Matter

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 5-PS1-3

Students who demonstrate understanding can:
Make observations and measurements to identify materials based on their properties.
[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.] [Assessment Boundary: Assessment does not include density or distinguishing mass and weight.]

FOSS Mixtures and Solutions
IG: pp. 49, 53, 55
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)

Science and Engineering Practices

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 and measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon. (5-PS1-3)

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

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Measurements of a variety of properties can be used to identify materials. (Boundary: 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.) (5-PS1-3)

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)
SRB: pp. 9 and 22
DOR: *"Tutorial: Saturation"*
"Tutorial: Solutions"

Crosscutting Concepts

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

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

GRADE 5-PS1-4

Structure and Properties of Matter

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 5-PS1-4

Students who demonstrate understanding can:
Conduct an investigation to determine whether the mixing of two or more substances results in new substances.
*[**Clarification Statement: Examples of combinations that do not produce new substances could include sand and water. Examples of combinations that do produce new substances could include baking soda and vinegar or milk and vinegar.]*

FOSS Mixtures and Solutions
IG: pp. 49, 55
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*

Science and Engineering Practices

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.

- 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. (5-PS1-4)

FOSS Mixtures and Solutions
IG: pp. 315, 321, 322, 329-330 (Steps 3-6), 340-341(Steps 2-3)
TR: pp. C14-C17, C46-C47

Disciplinary Core Ideas

PS1.B: Chemical Reactions

- When two or more different substances are mixed, a new substance with different properties may be formed. (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)
SRB: pp. 74-78, 79-80
DOR: *Chemical Reactions*
Changes in Properties of Matter
"Tutorial: Reaction or not?"

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified, tested, and used to explain change. (5-PS1-4)

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

GRADE 5-PS2-1

Space Systems: Stars and the Solar System

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 5-PS2-1

Students who demonstrate understanding can:
Use observations to describe patterns of what plants and animals (including humans) need to survive.
[Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.] [*Assessment Boundary: Assessment does not include mathematical representation of gravitational force*.]

FOSS Earth and Sun
IG: pp. 57, 59
EA: *Response Sheet,* IG p. 218, SNM No.10
BM: pp. 12-13 (Item 9)**,** pp. 32-33 (Item 4)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model. (5-PS2-1)

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

Disciplinary Core Ideas

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. (5-PS2-1)

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*

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships are routinely identified and used to explain change. (5-PS2-1)

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

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

GRADE 5-PS3-1

Matter and Energy in Organisms and Ecosystems

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 5-PS3-1

Students who demonstrate understanding can:
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.
[Clarification Statement: Examples of models could include diagrams, and flow charts.]

FOSS Living Systems
IG: pp. 47, 49, 51, 53, 55
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)

Science and Engineering Practices

Developing and Using Models
Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Use models to describe phenomena. (5-PS3-1)

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

Disciplinary Core Ideas

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). (5-PS3-1)

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

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

- Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. (secondary to 5-PS3-1)

FOSS Living Systems
IG: pp. 110 (Step 12), 112 (Step 18), 113 (Step 22), 122, 130 (Step 1), 143, 150-151, 161-162 (Steps 18-19), 191 (Step 22), 208-209, 242 (Step 18)
SRB: pp. 27-31
DOR: *Food Chains*
Web of Life: Life in the Sea

Crosscutting Concepts

Energy and Matter

- Energy can be transferred in various ways and between objects. (5-PS3-1)

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-D41

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

GRADE 3–5-ETS1

Engineering Design

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 3–5-ETS1-1

Students who demonstrate understanding can:
Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.

FOSS Mixtures and Solutions
IG: pp. 49, 51, 53
EA: *Notebook Entry,* IG p. 298 (Step 21)
BM: pp. 4-5 (Item 3a)

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in 3–5 builds on grades K–2 experiences and progresses to specifying qualitative relationships.

- Define a simple design problem that can be solved through the development of an object, tool, process, or system and includes several criteria for success and constraints on materials, time, or cost. (3–5-ETS1-1)

FOSS Mixtures and Solutions
IG: pp. 97, 127,132 (Steps 19-20), 259, 287, 297, 299 (Step 23)
SRB: pp. 14-15
TR: pp. C7-C11, C36-C37

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- Possible solutions to a problem are limited by available materials and resources (constraints). The success of a designed solution is determined by considering the desired features of a solution (criteria). Different proposals for solutions can be compared on the basis of how well each one meets the specified criteria for success or how well each takes the constraints into account. (3–5-ETS1-1)

FOSS Mixtures and Solutions
IG: pp. 96, 127 (Step 6), 127 (Step 9), 132 (Step 21), 297 (Steps 16-21), 301 (Step 29)
SRB: pp. 54-61

Crosscutting Concepts

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

- People's needs and wants change over time, as do their demands for new and improved technologies. (3–5-ETS1-1)

FOSS Mixtures and Solutions
IG: pp. 98 and 298 (Step 22)
SRB: pp. 54-61
DOR: *Water Cycle*

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

GRADE 3–5-ETS1-2

Engineering Design

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 3–5-ETS1-2

Students who demonstrate understanding can:
Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

FOSS Earth and Sun
IG: pp. 57, 59, 61
EA: *Performance Assessment,* IG p. 355 (Step 14)
BM: pp. 14-15 (Item 10), pp. 56-57 (Item 8)

FOSS Mixtures and Solutions
IG: pp. 49, 51, 53
EA: *Notebook Entry,* IG p. 298 (Step 21)
EA: *Performance Assessment,* IG p. 127 (Steps 6-9)
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), pp. 18-19 (Item 2), pp. 22-23 (Item 6b)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 3–5 builds on K–2 experiences and progresses to the use of evidence in constructing explanations that specify variables that describe and predict phenomena and in designing multiple solutions to design problems.

- Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design problem. (3–5-ETS1-2)

FOSS Earth and Sun
IG: pp. 305 and 358

FOSS Mixtures and Solutions
IG: pp. 97, 128, 132 (Step 21), 297, 299 (Step 25)
SRB: pp. 14-15, 62-67
TR: pp. C23-C26, C48-C51

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- Research on a problem should be carried out before beginning to design a solution. Testing a solution involves investigating how well it performs under a range of likely conditions. (3–5-ETS1-2)
- At whatever stage, communicating with peers about proposed solutions is an important part of the design process, and shared ideas can lead to improved designs. (3–5-ETS1-2)

FOSS Earth and Sun
IG: pp. 304-305, 354 (Step 7), 357 (Step 20), 361

FOSS Mixtures and Solutions
IG: pp. 127 (Steps 6-9), 297 (Step 19), 301
SRB: pp. 50-53

Crosscutting Concepts

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

- Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands. (3–5-ETS1-2

FOSS Earth and Sun
IG: pp. 346 (Step 28) and 360 (Step 27)
SRB: pp. 110-111

FOSS Mixtures and Solutions
IG: p. 300
SRB: pp. 62-69

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

GRADE 3–5-ETS1-3

Engineering Design

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 3–5-ETS1-3

Students who demonstrate understanding can:
Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

FOSS Earth and Sun
IG: *pp. 57, 61*
EA: *Performance Assessment, IG p. 355 (Step 14)*
BM: *pp. 14-15 (Item 11)*

FOSS Mixtures and Solutions
IG: *pp. 49, 51*
BM: *pp. 4-5 (Item 3a)*

Science and Engineering Practices	Disciplinary Core Ideas	
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in 3–5 builds on K–2 experiences and progresses to include investigations that control variables and provide evidence to support explanations or design solutions. • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence, using fair tests in which variables are controlled and the number of trials considered. (3–5-ETS1-3) ***FOSS Earth and Sun*** **IG:** pp. 294, 313, 315, 325, 339, 340, 353, 355 ***FOSS Mixtures and Solutions*** **IG:** pp. 88, 96, 128 (Step 13), 132 (Step 19), 137-138 (Steps 6-8) **SRB:** pp. 14-15 **TR:** pp. C14-C17, C46-C47	**ETS1.B: Developing Possible Solutions** • Tests are often designed to identify failure points or difficulties, which suggest the elements of the design that need to be improved. (3–5-ETS1-3) ***FOSS Earth and Sun*** **IG:** pp. 295, 304-305 ***FOSS Mixtures and Solutions*** **IG:** pp. 3, 96, 127 (Step 9), 132 (Steps 19-21) **ETS1.C: Optimizing the Design Solution** • Different solutions need to be tested in order to determine which of them best solves the problem, given the criteria and the constraints. (3–5-ETS1-3) ***FOSS Earth and Sun*** **IG:** pp. 295, 304-305, 354 (Step 7) ***FOSS Mixtures and Solutions*** **IG:** pp. 96, 132 (Steps 19-21)	