GRADE 6

Ecosystems: Interactions, Energy, and Dynamics

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.1

Students who demonstrate understanding can:
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems

FOSS Populations and Ecosystems

IG: pp. 55, 61, 67, *242, 262 (Step 2-6), 319, 416, 442 (Step 28) 443 (Step 29-30), 459 (Steps 19-20) 540, 541, 543, 589 (Step 10)*

EA: *Notebook Entry*, IG p. 257 (Step 12), IG p. 541 (Step 16), *Performance Assessment***,** IG p. 278 (Step 6)**,** IG pp. 441-442 (Step 24)

EA: *Response Sheet***,** IG p. 459, Student Notebook Master No. 23, *Review Notebook Entries***,** IG p. 280 (Step 12)**,** IG p. 477 (Step 12)

BM: *Assessment Coding Guide,* pp. 18-19 (Item 1)**,** pp. 20-21 (Items 2-4)**,** pp. 22-23 (Item 5)**,** pp. 32-33 (Item 1)**,** pp. 36-37 (Item 3)**,** pp. 38-39 (Item 6)**,** pp. 40-41 (Item 1)**,** pp. 42-43 (Item 2)**,** pp. 46-47 (Item 5)**,** pp. 48-49 (Item 6)**,** pp. 54-55 (Item 5)**,** pp. 60-61 (Item 2)**,** pp. 62-63 (Item 3)**,** pp. 66-67 (Item 8)**,** pp. 70-71 (Item 13)**,** pp. 74-75 (Item 15)

***SRB:** pp.76, 97-99*

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena.

FOSS Populations and Ecosystems
IG: pp. 407, 417, 443, 458, 459, 534, 535, 540, 541,542, 543, 589
TR: pp. C28-C32, C64-C73

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.

FOSS Populations and Ecosystems
***IG:** pp. 242, 262 (Step 2-6), 319, 416, 442 (Step 28) 443 (Step 29-30), 459 (Steps 19-20) 540, 541, 543, 589 (Step 10)*
***SRB:** pp.76, 97-99*
***DOR:** The Mono Lake Story, "Mono Lake Food Web", Hawaii: Strangers in Paradise*

Crosscutting Concepts

Patterns

- Patterns can be used to identify cause and effect relationships.

FOSS Populations and Ecosystems
IG: pp.244, 265, 266, 277, 280, 418, 440, 443, 452, 469, 532, 533, 560
TR: pp. D14, D26-27

GRADE 6

Ecosystems: Interactions, Energy, and Dynamics

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.2

Students who demonstrate understanding can:
Evaluate competing design solutions for maintaining biodiversity and ecosystem services. *

FOSS Populations and Ecosystems
IG: 55, 71, 73, 547, 557, 570 (Step 14), 571-572 (Steps 16-17), 581(I), 582 (Steps 21-22), *557-558, 594-595, 596 (Step 9), 604, 607, 614, 623 (Step 2), 624, 642*
EA: *Notebook Entry*, IG p. 582 (Step 22), IG p. 596 (Step 9), *Performance Assessment*, IG p. 627 (Step 10), IG p. 642 (Step 4), *Review Notebook Entries*, IG p. 604 (Step 14)
BM: *Assessment Coding Guide,* pp. 50-51(Item 1ab), pp. 52- 53 (Item 3), pp. 54-55 (Item 6), pp. 64-65 (Items 4 and 5), pp. 66-67 (Item 8)
SRB: pp. 100-101, *102-105, 118-122*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(S).

- Evaluate competing design solutions based on jointly developed and agreed-upon design criteria.

FOSS Populations and Ecosystems
IG: pp. 607, 615, 635, 636, 637, 642, 648
TR: pp. C33-C38, C72-C73

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health.

FOSS Populations and Ecosystems
IG: pp. 547, 557, 570 (Step 14), 571-572 (Steps 16-17), 581(I), 582 (Steps 21-22)
SRB: pp. 100-101
SNM: Nos. 42, 43
DOR: *Hawaii: Strangers in Paradise*

LS4.D: Biodiversity and Humans

- Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling.

FOSS Populations and Ecosystems
***IG:** pp. 557-558, 594-595, 596 (Step 9), 604, 607, 614, 623 (Step 2), 624, 642*
***SRB:** pp.102-105, 118-122*
***SNM:** Nos. 6, 20*

Crosscutting Concepts

Stability and Change

- Small changes in one part of a system might cause large changes in another part.

FOSS Populations and Ecosystems
IG: pp. 560, 571, 588, 589, 595, 598, 604, 616, 635, 636, 637, 642, 648
TR: pp. D19, D44-D45

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 6

From Molecules to Organisms: Structures and Processes

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.3

Students who demonstrate understanding can:
Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.

FOSS Populations and Ecosystems
IG: pp. 55, 65, 350, 373 (Steps 6 and 7), 374, 378 (D), 381 (H), 385 (Step 1), 350, 363 (Steps 12 and 13), 364 (Steps 15 and 16), 366 (Step 21), 372-374 (Steps 5-7), 381 (H) 425 (Step 2)
EA: *Notebook Entry,* IG p. 402 (Step 28), *Performance Assessment,* IG pp. 360-361 (Step 5), *Response Sheet,* IG p. 375**,** Student Notebook Master No. 19, *Review Notebook Entries***,** IG p. 504 (Step 30)
BM: *Assessment Coding Guide,* pp. 4-5 (Item 2a), pp. 6-7 (Item 3ab), pp.24-25 (Item 1ab), pp. 26-27 (Items 4 and 5), pp. 30-31 (Item 7abc), pp. 68-69 (Item 9), pp.72-73 (Item 14ab), pp. 74-75 (Item 15)
SRB: pp. 51-55, 56-61

FOSS Diversity of Life
IG: pp. 388, 418-433
EA: *Notebook Entry,* IG p. 420 (step 9)
SRB: 44-49, 50-57
BM: *Assessment Masters*, pp. 13 (Item 2), 14 (Item 4), 16 (Items 8 and 9), 27 (Items 6 and 7), 29 (Item 13), 31 (Item 19)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (Including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

FOSS Populations and Ecosystems
IG: pp. 351, 365, 375, 404
TR: pp. C28-C32, C64-C73

FOSS Diversity of Life
IG: pp. 413, 431

Disciplinary Core Ideas

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

- Plants, algae (Including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use.

FOSS Populations and Ecosystems
IG: pp. 350, 373 (Steps 6 and 7), 374, 378 (D), 381 (H), 385 (Step 1)
SNM: Nos.13, 19
SRB: pp. 51-55, 56-61

FOSS Diversity of Life
IG: pp. 388,
EA: *Notebook Entry,* IG p. 420 (step 9)

Crosscutting Concepts

Energy and Matter

- Within a natural system, the transfer of energy drives the motion and/or cycling of matter.

FOSS Populations and Ecosystems
IG: pp. 337, 352, 361, 373, 374, 395, 397, 398, 400, 404
TR: pp. D12-D13, D17, D38-D43

FOSS Diversity of Life
IG: pp. 418, 432
TR: pp. D12-D13, D17, D38-D43

TR: pp. C28-C32, C64-C73	**SRB:** 44-49, **PS3.D: Energy in Chemical Processes and Everyday Life** • The chemical reaction by which plants produce complex food molecules (Sugars) requires an energy input (I.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. (Secondary to MS-LS1-6) ***FOSS Populations and Ecosystems Module*** **IG:** pp. 350, 363 (Steps 12 and 13), 364 (Steps 15 and 16), 366 (Step 21), 372-374 (Steps 5-7), 381 (H) 425 (Step 2) **SRB:** pp. 51-55, 56-61	

GRADE 6

From Molecules to Organisms: Structures and Processes

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.4

Students who demonstrate understanding can:
Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.

FOSS Populations and Ecosystems
IG: pp. 55, 65, 337, 350, 353, 374 (Steps 8 and 9) 395 (Step 3), 396-397 (Step 10), 402 (Steps 27 and 28), 337, 350, 353, 374 (Step 8), 397 (Step 10), 402 (Step 27 and 28)
EA: *Notebook Entry***,** IG p. 402 (Step 28)**,** IG p. 404 (Steps 30-31), *Response Sheet***,** IG p. 375, Student Notebook Master No. 19, *Review Notebook Entries***,** IG p. 504 (Step 30)
BM: *Assessment Coding Guide, pp.* 4-5 (Item 2a)**,** pp. 6-7 (Item 3ab)**,** pp. 24-25 (Items 1ab, 2)**,** pp. 28-29, (Item 6abc)**,** pp. 70-71(12)**,** pp. 72-73 (Item 14ab)**,** pp. 74-75 (Item 15)
SRB: pp. 54-55

FOSS Diversity of Life
IG: pp. 388, 418-433
EA: *Notebook Entry,* IG p. 420 (step 9)
SRB: 44-49, 50-57
BM: *Assessment Masters*, pp. 13 (Item 2), 14 (Item 4), 16 (Items 8 and 9), 27 (Items 6 and 7), 29 (Item 13), 31 (Item 19)

FOSS Human Systems Interactions
IG: pp. 130, 131, 140-154
EA: *Performance Assessment,* IG p. 146 (step 13)
SRB: 50-54
BM: *Assessment Masters,* pp. 5 (Item 8), 14 (Item 9)

Science and Engineering Practices

Developing and using models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms.

FOSS Populations and Ecosystems
IG: pp. 337, 351, 397, 398, 400, 401, 404
TR: pp. C14-C17, C44-C51

FOSS Diversity of Life
IG: pp. 412, 431

Disciplinary Core Ideas

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

- Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy

FOSS Populations and Ecosystems
IG: pp. 337, 350, 353, 374 (Steps 8 and 9) 395 (Step 3), 396-397 (Step 10), 402 (Steps 27 and 28)
SRB: pp. 54-55

Crosscutting Concepts

Energy and Matter

- Matter is conserved because atoms are conserved in physical and chemical processes.

FOSS Populations and Ecosystems
IG: pp. 337, 352, 361, 373, 374, 378 (C), 395, 397, 398, 400, 404
TR: pp. D12-D13, D17, D38-D43

FOSS Diversity of Life
IG: pp. 418, 432
TR: pp. D12-D13, D17, D38-D43

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

TR: pp. C14-C17, C44-C51	**PS3.D: Energy in Chemical Processes and Everyday Life** • Cellular respiration in plants and animals involve chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. (Secondary to MS-LS1-7) ***FOSS Populations and Ecosystems*** **IG:** pp. 337, 350, 353, 374 (Step 8), 397 (Step 10), 402 (Step 27 and 28) **SRB:** pp. 54-55 ***FOSS Human Systems Interactions*** **IG:** pp. 130, 131, 140-154 **SRB:** 50-54	

GRADE 6

Ecosystems: Interactions, Energy, and Dynamics

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.5

Students who demonstrate understanding can:
Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.

FOSS Populations and Ecosystems
IG: pp. 55, 69, 481, 490, 502 (Step 15), 504 (Step 22), 506 (Step 26), 507 (Step 29-30), 514-515 (Step 5), 533-535 (Steps 5-9), 540 (Steps 12-14), 543 (Steps 20-21)
EA: *Notebook Entry,* IG p. 507 (Step 30), IG p. 541 (Step 16), *Performance Assessment*, IG p. 515 (Step 7), *Review Notebook Entries*, IG p. 543 (Step 20)
BM: *Assessment Coding Guide,* pp. 2-3 (Item 1abc), pp. 40-41 (Item 1), pp. 42-43 (Item 2), pp. 44-45 (Items 2c and 3), pp. 48-49 (Item 6), pp. 58-59 (Item 1), pp. 64-65 (Items 4 and 6), pp. 66-67 (Item 7), pp. 68-69 (Item 10), pp. 70-71 (Item 12)
SRB: pp. 87-96, 97-99

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to provide evidence for phenomena.

FOSS Populations and Ecosystems
IG: pp. 481, 491, 504, 505, 506, 514, 515, 531, 532, 540, 543
TR: pp. C22-C24, C56-C61

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.
- In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.
- Growth of organisms and population increases are limited by access to resources.

FOSS Populations and Ecosystems
IG: pp. 481, 490, 502 (Step 15), 504 (Step 22), 506 (Step 26), 507 (Step 29-30), 514-515 (Step 5), 533-535 (Steps 5-9), 540 (Steps 12-14), 543 (Steps 20-21)
SRB: pp. 87-96, 97-99
SNM: Nos. 9, 34-36, 40
DOR: "Milkweed Bugs: Limited", "Milkweed Bugs: Unlimited", "Ecoscenarios", *The Mono Lake Story*

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Populations and Ecosystems
IG: 492, 498, 504, 505, 506, 507, 508, 514, 515, 516, 518, 523, 531, 532, 533, 534, 535, 540, 543
TR: pp. D10, D14-D15, D26-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 6

Ecosystems: Interactions, Energy, and Dynamics

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.6

Students who demonstrate understanding can:
Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems

FOSS Populations and Ecosystems

IG: pp. 55, 61, 67, *242, 262 (Step 2-6), 319, 416, 442 (Step 28) 443 (Step 29-30), 459 (Steps 19-20) 540, 541, 543, 589 (Step 10)*

EA: *Notebook Entry*, IG p. 257 (Step 12), IG p. 541 (Step 16), *Performance Assessment*, IG p. 278 (Step 6), IG pp. 441-442 (Step 24), *Response Sheet*, IG p. 459, Student Notebook Master No. 23, *Review Notebook Entries*, IG p. 280 (Step 12), IG p. 477 (Step 12)

BM: *Assessment Coding Guide,* pp. 18-19 (Item 1), pp. 20-21 (Items 2-4), pp. 22-23 (Item 5), pp. 32-33 (Item 1), pp. 36-37 (Item 3), pp. 38-39 (Item 6), pp. 40-41 (Item 1), pp. 42-43 (Item 2), pp. 46-47 (Item 5), pp. 48-49 (Item 6), pp. 54-55 (Item 5), pp. 60-61 (Item 2), pp. 62-63 (Item 3), pp. 66-67 (Item 8), pp. 70-71 (Item 13), pp. 74-75 (Item 15)

***SRB:** pp.76, 97-99*

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena.

FOSS Populations and Ecosystems
IG: pp. 407, 417, 443, 458, 459, 534, 535, 540, 541,542, 543, 589
TR: pp. C28-C32, C64-C73

Disciplinary Core Ideas

LS2.A: Interdependent Relationships in Ecosystems

- Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.

FOSS Populations and Ecosystems
***IG:** pp. 242, 262 (Step 2-6), 319, 416, 442 (Step 28) 443 (Step 29-30), 459 (Steps 19-20) 540, 541, 543, 589 (Step 10)*
***SRB:** pp.76, 97-99*
***DOR:** The Mono Lake Story, "Mono Lake Food Web", Hawaii: Strangers in Paradise*

Crosscutting Concepts

Patterns

- Patterns can be used to identify cause and effect relationships.

FOSS Populations and Ecosystems
IG: pp.244, 265, 266, 277, 280, 418, 440, 443, 452, 469, 532, 533, 560
TR: pp. D14, D26-27

GRADE 6

Ecosystems: Interactions, Energy, and Dynamics

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.7

Students who demonstrate understanding can:
Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.

FOSS Populations and Ecosystems
IG: pp. 55, 63, 67, 69, 71, 73, 481, 532-533, 540, 541, 543, 547, 557-558, 561, 586, 587 (Step 4), 594-596 (Steps 3-9), 607, 614, 644-646
EA: *Notebook Entry*, IG p. 596 (Step 9), *Performance Assessment*, IG p. 589 (Step 10), *Review Notebook Entries*, IG p. 334 (Step 17), IG p. 477 (Step 12), IG p. 543 (Step 20), IG p. 604 (Step 14)
BM: *Assessment Coding Guide,* pp. 32-33 (Item 1bc), pp. 46-47 (Item 5ab), pp. 48-49 (Item 6), pp. 52-53 (Items 2-4), pp. 54-55 (Items 5 and 6), pp. 56-57 (Item 7), pp. 62-63 (Item 3c), pp. 66-67 (Item 8), pp. 68-69 (Item 11)
SRB: pp. 100-107, 118-119

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(S).

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

FOSS Populations and Ecosystems
IG: pp. 589, 604, 635, 636, 637, 642, 648
TR: pp. C33-C38, C72-C73

Disciplinary Core Ideas

LS2.C: Ecosystem Dynamics, Functioning, and Resilience

- Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations.

FOSS Populations and Ecosystems
IG: pp. 481, 532-533, 540, 541, 543, 547, 557-558, 561, 586, 587 (Step 4), 594-596 (Steps 3-9), 607, 614, 644-646
SRB: pp. 100-107, 118-119
SNM: No. 44
DOR: *The Mono Lake Story, Hawaii: Strangers in Paradise*

Crosscutting Concepts

Stability and Change

- Small changes in one part of a system might cause large changes in another part.

FOSS Populations and Ecosystems
IG: pp. 534, 535, 540, 541, 542, 543, 571, 586, 588, 589, 598, 635, 636, 637
TR: pp. D19, D44-D45

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science disciplines share common rules of obtaining and evaluating empirical evidence. (MS-LS2-4)

FOSS Populations and Ecosystems
IG: pp. 566-571 (Steps 2-17)

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 6

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.8

Students who demonstrate understanding can:
Develop models to describe the atomic composition of simple molecules and extended structures.

FOSS Chemical Interactions
IG: pp. 59, 77, 541, 543, 550, 553, 558-561, 563 (Step 11), 564 (Step15), 620
EA: *Notebook Entry,* IG p. 574 (Step 20)**,** Student Notebook Masters Nos. 67-68, *Performance Assessment***,** IG p. 588 (Step 13), *Review Notebook Entries***,** IG p. 620 (Step 20)
BM: *Assessment Coding Guide,* pp. 52-53 (Item 4)**,** pp. 54-55 (Items 6 and 7)**,** pp. 64-65 (Item 6)**,** pp. 66-67 (Items 8a and 9)
SRB: pp. 24-27, 110-117, 180-181

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to predict and/or describe phenomena.

FOSS Chemical Interactions
IG: pp. 551, 558, 559, 560, 562, 563, 574, 587, 620
TR: pp. C14-C17, C44-C51

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).

FOSS Chemical Interactions
IG: pp. 541, 543, 550, 553, 558-561, 563 (Step 11), 564 (Step15), 620
SRB: pp. 24-27, 110-117, 180-181

Crosscutting Concepts

Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

FOSS Chemical Interactions
IG: pp. 552, 589, 614, 617, 620
TR: pp. D15-D16, D32-D35

GRADE 6

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.9

Students who demonstrate understanding can:
Utilize the periodic table as an informational tool to identify elements.

FOSS Chemical Interactions
IG: pp. 54, 164, 165, 169-174, 183-184, 189-194, 197-199
EA: *Performance Assessment,* p. 183 (Step 12), *Response Sheet,* p. 192 (Step 8)
BM: *Assessment Masters,* pp. 7 (Items 5a and 5b),
SRB: pp. 3-10, 13-14

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop a model to predict and/or describe phenomena. ***FOSS Chemical Interactions*** **IG:** pp. 170, 198 **TR:** pp. C14-C17, C44-C51	**PS1.A: Structure and Properties of Matter** • Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. ***FOSS Chemical Interactions*** **IG:** pp. 54, 164, 165, 169-174, 183-184, 189-194, 197-199 **SRB:** pp. 3-10, 13-14	**Patterns** • Graphs and charts can be used to identify patterns in data. ***FOSS Chemical Interactions*** **IG:** pp. 170, 171, 172, 174, 183, 198 **TR:** pp. D9, D13, D22-D27

GRADE 6

Waves and Their Applications in Technologies for Information Transfer

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.10

Students who demonstrate understanding can:
Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.

FOSS Waves
IG: pp. 49, 51, 53, 86, 89, 103 (Step 4), 105 (Step 10), 106-107, 122, 125, 130, 131,132, 138, 172 (Step 25), 173
EA: *Notebook Entry,* IG pp. 95 (Step 8), IG 97 (Step 13), IG 107-108 (Step 16), IG 138 (Step 21), *Performance Assessment,* IG pp. 107-108 (Step 16)
EA: *Response Sheet,* IG p. 110, Student Notebook Master No. 3, *Review Notebook Entries*, IG p. 111 (Step 24), IG p. 173 (Step 29)
BM: *Assessment Coding Guide,* pp. 2-3 (Items 1 and 2ab), pp. 4-5 (Items 3ab), pp. 8-9 (Items 1, 2, and 4), pp. 12-13 (Item 7), pp. 14-15 (Item 8), pp. 28-29 (Items 1-3), pp. 32-33 (Item 5)
SRB: pp. 4-6, 8-9

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking at the 6–8 level builds on K–5 and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.
- Use mathematical representations to describe and/or support scientific conclusions and design solutions.

FOSS Waves
IG: pp. 87, 95, 96, 108, 114, 123, 137
SRB: p. 6
TR: pp. C25-C27, C60-C65

Disciplinary Core Ideas

PS4.A: Wave Properties
- A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude.

FOSS Waves
IG: pp. 86, 89, 103 (Step 4), 105 (Step 10), 106-107, 122, 125, 130, 131,132, 138, 172 (Step 25), 173
SRB: pp. 4-6, 8-9
DOR: *Standing Wave*
Big Waves
"Oscilloscope"

Crosscutting Concepts

Patterns
- Graphs and charts can be used to identify patterns in data.

FOSS Waves
IG: pp. 88, 96, 98, 104, 105, 108, 111, 124, 135, 136, 137, 173
SRB: pp. 4-6, 8-9
TR: pp. D9, D13, D22-D27

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence
- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS4-1)

FOSS Waves
IG: pp. 107-108 (Steps 14-16), 134-137 (Steps 10-18)

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

School Specialty. Delta Education

GRADE 6

Waves and Their Applications in Technologies for Information Transfer

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.11

Students who demonstrate understanding can:
Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.

FOSS Waves
IG: pp. 49, 53, 55, 122, 129, 161,162, 168, 169, 173, 177, 186, 189, 193, 194, 196, 197, 198, 205, 206, 208, 211-213, 226, 227, 238, 239
EA: *Notebook Entry,* IG p. 173 (Step 30), IG p. 220 (Step 16), IG p. 239 (Step 12), *Performance Assessment,* IG p. 167 (Step 15) IG p. 237 (Steps 6-7), Student Notebook Master No. 20, *Response Sheet,* IG p. 229, Student Notebook Master No. 19, *Review Notebook Entries*, IG p. 173 (Step 29), IG p. 240 (Step 13)
BM: *Assessment Coding Guide*, pp. 4-5 (Items 3 and 4), pp. 16-17 (Items 1-3), pp. 22-23 (Item 10), pp. 24-25 (Items 1 and 2), pp. 30-31 (Item 4abc), pp. 34-35 (Items 7 and 8), pp. 36-37 (Items 9 and 10)
SRB: pp. 17-20, 32-41

FOSS Planetary Science
IG: pp. 55, 71
EA: *Notebook Entry,* IG p. 519 (Step 18)
EA: *Review Notebook Entries*, IG p. 528 (Step 15)
BM: *Assessment Coding Guide*, pp. 50-51 (Items 1-3), pp. 52-53 (Item 4), pp. 54-55 (Items 6 and 7), pp. 68-69 (Item 9), pp. 74-75 (Item 14)

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Waves
IG: pp. 123, 125, 135, 136, 177, 178, 187, 208, 266
SRB: pp. 33-41
DOR: "Refraction"
"Oscilloscope"

FOSS Planetary Science
IG: pp. 499, 507, 543, 551, 563, 564
SRB: pp. 105-109, 110-111
DOR: "Exoplanet Transit Hunt"
TR: pp. C14-C17, C46-C51

Disciplinary Core Ideas

PS4.A: Wave Properties
- A sound wave needs a medium through which it is transmitted.

FOSS Waves
IG: pp. 122, 129, 161,162, 168, 169, 173
SRB: pp. 17-20
DOR: *"Oscilloscope"*

PS4.B: Electromagnetic Radiation
- When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material and the frequency (color) of the light. (MS-PS4-2)
- The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. (MS-PS4-2)

Crosscutting Concepts

Structure and Function
- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

FOSS Waves
IG: pp. 124, 168, 173, 198 (Step 17), 263
SRB: pp. 18-19, 30-31. 60-62
DOR: *Fiber Optics*

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

	• A wave model of light is useful for explaining brightness, color, and the frequency-dependent bending of light at a surface between media. • However, because light can travel through space, it cannot be a matter wave, like sound or water waves. ***FOSS Waves*** **IG:** pp. 177, 186, 189, 193, 194, 196, 197, 198, 205, 206, 208, 211-213, 226, 227, 238, 239 **SRB:** pp. 32-41 **SNM:** Nos. 7, 18, 20 **TM:** Q **DOR:** *"Refraction"* ***FOSS Planetary Science*** **IG:** pp. 498, 501, 507, 508, 509, 510, 511, 512, 513 (Step 14), 528 **SRB:** pp. 105-109 **DOR:** *"Properties of Light Slideshow"* *"Comparing Spectra"* *Hubble's Amazing Universe*	

GRADE 6

Waves and Their Applications in Technologies for Information Transfer

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard..

Standard S.6.12

Students who demonstrate understanding can:
Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.

FOSS Waves
IG: pp. 49, 57, 256, 259, 265 (Step 10), 276, 280, 282, 284-289, 293
EA: *Notebook Entry,* IG p. 265 (Step 13), IG p. 276 (Step 16), IG p. 290 (Step 10), IG p. 292 (Step 12)
BM: *Assessment Coding Guide*, pp. 6-7 (Item 6), pp. 24-25 (Item 3), pp. 26-27 (Items 4 and 5), pp. 38-39 (Items 12-14)
SRB: pp. 63-68, 69- 78

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods.

- Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings.

FOSS Waves
IG: pp. 257, 282, 283, 284- 290
SRB: pp. 63-68, 69-78, 84, 85, 86
DOR: *Fiber Optics*
"Digitized Images"
TR: pp. C39-C41, C74-C79

Disciplinary Core Ideas

PS4.C: Information Technologies and Instrumentation

- Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information.

FOSS Waves
IG: pp. 256, 259, 265 (Step 10), 276, 280, 282, 284-289, 293
SRB: pp. 63-68, 69- 78
SNM: No. 25
DOR: *"Digitized Images"*

Crosscutting Concepts

Structure and Function

- Structures can be designed to serve particular functions.

FOSS Waves
IG: pp. 263, 273-275
SRB: pp. 64-65, 86
TR: pp. D18, D44-D47

Connections to Nature of Science

Science is a Human Endeavor

- Advances in technology influence the progress of science and science has influenced advances in technology. (MS-PS4-3)

FOSS Waves
IG: pp. 258, 263 (Step 4), 264 (Step 5, 8), 266 (Step 14), 273, 275 **SRB:** pp. 69-78

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

School Specialty. Delta Education

GRADE 6

Earth's Place in the Universe

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.13

Students who demonstrate understanding can:
Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.

FOSS Planetary Science
IG: pp. 55, 57, 59, 61, 63, 65, 73, 146 (Step 6), 166, 168, 175, 176, 177, 274, 277, 178, 183, 203, 208, 220, 276, 281, 282, 284, 287, 289, 295, 297, 302 (Step 1)
EA: *Notebook Entry,* IG pp. 209-210 (Step 25), IG pp. 304-305 (Steps 7-8), *Performance Assessment,* IG p. 148 (Step 11) IG p. 177 (Step 13), IG p. 288 (Steps 21- 22)**,** IG p. 289 (Step 26), IG p. 296 (Step 6), *Response Sheet,* IG p. 194**,** Student Notebook Master No. 8**,** IG p. 297, Student Notebook Master No. 29, *Review Notebook Entries***,** IG (Step 14)**,** IG p. 220 (Step 29)**,** IG p. 260 (Step 19)**,** IG p. 304 (Step 6)**,** IG p. 358 (Step 23)
BM: *Assessment Coding Guide,* pp. 2-3 (Item 3)*,* pp. 6-7 (Item 4)*,* pp. 10-15 (Items 1-3)*,* pp. 16-20 (Items 4-7)*,* pp. 22-23 (Item 1), pp. 24-29 (Items 3-6)*,* pp. 58-59 (Item 1)*,* pp. 60-67 (Items 3-7)
SRB: pp. 15-21 34-37, 43-48

FOSS Weather and Water
IG: pp. 327-339,
EA: *Notebook Entry,* p. 334 (Step 15),
BM: *Assessment Masters,* pp. 19 (Item 4a and 4b)

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Planetary Science
IG: pp. 167, 175, 188, 191, 204, 214 (D), 220, 275, 284, 285, 286, 287, 288, 295, 296
SRB: pp. 11, 12, 23, 26
TR: pp. C14-C17, C46-C51

FOSS Weather and Water
IG: pp. 328, 329, 335, 336, 337
TR: pp. C14-C17, C46-C51

Disciplinary Core Ideas

ESS1.A: The Universe and Its Stars
- Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models.

FOSS Planetary Science
IG: pp. 146 (Step 6), 166, 175, 176, 274, 277, 281, 283, 289, 302 (Step 1)
***SRB:** pp. 43-45*
***DOR:** "Day and Night"*
"Phases of the Moon"
"Moon Puzzle"

ESS1.B: Earth and the Solar System
- This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short-term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight

Crosscutting Concepts

Patterns
- Patterns can be used to identify cause-and-effect relationships.

FOSS Planetary Science
IG: pp. 168,177, 178, 183, 203, 208, 220, 276, 281, 282, 284, 287, 289, 295, 297
SRB: pp. 34-37
TR: pp. D9, D13, D22-D27

	on different areas of Earth across the year. (MS-ESS1-1) ***FOSS Planetary Science*** **IG:** pp. 153, 166, 169, 185-220, 189 (Step 9), 190, 191, 192, 193, 203, 210 (Step 26), 211, 220, 288, 306 **SRB:** pp. 15-21, 45-48 **DOR:** *"Seasons"* *"Day and Night"*	

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation.

FOSS Planetary Science
IG: pp. 289 (Step 26), 298
SRB: pp. 10-12, 23-25, 40-41

GRADE 6

Earth's Place in the Universe

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.14

Students who demonstrate understanding can:
Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.

FOSS Planetary Science
IG: pp. 55, 67, 69, 365, 374, 377, 386 (Step 13), 397-400, 404 (Step 1), 408, 411 (Step 14), 415 (F), 417 (I), 418, 420, 423, 424, 436, 439, 446-448
EA: *Notebook Entry,* IG p. 418 (Step 16), IG p. 419 (Step 21), *Performance Assessment,* IG pp. 409-410 (Step 13), *Review Notebook Entries*, IG p. 420 (Step 22), IG p. 488 (Step 22)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 5), pp. 38-39 (Items 7 and 8), pp. 70-71 (Item 11)
SRB: pp. 69-71, 76-79, 82-85, 86-96, 135

FOSS Gravity and Kinetic Energy
IG: pp. 49, 53
EA: *Notebook Entry,* IG p. 187 (Step 20)
EA: *Review Notebook Entries*, IG p. 195 (Step 26)
BM: *Assessment Coding Guide*, pp. 2-3 (Item 2), pp. 18-19 (Item 3), pp. 20-21 (Item 5), pp. 22-23 (Item 7), pp. 38-39 (Item 10), pp. 42-43 (Item 13)

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena.

FOSS Planetary Science
IG: pp. 400, 405, 414, 420, 437, 444, 445, 447, 448
SRB: pp. 82, 135

FOSS Gravity and Kinetic Energy
IG: pp. 159, 179, 183, 188, 195
SRB: pp. 31-36
TR: pp. C14-C17, C46-C51

Disciplinary Core Ideas

ESS1.A: The Universe and Its Stars

- Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe.

FOSS Planetary Science
IG: pp. 365, 374, 377, 386 (Step 13), 397-400, 404 (Step 1), 408,420
SRB: pp. 76-79
SNM: Nos. 4-6
DOR: *"Solar System Origin Card Sort"*
"Cosmos Card Sort"

ESS1.B: Earth and the Solar System

- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. (MS-ESS1-2)

FOSS Planetary Science
IG: pp. 374, 377, 381, 389 (E), 400 (Step 16), 405, 408-409, 411 (Step 14), 415 (F), 417 (I), 418, 420, 423, 424, 436, 439, 446-448,

Crosscutting Concepts

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.

FOSS Planetary Science
IG: pp. 376, 381, 384, 400, 405, 409-410, 418 (Step 18), 438, 444

FOSS Gravity and Kinetic Energy
IG: pp. 160, 179, 188, 195
SRB: pp. 31-36
TR: pp. D16, D38-D43

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

	SRB: pp. 69-71, 82-85, 86-96, 135 **SNM:** Nos. 7-13 **DOR:** *"Community Scale Model"* *"Tides"* ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 151, 158, 161, 179, 180, 188, 195 **SRB:** pp. 31-36	

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-ESS1-2)

FOSS Planetary Science
IG: pp. 384-385 (Steps 10-11), 408-409
SRB: pp. 80-82

GRADE 6

Earth's Place in the Universe

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.15

Students who demonstrate understanding can:
Analyze and interpret data to determine scale properties of objects in the solar system.

FOSS Planetary Science
IG: pp. 55, 61, 63, 65, 67, 69, 73, 234, 237, 257, 260, 423, 425, 436, 439, 444, 445 (Step 3), 446, 448
EA: *Notebook Entry,* IG p. 260 (Item 17)*,* IG p. 447 (Step 10), IG p. 448 (Step 14)
EA: *Performance Assessment,* IG p. 258 (Step 11)**,** IG p. 445 (Step 5), *Review Notebook Entries***,** IG p. 260 (Step 19)**,** IG p. 304 (Step 6)**,** IG p. 358 (Step 23)**,** IG p. 420 (Step 22)**,** IG p. 488 (Step 22)
BM: *Assessment Coding Guide,* pp. 22-23 (Items 1bc and 2)*,* pp. 36-37 (Items 5 and 6)*,* pp. 42-43 (Item 1)*,* pp. 66-67 (Item 8), pp. 72-73 (Item 12)
SRB: p. 134

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings.

FOSS Planetary Science
IG: pp. 444 (Step 1), 445 (Step 4),446 (Step 7), 448 (Step 13)
SRB: p. 135
TR: pp. C22-C24, C54-C59

Disciplinary Core Ideas

ESS1.B: Earth and the Solar System

- The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them.

FOSS Planetary Science
IG: pp. 234, 237, 257, 260, 423, 425, 436, 439, 444, 445 (Step 3), 446, 448
SRB: p. 134
SNM: Nos. 45-46

Crosscutting Concepts

Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

FOSS Planetary Science
IG: pp. 236, 254, 255, 260, 438, 444, 445, 447, 448
TR: pp. D11, D15, D32-D37

Connections to Engineering, Technology, and Applications of Science

Interdependence of Science, Engineering, and Technology

- Engineering advances have led to important discoveries in virtually every field of science and scientific discoveries have led to the development of entire industries and engineered systems. (MS-ESS1-3)

FOSS Planetary Science
IG: pp. 500, 526 (Step 9), 527
SRB: pp. 25-26, 110- 117, 161- 171

GRADE 6

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.16

Students who demonstrate understanding can:
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

FOSS Weather and Water
IG: pp. 61, 75, 77, 483, 485, 486-493, 494, 497, 505 (Step 15), 509 (Step 2), 511-512 (Steps 6-9), 528 (Step 21), 529 (Step 24), 530, 533, 535, 536-538, 544, 547, 554-555 (Step 7), 564-565 (Steps 20-22), 566 (Step 24), 594
EA: *Notebook Entry***,** IG p. 527 (Step 20)**,** IG p. 565 (Step 22), **EA:** *Review Notebook Entries***,** IG p. 530 (Step 26)**,** IG p. 594 (Step 15)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 4), pp. 50-51 (Item 1), pp. 54-55 (Item 4acde), pp. 56-57 (Items 5 and 6), pp. 76-77 (Items 8 and 9), pp. 78-79 (Item 10ab), pp. 80-81 (Item 11)
SRB: pp. 91-95, 123, 124-125

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms.

FOSS Weather and Water
IG: pp. 484, 495, 509, 521, 526, 530, 533, 534, 545, 553, 556, 565, 594
TR: pp. C14-C17, C44-C49

Disciplinary Core Ideas

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

- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.
- Global movements of water and its changes in form are propelled by sunlight and gravity.

FOSS Weather and Water
IG: pp. 483, 485, 486-493, 494, 497, 505 (Step 15), 509 (Step 2), 511-512 (Steps 6-9), 528 (Step 21), 529 (Step 24), 530, 533, 535, 536-538, 544, 547, 554-555 (Step 7), 564-565 (Steps 20-22), 566 (Step 24), 594
SNM: Nos. 42, 44
SRB: pp. 91-95, 123, 124-125
DOR: "Water Cycle"

Crosscutting Concepts

Energy and Matter

- Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.

FOSS Weather and Water
IG: pp. 496, 510, 515, 530, 546, 556, 595
TR: pp. D17, D36-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

GRADE 6

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.17

Students who demonstrate understanding can:
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

FOSS Weather and Water
IG: pp. 67, 69, 77, 233, 237-238, 238-241, 242, 245, 261 (Step 25), 273 (Step 17), 291 (Step 9), 297, 299, 300-307, 308, 311, 320 (Step 13), 328 (Step 3), 352 (Step 13), 319, 357, 533, 535, 541-543, 569 (Step 1), 580 (Step 9), 589 (Step 10)
EA: *Review Notebook Entries***,** IG p. 294 (Step 16)**,** IG p. 357 (Step 21)**,** IG p. 594 (Step 15)
BM: *Assessment Coding Guide,* pp. 4-5 (Item 3ab)**,** pp. 8-9 (Item 6), pp. 28-29 (Item 3abc), pp. 30-31 (Item 4ab), pp. 32-33 (Item 7), pp. 34-35 (Item 1abc), pp. 44-45 (Item 4abcd), pp. 54-55 (Item 4abcde), pp. 44-45 (Item 4abcd), pp. 58-59 (Item 7a), pp. 74-75 (Item 6 and 7), pp. 82-83 (Item 14)
SRB: pp. 41-46, 47-50, 51-52, 96-102, 103-104, 116-117, 120-121

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop and use a model to describe phenomena.

FOSS Weather and Water
IG: pp. 232, 243, 256, 261, 272, 273, 289, 291, 297, 298, 328, 329, 335, 337, 338, 353, 357, 587
TR: pp. C14-C17, C44-C49

Disciplinary Core Ideas

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

- Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents.

FOSS Weather and Water
IG: pp. 233, 237-238, 238-241, 242, 245, 261 (Step 25), 273 (Step 17), 291 (Step 9), 309
SNM: Nos. 8-10, 13
SRB: pp. 41-46, 47-50, 51-52
DOR: *Fluid Convection*

ESS2.D: Weather and Climate

- Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. (MS-ESS2-6)
- The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. (MS-ESS2-6)

FOSS Weather and Water
IG: pp. 297, 299, 300-307, 308, 311, 320 (Step 13), 328 (Step 3), 352 (Step 13), 319, 357
SRB: pp.116-117, 120-121

Crosscutting Concepts

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy, matter, and information flows within systems.

FOSS Weather and Water
IG: pp. 244, 290, 310, 329, 352, 594
TR: pp. D12, D16, C32-C35

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

	FOSS Weather and Water **IG:** pp. 533, 535, 541-543, 569 (Step 1), 580 (Step 9), 589 (Step 10) **SRB:** pp. 96-102, 103-104 **DOR:** *Perpetual Ocean*	

GRADE 6

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.18

Students who demonstrate understanding can:
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

FOSS Weather and Water
IG: p. 79, *597, 599, 600-609, 610-611, 613, 619 (Step 11), 627 (Step 3), 652 (Step 12), 655, 656*
EA: *Review Notebook Entries***,** IG p. 655 (Step 18)
BM: *Assessment Coding Guide,* pp. 8-9 (Item 7), pp. 66-67 (Item 5ab), pp. 80-81 (Item 13)
***SRB:** pp. 72-75, 105-110, 130-131*

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarifying arguments and models.

- Ask questions to identify and clarify evidence of an argument.

FOSS Weather and Water
IG: pp. 598, 611, 647
TR: pp. C9-C13, C42-C43

Disciplinary Core Ideas

ESS3.D: Global Climate Change

- Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior and on applying that knowledge wisely in decisions and activities.

FOSS Weather and Water
***IG:** pp. 597, 599, 600-609, 610-611, 613, 619 (Step 11), 627 (Step 3), 652 (Step 12), 655, 656*
***SRB:** pp. 72-75, 105-110, 130-131*
***DOR:** Earth's Climate over Time*
"Greenhouse-Gas Simulator"

Crosscutting Concepts

Stability and Change

- Stability might be disturbed either by sudden events or gradual changes that accumulate over time.

FOSS Weather and Water
IG: pp. 612, 630, 632, 655
TR: pp. D19, D40-D41

GRADE 6

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.19

Students who demonstrate understanding can:
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

FOSS Earth History
IG: pp. 55, 65, 69, 470, 479-482, 485, 486-487 (Step 26) 491- 494, 517, 550 (Step 12), 565
EA: *Notebook Entry***,** IG p. 494 (Step 15), IG p. 516 (Step 20)
EA: *Performance Assessment***,** IG p. 481 (Step 8)
EA: *Review Notebook Entries***,** IG p. 517 (Step 21)**,** IG p. 633 (Steps 10-11)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 4)*,* pp. 30-31 (Item 2)*,* pp. 46-47 (Item 1ab)
SRB: p. 74

FOSS Weather and Water
IG: p. 79, *597, 599, 600-609, 610-611, 613, 619 (Step 11), 627 (Step 3), 652 (Step 12), 655, 656*
EA: *Review Notebook Entries***,** IG p. 655 (Step 18)
BM: *Assessment Coding Guide,* pp. 8-9 (Item 7), pp. 66-67 (Item 5ab), pp. 80-81 (Item 13)
***SRB:** pp. 72-75, 105-110, 130-131*

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings.

FOSS Earth History
IG: pp. 471, 480, 481, 482, 486, 485, 517
TR: pp. C22-C24, C56-C61

Disciplinary Core Ideas

ESS3.B: Natural Hazards

- Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces can help forecast the locations and likelihoods of future events.

FOSS Earth History
IG: pp. 470, 479-482, 485, 486-487 (Step 26) 491-494, 517, 550 (Step 12), 565
SRB: p. 74
DOR: *"Volcano-Plotting Activity"*
"Volcanoes Around the World"
"Earthquake-Plotting Activity"
"Earthquakes around the World"
Mount St. Helens: The Eruption Impact
ShakeAlert

Crosscutting Concepts

Patterns

- Graphs, charts, and images can be used to identify patterns in data. (MS-ESS3-2)

FOSS Earth History
IG: pp. 472, 481, 482, 483, 485 (Step 24); 486 (Step 25), 487 (Step 30), 491, 494, 517
TR: pp. D14, 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 6

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.20

Students who demonstrate understanding can:
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

FOSS Chemical Interactions
IG: p. 71, 373, 375, 378, 380, 383, 390 (Step 7 and 9), 398, 399 (Step 3), 400 (Step 5), 401 (Step 9), 524 (Step 15)
EA: *Performance Assessment*, IG p. 400 (Step 6)
SRB: pp. 56-58

FOSS Populations and Ecosystems
IG: p. 73, 627 (Step 9), 633
EA: *Performance Assessment***,** IG p. 642 (Step 4), *Review Notebook Entries***,** IG p. 413 (Step 17)

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarify arguments and models.

- Define a design problem that can be solved through the development of an object, tool, process, or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.

FOSS Chemical Interactions
IG: pp. 378, 381,389, 401, 413
SRB: pp.183-184

FOSS Populations and Ecosystems
IG: pp. 615, 627, 642, 644-646, 648
TR: pp. C9-C13, C42-C43

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.

FOSS Chemical Interactions
IG: pp.373, 375, 378, 380, 383, 390 (Step 7 and 9), 398, 399 (Step 3), 400 (Step 5), 401 (Step 9), 524 (Step 15),
SRB: pp. 56-58
SNM: Nos. 45-46

FOSS Populations and Ecosystems
IG: 627 (Step 9), 633

Crosscutting Concepts

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

- All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment.
- The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.

FOSS Chemical Interactions
IG: pp. 401 (Step 9-10), 411 (K)
SRB: pp. 60-63

FOSS Populations and Ecosystems
IG: pp. 607, 610-613, 616, 623, 624, 642 (Step 4)
DOR: **"**Ecoscenarios and Ecoscenario Research Center"

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 6

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.6.21

Students who demonstrate understanding can:
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

FOSS Waves
IG: pp. 49, 53, 122, 153, 155, 164, 168 (Step 16), 172 (Steps 26-27), 173
EA: *Notebook Entry,* IG p. 155 (Step 13), IG p. 167 (Step 14) SNM No. 6, *Performance Assessment,* IG pp. 167-168 (Steps 15-16), *Review Notebook Entries*, IG p. 173 (Step 29)
SRB: pp. 16, 23, 24, 83

FOSS Gravity and Kinetic Energy
IG: pp. 49, 57, 264, 275-277 (Steps 13-18), 287 (Step 29)
EA: *Performance Assessment,* IG p. 277 (Step 20)
BM: *Assessment Coding Guide*, pp. 38-39 (Item 8)
SRB: pp. 50, 51

FOSS Electromagnetic Force
IG: pp. 250-251 (Step 12), 255

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings.

FOSS Waves
IG: pp. 114, 123, 168, 172, 173
SRB: pp. 12-16
TR: pp. C22-C24, C54-C59

Disciplinary Core Ideas

ETS1.B: Developing Possible Solutions

- There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem.
- Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors.

FOSS Electromagnetic Force
IG: pp. 250-251 (Step 12), 255

FOSS Waves
IG: pp. 122, 153, 155, 164, 168 (Step 16), 172 (Steps 26-27), 173
SRB: pp. 15, 24, 83

FOSS Gravity and Kinetic Energy
IG: pp. 47, 264, 275-277 (Steps 13-18), 287 (Step 29)
SRB: pp. 50, 51

Crosscutting Concepts

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: *Understanding Car Crashes-It's Basic Physics* **ETS1.C: Optimizing the Design Solution** • Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. ***FOSS Waves*** **IG:** pp. 122, 151 (Step 13), 172 (Steps 26-27), 173 **SRB:** pp. 16, 23, 24, 83 ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 47, 264, 275-277 (Steps 13-18), 287 (Step 29)	

GRADE 7

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard..

Standard S.7.1

Students who demonstrate understanding can:
Conduct an investigation to provide evidence that living things are made of cells; either one cell or many different numbers and types of cells.

FOSS Diversity of Life
IG: pp. 53, 57, 59, 61, 65, 207, 209, 211, 215, 218, 219, 223, 230 (Step 6), 231, 245 (Step 14), 276 (Step 12), 283, 285, 287, 289-293, 295, 299, 312, (Step 14), 344 (Step 24), 359 (Step 15)
EA: *Performance Assessment,* IG p. 181 (Step 13), IG p. 231 (Step 8), IG p. 256 (Step 10), *Notebook Entry***,** IG pp. 638-639 (Step 11), *Response Sheet,* IG pp. 249-250 (Step 23)**,** Student Notebook Masters No. 15, *Review Notebook Entries***,** IG pp. 277-278 (Step 16)**,** IG pp. 371-372 (Step 13)
BM: *Assessment Coding Guide*, pp. 2-3 (Item 2ab), pp. 10-11 (Item 2), pp. 14-15 (Item 6)
SRB: pp.14-19, 20-27, 29-30, 106-109, 110-113

FOSS Human Systems Interactions
IG: pp. 42, 45, 83, 89-95, 105, 110, 123, 128-136, 140-154, 175, 188, 195
EA: *Performance Assessment,* IG p. 108 (step 21), *Performance Assessment,* IG p. 146 (Step 13)
BM: *Assessment Coding Guide*, p. 4 (Item 1), p. 24 (Items 1b and 2)
SRB: pp.3-48, 50-54, 79- 83, 84-87, 88-92

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.

- Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation.

FOSS Diversity of Life
IG: pp. 208, 210, 230, 231, 241, 242, 255, 256, 264, 277-278, 309, 310, 326, 329, 353
TR: pp. C18-C21, C50-C53

Disciplinary Core Ideas

LS1.A: Structure and Function

- All living things are made up of cells. A cell is the smallest unit that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular).

FOSS Diversity of Life
IG: pp. 207, 209, 211, 215, 218, 219, 223, 230 (Step 6), 231, 245 (Step 14), 276 (Step 12), 283, 285, 287, 289-293, 295, 299, 312, (Step 14), 344 (Step 24), 359 (Step 15),
371-372 (Step 13)
SRB: pp.14-19, 20-27, 29-30, 106-109, 110-113
SNM: Nos. 11, 15
DOR: Levels of Complexity

FOSS Human Systems Interactions
IG: pp. 42, 45, 83, 89-95, 105, 110, 123, 128-136, 140-154, 175, 188, 195
BM: *Assessment Coding Guide*, p. 4 (Item 1), p. 24 (Items 1b and 2)
SRB: pp.3-48, 50-54, 79- 83, 84-87, 88-92

Crosscutting Concepts

Scale, Proportion, and Quantity

- Phenomena that can be observed at one scale may not be observable at another scale.

FOSS Diversity of Life
IG: pp. 220, 231, 242, 256, 276, 277-278, 296, 314, 315, 341, 372
SRB: pp. 106-109, 110-113
SNM: Nos. 7-9
TR: pp. D15-D16, 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 7

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.2

Students who demonstrate understanding can:
Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

FOSS Diversity of Life
IG: pp. 53, 55, 57, 59, 61
EA: *Performance Assessment,* IG p. 201 (Step 7), IG p. 231 (Step 8), *Response Sheet,* IG pp. 317-318, Student Notebook Masters No. 29, *Review Notebook Entries*, IG pp. 277-278 (Step 16), IG pp. 371-372 (Step 13)
BM: *Assessment Coding Guide,* pp. 14-15 (Item 7), pp. 16-17 (Item 9), pp.18-19 (Item 1), pp. 52-53 (Item 4), pp. 60-61 (Item 16), pp. 62-63 (Item 17)

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Diversity of Life
IG: pp. 208, 210, 220, 234, 247, 266, 277, 284, 286, 296, 315, 367, 371
TR: pp. C14-C17, C44-C49

Disciplinary Core Ideas

LS1.A: Structure and Function
- Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell.

FOSS Diversity of Life
IG: pp. 207, 209, 211, 212-214, 219, 223, 228 (Step 6), 232-233 (Steps 12-14), 234 (Step 16), 247 (Step 18), 266 (Step 8), 283, 277, 285, 295, 299, 328-329 (Step 6), 356 (Step 10 and 11), 366 (Step 3), 367 (Step 5), 371-372 (Step 13)
SRB: pp. 24-27, 30, 114-118
STUDENT NOTEBOOK MASTERS: Nos. 11-14, 17,18, 30, 31
DOR: *Levels of Complexity:*
"Plant Cell"
"Animal Cells"
"Bacterial Cell"
"Fungal Cell"
"Archaean Cell"
"Levels of Complexity Card Sort"

Crosscutting Concepts

Structure and Function
- Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural and designed structures/systems can be analyzed to determine how they function.

FOSS Diversity of Life
IG: pp. 220, 231-232, 247, 248, 266, 296, 277, 328, 366
SRB: pp. 24-27, 30, 110-113
DOR: *Levels of Complexity*
TR: pp. D13, D18, D38-D39

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

School Specialty. Delta Education

GRADE 7

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.3

Students who demonstrate understanding can:
Use argument supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.

FOSS Human Systems Interactions
IG: pp. 43, 45, 47, 49, 80, 71, 73, 83, 89-92 (Steps 6-8), 123, 134 (Step 15), 166, 169, 173 (Step 1)
EA: *Performance Assessment,* IG p. 108 (Step 21), IG p. 146 (Step 13), *Response Sheet,* IG p. 135, Student Notebook Masters No. 5, IG p. 206, Student Notebook Masters No. 9, *Review Notebook Entries*, IG p. 110 (Step 25), IG p. 154-155 (Step 20), IG p. 247 (Step 21)
BM: Assessment Coding Guide, pp. 6-7 (Items 1-3), pp. 8-9 (Item 9), pp.10-11 (Item 7ab), pp.12-13 (Item 9), pp. 22-23 (Item 1ab), pp. 26-27 (Items 7 and 8), pp. 28-29 (Item 10)
SRB: pp. 3, 4-7, 8-13, 14-19, 20-25, 26-31, 32-37, 38-44, 45-49

FOSS Diversity of Life
IG: pp. 228-235, 240-250, 263-278, 572-582
EA: *Performance Assessment,* p. 231 (Step 8), *Review Notebook Entries*, p. 277 (Step 16), *Performance Assessment,* p. 576 (Step 10)
BM: Assessment Coding Guide,
SRB: pp. 20-27,
DOR: *Levels of Complexity, Database: Paramecium Collection, Database: Elodea Cytoplasmic Streaming,*

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).
- Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon.

FOSS Human Systems Interactions
IG: pp. 71, 72. 81, 91, 107 (Step 20), 158, 167, 186, 206
SNM: No. 9
TR: pp. C33-C38, C66-C69

Disciplinary Core Ideas

LS1.A: Structure and Function
- In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

FOSS Human Systems Interactions
IG: pp. 80, 71, 73, 83, 89-92 (Steps 6-8), 123, 134 (Step 15), 166, 169, 173 (Step 1)
SRB: pp. 3, 4-7, 8-13, 14-19, 20-25, 26-31, 32-37, 38-44, 45-49
SNM: Nos. 1-3
DOR: "Human Systems Structural Levels"
"Levels of Complexity"
"Human Cardiovascular System"

Crosscutting Concepts

Systems and System Models
- Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

FOSS Human Systems Interactions
IG: pp. 82, 102, 105, 127, 133, 145, 168, 199, 203, 204, 206, 228
TR: pp. D12, D16, D32-D35

Connections to Nature of Science

Science is a Human Endeavor
- Scientists and engineers are guided by habits of mind such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas. (MS-LS1-3)

FOSS Human Systems Interactions

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

IG: pp. 88 (Step 4), 103 (Step 13), 107 (Step 19), 109 (Step 24), 111 (Step 27), 245 (Step 17)

GRADE 7

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard..

Standard S.7.4

Students who demonstrate understanding can:
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

FOSS Human Systems Interactions
IG: pp. 43, 49, 157, 159, 160-165, 166, 169, 175 (Step 6), 195 (Step 4), 206 (Step 16), 221 (Step 9), 227 (Step 21 and 22), 245 (Step 17), 247
EA: *Notebook Entry,* IG p. 246 (Step 20), *Review Notebook Entries*, IG p. 247 (Step 21)
BM: *Assessment Coding Guide*, pp. 4-5 (Items 5 and 6), pp. 14-15 (Items 2 and 3), pp. 18-19 (Items 6 and 7), pp. 20-21 (Item 9), pp. 24-25 (Item 4abc)
SRB: pp. 55-59, 60-63, 64- 68, 69-73, 74-78, 79-83, 84-87, 88-92, 104

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

FOSS Human Systems Interactions
IG: pp. 158, 167, 176, 179, 196, 207, 218, 227, 239, 247
TR: pp. C39-C41, C70-C73

Disciplinary Core Ideas

LS1.D: Information Processing

- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.

FOSS Human Systems Interactions
IG: pp. 157, 159, 160-165, 166, 169, 175 (Step 6), 195 (Step 4), 206 (Step 16), 221 (Step 9), 227 (Step 21 and 22), 245 (Step 17), 247
SRB: pp. 55-59, 60-63, 64- 68, 69-73, 74-78, 79-83, 84-87, 88-92, 104
SNM: Nos. 8, 9, 13
DOR: *"Touch Menu"*
"Brain: Synapse Function"
"Smell Menu"
"Vision Menu"

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural systems.

FOSS Human Systems Interactions
IG: pp. 168, 194, 247
TR: pp. D11, D14-D15, D24-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 7

Energy

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.5

Students who demonstrate understanding can:
Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.

FOSS Gravity and Kinetic Energy

IG: pp. 49, 55, 206, 214-215, 216 (Step 7), 232 (Step 2), 234-237 (Steps 8-13), 254, 291

EA: *Notebook Entry,* IG p. 237 (Step 16), IG p. 253 (Step 16), *Performance Assessment,* IG pp. 217-218 (Step 12), *Review Notebook Entries***,** IG p. 254 (Step 18)

BM: *Assessment Coding Guide,* pp. 4-5 (Item 3ab), pp. 24-25 (Item 2), pp. 28-29 (Items 6ab and 7), pp. 30-31 (Item 8ab), pp. 36-37 (Item 7ab), pp. 38-39 (Item 9), pp. 42-43 (Item 12)

SRB: pp. 37-40

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Construct and interpret graphical displays of data to identify linear and nonlinear relationships.

FOSS Gravity and Kinetic Energy
IG: pp. 207, 218, 219, 226 (F), 235, 236, 254, 291
SRB: p. 40
TR: pp. C22-C24, C54-C59

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- Motion energy is properly called kinetic energy; it is proportional to the mass of the moving object and grows with the square of its speed.

FOSS Gravity and Kinetic Energy
IG: *pp. 206, 214-215, 216 (Step 7), 232 (Step 2), 234-237 (Steps 8-13), 254, 291*
SRB: *pp. 37-40*
SNM: *Nos. 15-16*

Crosscutting Concepts

Scale, Proportion, and Quantity

- Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.

FOSS Gravity and Kinetic Energy
IG: pp. 208, 222, 235, 236, 238, 254, 291
SRB: pp. 41-42, 49
TR: pp. D11, D15, D32-D37

GRADE 7

Energy

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.6

Students who demonstrate understanding can:
Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.

FOSS Electromagnetic Force
IG: pp. 51, 55, 57, 59, 181 (Step 2), 186, 187 (Step 21), 215, 216, 217, 220, 221, 222, 233-234
EA: *Performance Assessment,* IG p. 185 (Step 14), *Response Sheet,* IG p. 222 (Step 16), Student Notebook Master No. 11, *Review Notebook Entries*, IG p. 189 (Step 26), IG p. 252 (Step 16)
BM: *Assessment Coding Guide,* pp. 4-5 (Item 4), pp. 16-17 (Item 3), pp. 26-27 (Item 3ab), pp. 40-41 (Item 5), pp. 42-43 (Item 8)
SRB: pp. 20, 21 32, 33, 61

FOSS Gravity and Kinetic Energy
IG: pp. 49, 55, 57, 206, 214, 215 (Step 5), 218, 220-222, 232 (Step 2), 242 (Step 2), 254, 291
EA: *Notebook Entry,* IG p. 237 (Step 16), *Performance Assessment,* IG p. 217 (Step 12), *Review Notebook Entries,* IG p. 254 (Step 18)
BM: *Assessment Coding Guide*, pp. 2-3 (Item 1), pp. 24-25 (Item 3), pp. 28-29 (Item 6abc), pp. 30-31 (Item 8b), pp. 34-35 (Item 6), pp. 42-43 (Items 12 and 13)
SRB: pp. 17-18, 37-40, 40-41, 45-49

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms.

FOSS Electromagnetic Force
IG: pp. 147, 164, 167, 168, 171, 174, 185, 188, 189
SRB: pp. 20, 21, 23, 32

FOSS Gravity and Kinetic Energy
IG: pp. 209, 219, 221, 226 (F), 236, 254, 291
SRB: pp. 39-40
TR: pp. C14-C17, C46-C51

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- A system of objects may also contain stored (potential) energy, depending on their relative positions.

FOSS Electromagnetic Force
IG: pp. 181 (Step 2), 186, 187 (Step 21), 215, 216, 217, 220, 221, 222
SRB: pp. 20, 21 32, 33, 61
DOR: *"Adding Magnetic Fields"*

FOSS Gravity and Kinetic Energy
IG: pp. 206, 214, 215 (Step 5), 218, 209, 254
SRB: pp. 37-40

PS3.C: Relationship Between Energy and Forces

- When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object.

FOSS Electromagnetic Force
IG: pp. 184 (Step 12), 186 (Steps 18, 19), 233-234
SRB: pp. 17-18, 37, 40-41, 45-49

Crosscutting Concepts

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes, and outputs—and energy and matter flows within systems.

FOSS Electromagnetic Force
IG: pp. 148, 167, 185, 188, 189, 223, 239, 249

FOSS Gravity and Kinetic Energy
IG: pp. 208, 218, 219, 221
SRB: pp. 39-40
TR: pp. D16, D38-D43

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

	SNM: No. 9 ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 206, 209, 220 (Step 17), 221, 222, 232 (Step 2), 242 (Step 2), 254, 291 **SRB:** pp. 37-40	

GRADE 7

Energy

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.7

Students who demonstrate understanding can:
Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.*

FOSS Weather and Water
IG: p. 79, *364, 361, 363, 365, 370, 373, 381 (Step 9), 385 (Step 18), 394-395 (Step 6), 398 (Step 16), 408, 418*
EA: *Performance Assessment*, IG p. 408 (Step 17), *Review Notebook Entries*, IG p. 418 (Step 32), *Response Sheet,* IG p. 398, Student Notebook Masters No. 28
BM: *Assessment Coding Guide,* pp. 42-43 (Items 1 and 2), pp. 48-49 (Item 6abcde), pp. 70-71 (Item 4)

FOSS Chemical Interactions
IG: pp. 333-339, 342-359, 363-369, 390 (Steps 9 and 10), 399 (Step 3), 398-412
EA: Notebook Entry, IG p. 338 (Step 13), Response Sheet, IG p. 358 (Step 15), Review Notebook Entries, IG p. 370 (Step 15), Notebook Entry, IG p. 393 (Step 19), Performance Assessment, IG p. 400 (Step 6)
SRB: pp. 46-55

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system.

FOSS Weather and Water
IG: pp. 361, 362, 371, 380, 383, 385, 398, 408, 418
TR: pp. C28-C32, C66-C67

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.

FOSS Weather and Water
***IG:** pp. 364, 365, 370, 373, 385 (Step 18), 398 (Step 16), 418*
***DOR:** "Thermometer", "Particles in Solids, Liquids, and Gases"*

FOSS Chemical Interactions
***IG:** pp. 333-339, 342-359, 363-369*
SRB: pp. 46-55
***DOR:** "Energy Flow", "Energy Transfer by Collision", "Mixing Hot and Cold Water"*

PS3.B: Conservation of Energy and Energy Transfer

- Energy is spontaneously transferred out of hotter regions or objects and into colder ones.

FOSS Weather and Water
***IG:** pp. 361, 363, 370, 373, 381 (Step 9), 408, 418*

FOSS Chemical Interactions

Crosscutting Concepts

Energy and Matter

- The transfer of energy can be tracked as energy flows through a designed or natural system.

FOSS Weather and Water
IG: pp. 372, 382, 385, 392, 393, 405, 406
TR: pp. D17, D36-D37

IG: *pp. 333-339, 342-359, 363-369, 387-393, 398-412*
SRB: pp. 46-55

ETS1.A: Defining and Delimiting an Engineering Problem

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions.

FOSS Weather and Water
IG: *pp. 361, 367-369, 370, 373, 394-395 (Step 6), 404 (Step 3), 418*
TM: *X, Y*

FOSS Chemical Interactions
IG: pp. *390 (Steps 9 and 10)*, 399 (Step 3)

ETS1.B: Developing Possible Solutions

- A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem.

FOSS Weather and Water
IG: *pp. 361, 367-369, 370, 373, 397 (Step 15), 418*
TM: *Z*

FOSS Chemical Interactions
IG: pp. *398-412*

GRADE 7

Energy

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.8

Students who demonstrate understanding can:
Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.

FOSS Weather and Water
IG: p. 79, *361, 363, 364, 365, 370, 373, 381 (Step 9), 385 (Step 18), 394-395 (Step 6), 398 (Step 16), 404 (Step 3), 408, 418*
EA: *Performance Assessment*, IG p. 408 (Step 17), *Review Notebook Entries*, IG p. 418 (Step 32), *Response Sheet,* IG p. 398, Student Notebook Masters No. 28
BM: *Assessment Coding Guide,* pp. 42-43 (Items 1 and 2), pp. 48-49 (Item 6abcde), pp. 70-71 (Item 4)

FOSS Chemical Interactions
IG: pp. 333-339, 342-359, 363-369, 390 (Steps 9 and 10), 399 (Step 3), 398-412
EA: Notebook Entry, IG p. 338 (Step 13), Response Sheet, IG p. 358 (Step 15), Review Notebook Entries, IG p. 370 (Step 15), Notebook Entry, IG p. 393 (Step 19), Performance Assessment, IG p. 400 (Step 6)
SRB: pp. 46-55

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process or system.

FOSS Weather and Water
IG: pp. 361, 362, 371, 380, 383, 385, 398, 408, 418
TR: pp. C28-C32, C66-C67

Disciplinary Core Ideas

PS3.A: Definitions of Energy

- Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present.

FOSS Weather and Water
***IG:** pp. 364, 365, 370, 373, 385 (Step 18), 398 (Step 16), 418*
***DOR:** "Thermometer", "Particles in Solids, Liquids, and Gases"*

PS3.B: Conservation of Energy and Energy Transfer

- Energy is spontaneously transferred out of hotter regions or objects and into colder ones.

FOSS Weather and Water
***IG:** pp. 361, 363, 370, 373, 381 (Step 9), 408, 418*

ETS1.A: Defining and Delimiting an Engineering Problem

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful.

Crosscutting Concepts

Energy and Matter

- The transfer of energy can be tracked as energy flows through a designed or natural system.

FOSS Weather and Water
IG: pp. 372, 382, 385, 392, 393, 405, 406
TR: pp. D17, D36-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

School Specialty. Delta Education

	Specification of constraints includes consideration of scientific principles and other relevant knowledge that is likely to limit possible solutions. ***FOSS Weather and Water*** ***IG:*** *pp. 361, 367-369, 370, 373, 394-395 (Step 6), 404 (Step 3), 418* ***TM:*** *X, Y* **ETS1.B: Developing Possible Solutions** • A solution needs to be tested, and then modified on the basis of the test results in order to improve it. There are systematic processes for evaluating solutions with respect to how well they meet criteria and constraints of a problem. ***FOSS Weather and Water*** ***IG:*** *pp. 361, 367-369, 370, 373, 397 (Step 15), 418* ***TM:*** *Z*	

GRADE 7

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.9

Students who demonstrate understanding can:
Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.

FOSS Weather and Water
IG: p. 69, 297, 350, 352-354 (Steps 13-15), 357, 361, 370, 378-379 (Step 1), 381-383 (Steps 9-14)
EA: *Performance Assessment***,** IG p. 350 (Step 9), *Review Notebook Entries***,** IG p. 357 (Step 21)
BM: *Assessment Coding Guide,* pp. 34-35 (Item 1)**,** pp. 70-71 (Item 4)**,** pp. 74-75 (Item 6)**,** pp. 76-77 (Items 8 and 9)

FOSS Chemical Interactions
IG: p. 41, 279 (Step 12), 287 (Step 1), 289-302, 308-312, 333-334, 337-338, 343-358, 363, 367-370
EA: *Review Notebook Entries,* IG p. 311 (Step 9), *Performance Assessment*, IG p. 367 (Step 8), *Review Notebook Entries,* IG p. 370 (Step 15), *Performance Assessment,* IG p. 400 (Step 6), *Performance Assessment,* IG p. 487 (Step 8), *Review Notebook Entries,* IG p. 537 (Step 15)
BM: *Assessment Coding Guide,* pp. 6 (Items 3a and 3b), p. 8 (Items 4a and 4b), p. 37 (Items 1 and 2), p. 39 (Item 3), p. 41 (Item 5), p. 43 (Item 7),
SRB: pp. 33-39, 46-55, 56-63, 105, 108

FOSS Gravity and Kinetic Energy
IG: p. 213-228, 232-238, 254
EA: *Performance Assessment,* p. 217 (Step 12), *Notebook Entry,* p. 237 (Step 16), 291
BM: *Assessment Coding Guide,* pp. 7 (Items 3a and 3b), p. 9 (Item 5), p. 27 (Item 3), p. 29 (Item 5)
SRB: pp. 37-40

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed worlds.
- Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon.

FOSS Weather and Water
IG: pp. 322 (Step 17), 338 (Step 23), 353 (Step 14), 357 (Step 22)
TR: pp. C33-C38, C66-C69

Disciplinary Core Ideas

PS3.B: Conservation of Energy and Energy Transfer
- When the motion energy of an object changes, there is inevitably some other change in energy at the same time.

FOSS Weather and Water
IG: pp. 297, 350, 352-354 (Steps 13-15), 357, 361, 370, 378-379 (Step 1), 381-383 (Steps 9-14)

FOSS Chemical Interactions
IG: p. 41, 279 (Step 12), 287 (Step 1), 289-302, 308-312, 333-334, 337-338, 343-358, 363, 367-370
SRB: pp. 33-39, 46-55, 56-63, 105, 108

FOSS Gravity and Kinetic Energy
IG: p. 213-228, 232-238, 254
SRB: pp. 37-40

Crosscutting Concepts

Energy and Matter
- Energy may take different forms (e.g., energy in fields, thermal energy, energy of motion).

FOSS Weather and Water
IG: pp. 310, 337, 350, 353, 357
TR: pp. D17, D36-D37

Connections to 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 Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS3–5)

FOSS Weather and Water

IG: 330-331 (Step 9), 353 (Step 14), 383 (Steps 12-13), 436-437 (Steps 1-2)

GRADE 7

Motion and Stability: Forces and Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.10

Students who demonstrate understanding can:
Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.*

FOSS Gravity and Kinetic Energy
IG: pp. 49, 55, 57, 199, 206, 209, 242 (Step 2), 244, 245, 249, 264, 267, 271, 272 (Step 3), 279 (Step 23), 280 (Step 25), 287 (Step 28), 290-293
EA: *Notebook Entry,* IG p. 253 (Step 16), *Performance Assessment,* IG p. 277 (Step 20), *Review Notebook Entries*, IG p. 254 (Step 18)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 5), pp. 26-27 (Item 5), pp. 36-37 (Item 7ab), pp. 40-41 (11ab)
SRB: pp. 47-49, 57-62

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas or principles to design an object, tool, process or system.

FOSS Gravity and Kinetic Energy
IG: pp. 265, 274, 275, 276, 279, 287 (Step 29)
SRB: pp. 56,62, 71
TR: pp. C28-C31, C66-C71

Disciplinary Core Ideas

PS2.A: Forces and Motion

- For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction (Newton's Third Law).

FOSS Gravity and Kinetic Energy
IG: pp. 199, 206, 209, 242 (Step 2), 244, 245, 249, 264, 267, 271, 272 (Step 3), 279 (Step 23), 280 (Step 25), 287 (Step 28), 290-293
SRB: pp. 47-49, 57-62
SNM: No. 17
DOR: *Understanding Car Crashes-It's Basic Physics*

Crosscutting Concepts

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes, and outputs—and energy and matter flows within systems.

FOSS Gravity and Kinetic Energy
IG: pp. 208, 254, 266, 277, 278 (Step 22), 279, 290-291
SRB: pp. 52-55, 60
TR: pp. D16, D38-D43

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 7

Motion and Stability: Forces and Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.11

Students who demonstrate understanding can:
Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

FOSS Electromagnetic Force
IG: pp. 51, 53, 55, 90, 93, 105 (Step 24), 112, 114, 122 (Step 4), 125 (Step 7), 127-131, 133, 185 (Step 15)
EA: *Notebook Entry,* IG p. 100 (Step 10), IG p. 102 (Step 15), IG p. 105 (Step 25), *Performance Assessment,* IG p. 114 (Step 7), *Response Sheet,* IG p. 126**,** Student Notebook Master No. 7, *Review Notebook Entries*, IG p. 133 (Step 29), IG pp. 189-190 (Step 26)
BM: *Assessment Coding Guide,* pp. 2-3 (Items 1 and 2)**,** pp. 8-9 (Items 1 and 2)**,** pp. 14-15 (Items 7 and 8)**,** pp. 38-39 (Items 3 and 4)**,** pp. 42-43 (Item 8)
SRB: pp. 3-7, 12-13, 15-18

FOSS Gravity and Kinetic Energy
IG: pp. 49, 51, 53, 55, 57, 149, 151, 158, 161, 164 (Step 2), 187 (Step 19), 179 (Step 2), 195, 290-291
EA: *Notebook Entry,* IG p. 187 (Step 20), *Performance Assessment,* IG p. 166 (Step 7), *Review Notebook Entries***,** IG p. 145 (Step 29)**,** IG p. 195 (Step 26)**,** IG p. 254 (Step 18)
BM: *Assessment Coding Guide,* pp. 2-3 (Item 1), pp. 4-5 (Item 3ab), pp. 8-9 (Items 1abcd and 2), pp. 12-13 (Items 4-6), pp. 20-21 (Item 6), pp. 24-25 (Item 1ab), pp. 26-27 (Item 4), pp. 28-29 (Item 6abc), pp. 32-33 (Items 1 and 3), pp. 34-35 (Item 4), pp. 44-45 (Item 14)
SRB: pp. 26-30

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.

- Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim.

FOSS Electromagnetic Force
IG: pp. 91, 99, 102, 113, 114, 133,

FOSS Gravity and Kinetic Energy
IG: pp. 150, 159, 161, 167, 183, 195, 290-291
TR: pp. C18-C21, C52-C55

Disciplinary Core Ideas

PS2.A: Forces and Motion

- The motion of an object is determined by the sum of the forces acting on it; if the total force on the object is not zero, its motion will change. The greater the mass of the object, the greater the force needed to achieve the same change in motion. For any given object, a larger force causes a larger change in motion. (MS-PS2-2)
- All positions of objects and the directions of forces and motions must be described in an arbitrarily chosen reference frame and arbitrarily chosen units of size. In order to share information with other people, these choices must also be shared.

FOSS Electromagnetic Force
IG: pp. 90, 93, 105 (Step 24), 112, 114, 122 (Step 4), 125 (Step 7), 127-131, 133, 185 (Step 15)
SRB: pp. 3-7, 12-13, 15-18
SNM: Nos. 5-6

Crosscutting Concepts

Stability and Change

- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.

FOSS Electromagnetic Force
IG: pp. 92, 130 (C), 131 (D), 133
SRB: pp. 15-18
TR: pp. D12, D19, D46-D49

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: Forces ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 149, 151, 158, 161, 164 (Step 2), 187 (Step 19), 179 (Step 2), 195, 290-291 **SRB:** pp. 26-30 **SNM:** No. 11	

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS2-2)

FOSS Electromagnetic Force
IG: pp. 116
SRB: pp. 9-14

FOSS Gravity and Kinetic Energy
IG: pp. 160, 186 (Step 17), 187 (Steps 22-23)

GRADE 7

Motion and Stability: Forces and Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.12

Students who demonstrate understanding can:
Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.

FOSS Electromagnetic Force Model
IG: pp. 51, 55, 57, 146, 149, 155, 156 164, 165, 167,168 (Step 17), 187, 251 (Step 15)
EA: *Notebook Entry,* IG p. 158 (Step 18), IG p. 188 (Step 25), IG p. 240 (Step 18), *Performance Assessment,* IG p. 185 (Step 14), IG p. 249 (Step 10)
EA: *Response Sheet,* IG p. 168, SNM No. 8, *Review Notebook Entries*, IG p. 189 (Step 26), IG p. 252 (Step 16)
BM: *Assessment Coding Guide,* pp.4-5 (Item 3), pp. 18-19 (Item 6), pp. 20-21 (Item 7), pp. 22-23 (Items 8 and 9), pp. 26-27 (Item 4), pp.42-43 (Item 7)
SRB: pp. 19-24, 38-41

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 6–8 builds from grades K–5 experiences and progresses to specifying relationships between variables, and clarifying arguments and models.

- Ask questions that can be investigated within the scope of the classroom, outdoor environment, and museums and other public facilities with available resources and, when appropriate, frame a hypothesis based on observations and scientific principles.

FOSS Electromagnetic Force
IG: pp. 203, 230, 236, 251
TR: pp. C9-C14, C42-C45

Disciplinary Core Ideas

PS2.B: Types of Interactions

- Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved and on the distances between the interacting objects.

FOSS Electromagnetic Force
IG: pp. 146, 149, 155, 156 164, 165, 167,168 (Step 17), 187, 251 (Step 15)
SRB: pp. 19-24, 38-41
DOR: *Magnetism*
"Adding Magnetic Fields"
"Virtual Electromagnet"

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Electromagnetic Force
IG: pp. 148, 155, 157, 166, 189, 249, 250, 252
SRB: pp. 24, 41
TR: pp. D10, D14, D22-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 7

Motion and Stability: Forces and Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.13

Students who demonstrate understanding can:
Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.

FOSS Gravity and Kinetic Energy
IG: pp. 49, 51, 88, 91, 127 (Step 2), 128, 129, 145, 149, 161, 185, 188 (Step 24), 195, 290-291
EA: *Notebook Entry,* IG p. 144 (Step 27), IG p. 187 (Step 20), *Performance Assessment,* IG p. 184 (Step 11), *Review Notebook Entries*, IG p. 145 (Step 29)
BM: *Assessment Coding Guide,* pp. 10-11 (Item 3ab), pp. 18-19 (Items 1-3), pp. 22-23 (Item 7), pp. 32-33 (Item 2), pp. 42-43 (Item 13)
SRB: pp. 18-25, 31-36

FOSS Planetary Science
IG: pp. 55, 67 , 374, 377, 408, 409, 411 (Step 14), 415, 417 (I), 420, 542, 569
EA: *Performance Assessment,* IG p. 409 (Step 13), *Review Notebook Entries,* IG p. 420 (Step 22)
SRB: pp. 80-85, 110-120

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds from K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world.

- Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

FOSS Gravity and Kinetic Energy
IG: pp. 59, 161, 180 (Step 6), 181 (Step 8), 183 (Step 13), 184, 187 (Step 20)

FOSS Planetary Science
IG: pp. 375, 409-410, 420, 543, 569, 574
SRB: pp. 80-85
TR: pp. C33-C38, C72-C73

Disciplinary Core Ideas

PS2.B: Types of Interactions

- Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have large mass—e.g., Earth and the sun.

Gravity and Kinetic Energy
IG: pp. 88, 91, 127 (Step 2), 128, 129, 145, 149, 161, 185, 188 (Step 24), 195, 290-291
SRB: pp. 18-25, 31-36
DOR: *Falling Ball Analysis Slideshow*
Falling Ball Videos
Hammer and Feather in Space

FOSS Planetary Science
IG: pp. 374, 377, 408, 409, 411 (Step 14), 415, 417 (I), 420, 542, 569
SRB: pp. 80-85, 110-120
DOR: *"Origin of the Moon"*
Tides

Crosscutting Concepts

Systems and System Models

- Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.

FOSS Gravity and Kinetic Energy
IG: pp. 90, 132, 137, 145, 160, 179, 188, 195, 291
SRB: pp. 18-25

FOSS Planetary Science
IG: pp. 376, 405, 410
SRB: pp. 80-85
TR: pp. D16, D38-D43

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 7

Motion and Stability: Forces and Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.14

Students who demonstrate understanding can:
Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

FOSS Electromagnetic Force
IG: pp. 51, 55, 57, 146, 149, 155, 164, 165, 187, 189
EA: *Notebook Entry,* IG p. 158 (Step 18), IG p. 240 (Item 18), *Performance Assessment,* IG p. 185 (Step 14)**,** IG p. 249 (Step 10), *Response Sheet,* IG p. 168 (Step 19), Student Notebook Master No. 8, *Review Notebook Entries***,** IG p. 189 (Step 26)**,** IG p. 252 (Step 16)
BM: *Assessment Coding Guide,* pp. 4-5 (Item 3), pp. 16-17 (Items 2 and 3), pp. 18-19 (Items 4 and 6), pp. 20-21 (Item 7ab), pp. 22-23 (Item 9), pp. 26-27 (Item 4), pp. 28-29 (Item 6), pp. 30-31 (Item 7), pp. 40-41 (Item 6), pp. 42-43 (Items 7 and 8)
SRB: pp. 19-24, 40

FOSS Gravity and Kinetic Energy
IG: pp. 34, 126-144, 164-175, 178-195
EA: *Notebook Entry,* IG p. 144 (Step 27), *Performance Assessment,* IG p. 166 (Step 7), *Notebook Entry*, IG p. 187 (Step 20)
BM: *Assessment Coding Guide,* pp. 5 (Item 2), p. 21 (Item 1), p. 25 (Item 8), p. 41 (Item 10)
SRB: pp. 18-25, 26-30, 31-36

Science and Engineering Practices

Planning and Carrying Out Investigations
Planning and carrying out investigations to answer questions or test solutions to problems in 6–8 builds on K–5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or design solutions.

- Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation.

FOSS Electromagnetic Force
IG: pp. 147, 183, 184, 185, 189, 203, 247
TR: pp. C18-C21, C52-C55

Disciplinary Core Ideas

PS2.B: Types of Interactions

- Forces that act at a distance (electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (a charged object, or a ball, respectively).

FOSS Electromagnetic Force
IG: pp. 146, 149, 155, 164, 165, 187, 189
SRB: pp. 19-24, 40
DOR: *"Adding Magnetic Fields"*

FOSS Gravity and Kinetic Energy
IG: pp. 34, 126-144, 164-175, 178-195
SRB: pp. 18-25, 26-30, 31-36

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Electromagnetic Force
IG: pp. 148, 155, 157, 166, 189, 204, 249, 250
TR: pp. D10, D14, D22-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

School Specialty. Delta Education

GRADE 7

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.15

Students who demonstrate understanding can:
Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.

FOSS Earth History
IG: 55, 59, 61, 65, 67, 69, 179, 194 (Steps 10-11), 201 (Step 25), 209 (Step 4), 215 (Steps 16-17), 237 (Step 17), 239, 245, 254, 266-267 (Steps 13-16), 269, 281, 302, 395, 407, 420, 428, 431, 433 (Step 18), 453, 504, 578, 582-584, 592
EA: *Notebook Entry*, IG p. 226 (Step 26), IG p. 266 (Step 13), IG p. 451 (Step 9), IG p. 492 (Step 38), *Response Sheet*, IG p. 238, Student Notebook Master No. 20, *Performance Assessment*, IG p. 279 (Step 9), IG p. 416 (Step 3), IG p. 431 (Step 11), IG p. 579 (Step 19), *Review Notebook Entries*, IG p. 239 (Step 21), IG p. 302 (Step 20), IG p. 453 (Step 15), IG p. 517 (Step 21)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 3), pp. 30-31 (Items 1 and 3), pp. 34-35 (Item 6), pp. 36-37 (Item 9), pp. 44-45 (Item 5), pp. 48-49 (Item 3ab)
SRB: *pp. 20-26, 36, 88-92*

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Earth History
IG: pp. 191, 192, 196, 197, 198, 209, 239, 263, 276, 295, 298, 302, 429, 435, 453, 547, 548, 551, 554, 653
TR: pp. C14-C17, C44-C51

Disciplinary Core Ideas

ESS2.A: Earth's Materials and Systems
- All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms.

FOSS Earth History
IG: *pp. 179, 194 (Steps 10-11), 201 (Step 25), 209 (Step 4), 215 (Steps 16-17), 237 (Step 17), 239, 245, 254, 266-267 (Steps 13-16), 269, 281, 302, 395, 407, 420, 428, 431, 433 (Step 18), 453, 504, 578, 582-584, 592*
SRB: *pp. 20-26, 36, 88-92*
DOR: *Earth's Interior, Convection Tank, Animations: Sandstone Formation, Shale Formation, Limestone Formation*

Crosscutting Concepts

Stability and Change
- Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.

FOSS Earth History
IG: pp.472, 492, 504, 517, 536, 550, 552, 553, 555, 566, 567, 592
TR: pp. D19, D44-D45

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 7

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.16

Students who demonstrate understanding can:
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

FOSS Weather and Water
IG: pp. 61, 75, 77, 483, 485, 486-493, 494, 497, 505 (Step 15), 509 (Step 2), 511-512 (Steps 6-9), 528 (Step 21), 529 (Step 24), 530, 533, 535, 536-538, 544, 547, 554-555 (Step 7), 564-565 (Steps 20-22), 566 (Step 24), 594
EA: *Notebook Entry***,** IG p. 527 (Step 20)**,** IG p. 565 (Step 22), *Review Notebook Entries***,** IG p. 530 (Step 26)**,** IG p. 594 (Step 15)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 4), pp. 50-51 (Item 1), pp. 54-55 (Item 4acde), pp. 56-57 (Items 5 and 6), pp. 76-77 (Items 8 and 9), pp. 78-79 (Item 10ab), pp. 80-81 (Item 11)
SRB: pp. 91-95, 123, 124-125

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to describe unobservable mechanisms.

FOSS Weather and Water
IG: pp. 484, 495, 509, 521, 526, 530, 533, 534, 545, 553, 556, 565, 594
TR: pp. C14-C17, C44-C49

Disciplinary Core Ideas

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

- Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land.
- Global movements of water and its changes in form are propelled by sunlight and gravity.

FOSS Weather and Water
IG: pp. 483, 485, 486-493, 494, 497, 505 (Step 15), 509 (Step 2), 511-512 (Steps 6-9), 528 (Step 21), 529 (Step 24), 530, 533, 535, 536-538, 544, 547, 554-555 (Step 7), 564-565 (Steps 20-22), 566 (Step 24), 594
SNM: Nos. 42, 44
SRB: pp. 91-95, 123, 124-125
DOR: "Water Cycle"

Crosscutting Concepts

Energy and Matter

- Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.

FOSS Weather and Water
IG: pp. 496, 510, 515, 530, 546, 556, 595
TR: pp. D17, D36-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

GRADE 7

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.17

Students who demonstrate understanding can:
Construct a scientific explanation based on evidence for how the uneven distributions of Earth's mineral, energy, and groundwater resources are the result of past and current geoscience processes.

FOSS Earth History
IG: pp. 55, 65, 69, 494, 597, 601, 603, 604, 607, 631, 633
EA: *Notebook Entry*, IG p. 623 (Step 10), IG p. 625 (Step 16), *Performance Assessment*, IG: p. 630 (Steps 4 and 5), *Review Notebook Entries*, IG p. 517 (Step 21), IG p. 633 (Steps 10-11)
BM: *Assessment Coding Guide*, pp. 8-9 (Item 5)
SRB: pp. 99-114

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (Including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

FOSS Earth History
IG: pp. 471, 492, 494, 505, 517, 605, 623, 625, 633
TR: pp. C28-C32, C64-C73

Disciplinary Core Ideas

ESS3.A: Natural Resources

- Humans depend on Earth's land, ocean, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes.

FOSS Earth History
IG: pp. 494 (TM), 597, 601, 603, 604, 607, 631, 633
SRB: pp. 99-114
DOR: *"Geoscenarios", "Timeliner"*

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Earth History
IG: pp.472, 486, 517, 606, 623, 625, 630, 633
TR: pp. D10, D14-D15, D26-D31

GRADE 7

Earth's Place in the Universe

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.18

Students who demonstrate understanding can:
Construct a scientific explanation based on evidence from rock strata for how the geologic time scale is used to organize Earth's 4.6-billion-year-old history.

FOSS Heredity and Adaptation
IG: pp. 47, 49, 84, 87, 95 (Steps 7, 8), 98, 99, 101, 104, 105
EA: *Notebook Entry,* IG pp. 107-108 (Step 19), *Performance Assessment,* IG p. 100 (Step 15), *Review Notebook Entries*, IG pp. 132-133 (Step 24)
BM: *Assessment Coding Guide,* pp. 14-15 (Item 6), pp. 34-35 (Item 3)
SRB: pp. 2-10, 73-77

FOSS Earth History
IG: pp. 328-345, 351-359, 364-390
EA: *Response Sheet,* IG p. 331 (Step 10), *Notebook Entry,* p. 355 (Step 11), *Performance Assessment,* p. 367 (Step 8)
BM: *Assessment Coding Guide,* p. 7 (Item 2), p. 13 (Item 6), p. 17 (Item 3), p. 21 (Item 7), p. 25 (Items 2 and 3), p. 27 (Items 4 and 5),
SRB: pp. 45-49, 50-63

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

FOSS Heredity and Adaptation
IG: pp. 88 (Step 13), 100 (Steps 14, 15), 118, 119, 120, 132
SRB: pp. 4-7, 73-77
TR: pp. C28-C31, C66-C71

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.

FOSS Heredity and Adaptation
IG: pp. 84, 87, 95 (Steps 7, 8), 98, 99, 101, 104, 105
SRB: pp. 2-10, 73-77
DOR: *"Fossil Slideshow"*

FOSS Earth History
IG: pp. 328-345, 351-359, 364-390
SRB: pp. 45-49, 50-63
DOR: *"Rock Column Movie Maker", "Timeliner"*

Crosscutting Concepts

Scale, Proportion, and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

FOSS Heredity and Adaptation
IG: pp. 99, 100 (Step 15)
SRB: pp. 5, 6, 7, 8, 9, 78-81
TR: pp. D11, D15, D32-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

GRADE 7

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.19

Students who demonstrate understanding can:
Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales.

FOSS Earth History
IG: pp. 55, 57, 59, 61, 65, 67, 69
DOR: *"Geoscenarios"*
EA: *Notebook Entry,* IG pp. 195-196 (Step 14), IG p. 226 (Step 26), IG p. 266 (Step 13), IG p. 297 (Step 10), IG p. 494 (Step 15), IG p. 554 (Step 22), IG p. 564 (Step 27), IG pp. 656-657 (Step 15)
EA: *Performance Assessment*, IG p. 279 (Step 9)
EA: *Review Notebook Entries*, IG p. 162 (Step 18), IG p. 239 (Step 21), IG p. 302 (Step 20), IG p. 453 (Step 15), IG p. 517 (Step 21), IG p. 592 (Step 38)
BM: *Assessment Coding Guide,* pp. 12-13 (Items 1 and 2), pp. 18-19 (Item 7ab), pp. 22-23 (Item 2ab), pp. 28-29 (Item 8ab), pp. 30-31 (Item 2), pp. 38-39 (Item 1ab), pp. 46-47 (Item 1ab), pp. 50-51 (Item 4abc), pp. 56-57 (Item 8), pp. 58-59 (Item 10ab)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct a scientific explanation based on valid and reliable evidence obtained from sources (Including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do so in the future.

FOSS Earth History
IG: pp. 196, 199, 225, 237, 239, 266, 277, 280, 298, 430, 434, 471, 492, 494, 505, 517, 548, 552, 554, 577, 578, 582, 584, 652, 653, 654, 661
TR: pp. C28-C32, C64-C73

Disciplinary Core Ideas

ESS2.A: Earth's Materials and Systems

- The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future.

FOSS Earth History
IG: *pp. 179, 245, 299, 302,493 (Step 11), 521, 523, 534, 565 (Steps 30-31)*
SRB: *pp. 36-39, 81-87*
DOR: *"Rock Column Movie Maker", Mountain Types Slideshow, Folding, Fault Type: Convergent Boundary, Divergent Boundary, Transform Boundary*

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

- Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations.

FOSS Earth History
IG: *pp.165, 183, 196 (Step 15), 201 (Step 25), 211, 215, 302, 657*
SRB: *pp. 20-26*
SNM: *Nos. 1, 10, 11, 12*

Crosscutting Concepts

Scale Proportion and Quantity

- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

FOSS Earth History
IG: pp. 182,191,209, 239, 256, 264, 296, 302, 409, 428, 472, 480, 645, 657
TR: pp. D15-D16, D32-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

DOR: *Glen Canyon Dam High Flow Experiment*
Grand Canyon Flyover

GRADE 7

Earth's Systems

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.20

Students who demonstrate understanding can:
Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.

FOSS Earth History
IG: pp. 55, 65, 67, 69, *305, 455, 470, 491, 492, 493, 505-507, 517, 526, 550 (Step 13), 551, 552 (Step 16), 547 (Step 5 w/SNM No. 41), 554 (Step 21), 566, 592 (Step 39)*
EA: *Notebook Entry,* IG p. 493 (Step 10) Student Notebook Master No. 32**,** IG p. 516 (Step 20)**,** IG p. 554 (Step 22)**,** IG p. 656 (Step 15), *Review Notebook Entries*, IG p. 517 (Step 21)**,** IG p. 592 (Step 38)
BM: *Assessment Coding Guide,* pp. 34-35 (Items 5 and 7), pp. 36-37 (Item 8), pp. 38-39 (Item 1ab), pp. 42-43 (Item 3abc), pp. 44-45 (Item 4ab), pp. 46-47 (Item 2), pp. 54-55 (Item 7), pp. 56-57 (Item 9)
SRB: pp.46-49, 74-79, 83, 85-86

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to provide evidence for phenomena.

FOSS Earth History
IG: 471, 480, 481, 482, 486, 491, 517, 535, 574, 579, 580, 592
TR: pp. C22-C24, C56-C61

Disciplinary Core Ideas

ESS1.C: The History of Planet Earth

- Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches.

FOSS Earth History
IG: *pp. 505-507, 517, 526, 550 (Step 13), 551, 552 (Step 16),*
SRB: *pp. 77-78, 84*
SNM: *No. 40*

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

- Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart.

FOSS Earth History
IG: *pp. 305, 455, 470, 491, 492, 493, 507, 517 (Step 21 and 22), 547 (Step 5 w/SNM No. 41), 554 (Step 21), 566, 592 (Step 39)*
SRB: *pp.46-49, 74-79, 83, 85-86*
SNM: *No. 32*
DOR: *NOAA Plate Tectonics**,** Folding*

Crosscutting Concepts

Patterns

- Patterns in rates of change and other numerical relationships can provide information about natural and human designed systems.

FOSS Earth History
IG: pp. 472, 481, 482, 483, 486, 487, 491, 494, 517, 536, 578, 580, 592, 645, 652
TR: pp. D14, D26-D27

	Fault Type: *Convergent Boundary* *Divergent Boundary* *Transform Boundary*	

Connections to Nature of Science

Scientific Knowledge is Open to Revision in Light of New Evidence

- Science findings are frequently revised and/or reinterpreted based on new evidence. (MS-ESS2-3)

FOSS Earth History
IG: pp. 491, 493, 495 (Step 17), 501 (Step 2), 502 (Step 4)
SRB: p. 80

GRADE 7

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7.21

Students who demonstrate understanding can:
Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.*

FOSS Weather and Water
IG: p. 79, *597, 604, 605-609, 610-611, 613, 629-630 (Step 7), 649, 656*
EA: *Performance Assessment***,** IG p. 649 (Step 6), *Review Notebook Entries,* IG p. 655 (Step 18)
BM: *Assessment Coding Guide,* pp. 60-61 (Item 2)**,** pp. 86-86 (Item 18)

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific principles to design an object, tool, process or system.

FOSS Weather and Water
IG: pp. 597, 598, 611, 630, 652, 655
TR: pp. C28-C32, C66-C67

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems

- Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things.

FOSS Human Systems Interactions
***IG:** p. 111 (Step 27)*

FOSS Weather and Water
***IG:** pp. 597, 604, 605-609, 610-611, 613, 629-630 (Step 7), 649, 656*
***DOR:** "Human-Caused Sources of Carbon Dioxide*

Crosscutting Concepts

Cause and Effect

- Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.

FOSS Human Systems Interactions
IG: p. 111 (Step 27)

FOSS Weather and Water
IG: pp. 612, 629, 649, 651, 655
TR: pp. D11, D14-D15, D24-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

School Specialty. Delta Education

GRADE 7

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7 22

Students who demonstrate understanding can:
Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

FOSS Weather and Water
IG: p. 71, 361, 367-369, 370, 373, 394-395 (Step 6), 404 (Step 3), 418
EA: IG p. 407 (Step 14)
BM: *Assessment Coding Guide*, pp. 48-49 (Item 6abcde)**,** pp. 85-86 (Item 17)

FOSS Chemical Interactions
IG: pp. 333-339, 342-359, 363-369, 390 (Steps 9 and 10), 399 (Step 3), 398-412
EA: Notebook Entry, IG p. 338 (Step 13), Response Sheet, IG p. 358 (Step 15), Review Notebook Entries, IG p. 370 (Step 15), Notebook Entry, IG p. 393 (Step 19), Performance Assessment, IG p. 400 (Step 6)
SRB: pp. 46-55

FOSS Gravity and Kinetic Energy
IG: pp. 49, 55, 57, 206, 214, 215 (Step 5), 218, 220-222, 232 (Step 2), 242 (Step 2), 254, 291
EA: *Notebook Entry,* IG p. 237 (Step 16), *Performance Assessment,* IG p. 217 (Step 12), *Review Notebook Entries,* IG p. 254 (Step 18)
BM: *Assessment Coding Guide*, pp. 2-3 (Item 1), pp. 24-25 (Item 3), pp. 28-29 (Item 6abc), pp. 30-31 (Item 8b), pp. 34-35 (Item 6), pp. 42-43 (Items 12 and 13)
SRB: pp. 17-18, 37-40, 40-41, 45-49

Science and Engineering Practices

Asking Questions and Defining Problems
Asking questions and defining problems in grades 6–8 builds on grades K–5 experiences and progresses to specifying relationships between variables, clarifying arguments and models.

- Define a design problem that can be solved through the development of an object, tool, process or system and includes multiple criteria and constraints, including scientific knowledge that may limit possible solutions.

FOSS Weather and Water
IG: pp. 362, 371, 395 (Step 7), 406
TR: pp. C9-C13, C42-C43

Disciplinary Core Ideas

ETS1.A: Defining and Delimiting Engineering Problems

- The more precisely a design task's criteria and constraints can be defined, the more likely it is that the designed solution will be successful. Specification of constraints includes consideration of scientific principles and other relevant knowledge that are likely to limit possible solutions.

FOSS Weather and Water
IG: pp. 361, 367-369, 370, 373, 394-395 (Step 6), 404 (Step 3), 418
TM: X, Y, BB

Crosscutting Concepts

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

- All human activity draws on natural resources and has both short and long-term consequences, positive as well as negative, for the health of people and the natural environment. (MS-ETS1-1)
- The uses of technologies and limitations on their use are driven by individual or societal needs, desires, and values; by the findings of scientific research; and by differences in such factors as climate, natural resources, and economic conditions.

FOSS Weather and Water
IG: pp. 407 (Steps 14-15), 409-410 (Steps 24-24), 417 (Step 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

		TM: EE **SRB:** pp. 64-68

GRADE 7

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.7 23

Students who demonstrate understanding can:
Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.

FOSS Weather and Water
IG: p. 71, 397 (Step 15), 398 (Step 17), 406 (Steps 10-11), 404 (Step 3), 405 (Step 4), 406 (Steps 10-11), 408 (Step 20), 418
EA: *Review Notebook Entries***,** IG p. 418 (Step 32)
BM: *Assessment Coding Guide***,** pp. 48-49 (Item 6abcde)**,** pp. 84-85 (Item 16ab)

FOSS Chemical Interactions
IG: pp. 333-339, 342-359, 363-369, 390 (Steps 9 and 10), 399 (Step 3), 398-412
EA: Notebook Entry, IG p. 338 (Step 13), Response Sheet, IG p. 358 (Step 15), Review Notebook Entries, IG p. 370 (Step 15), Notebook Entry, IG p. 393 (Step 19), Performance Assessment, IG p. 400 (Step 6)
SRB: pp. 46-55

FOSS Gravity and Kinetic Energy
IG: pp. 49, 55, 57, 206, 214, 215 (Step 5), 218, 220-222, 232 (Step 2), 242 (Step 2), 254, 291
EA: *Notebook Entry,* IG p. 237 (Step 16), *Performance Assessment,* IG p. 217 (Step 12), *Review Notebook Entries,* IG p. 254 (Step 18)
BM: *Assessment Coding Guide*, pp. 2-3 (Item 1), pp. 24-25 (Item 3), pp. 28-29 (Item 6abc), pp. 30-31 (Item 8b), pp. 34-35 (Item 6), pp. 42-43 (Items 12 and 13)
SRB: pp. 17-18, 37-40, 40-41, 45-49

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis. • Analyze and interpret data to determine similarities and differences in findings. ***FOSS Weather and Water*** **IG:** pp. 362, 371, 380, 383, 397, 406, 408 **TR:** pp. C22-C24, C54-C59	**ETS1.B: Developing Possible Solutions** • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. • Sometimes parts of different solutions can be combined to create a solution that is better than any of its predecessors. ***FOSS Weather and Water*** **IG:** pp. 404 (Step 3), 405 (Step 4), 406 (Steps 10-11), 408 (Step 20), 418 **TM:** DD **ETS1.C: Optimizing the Design Solution**	

	• Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of those characteristics may be incorporated into the new design. ***FOSS Weather and Water*** **IG:** pp. 397 (Step 15), 398 (Step 17), 406 (Steps 10-11), 407 (14-16), 408 (Step 20), 418 **TM:** DD	

GRADE 8

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.1

Students who demonstrate understanding can:
Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants respectively.

FOSS Diversity of Life
IG: pp. 53, 63, 65
EA: *Performance Assessment,* IG p. 472 (Step 12)
EA: *Response Sheet,* IG p. 487, Student Notebook Masters No. 54
EA: *Review Notebook Entries*, IG p. 501 (Step 13), IG p. 590 (Step 11)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 6), pp. 34-35 (Item 2ab) pp. 36-37 (Item 4), pp. 51-52 (Item 3), pp. 56-57 (Item 9)

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

FOSS Diversity of Life
IG: pp. 438, 447, 473 (Step 15), 498, 501, 587, 590
TR: pp. C33-C38, C66-C69

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms

- Animals engage in characteristic behaviors that increase the odds of reproduction.
- Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction.

FOSS Diversity of Life
IG: pp. 435, 437, 439, 440, 442-445, 446-447, 451, 456-457 (Step 1), 479-480 (Step 1), 483-484 (Steps 12-13), 486-487 (Step 16), 495 (Step 1), 497 (Step 7), 499 (Step 10), 501-502 (Steps 13 and 14)
SRB: pp. 62-64, 65-72, 81-89, 122-125, 126-133
SNM: Nos. 47, 51-53, 55-56, 62, 63
DOR: *Slide Show:*
Non-flowering Plants
"Database: Pollinator Collection"
"Pollinators Game"

Crosscutting Concepts

Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

FOSS Diversity of Life
IG: pp.565, 578-579, 580, 590
TR: pp. D11, D14-D15, D24-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

School Specialty. Delta Education

GRADE 8

Structure, Function and Information Processing

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.2

Students who demonstrate understanding can:
Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.

FOSS Human Systems Interactions
IG: pp. 43, 49, 157, 159, 160-165, 166, 169, 175 (Step 6), 195 (Step 4), 206 (Step 16), 221 (Step 9), 227 (Step 21 and 22), 245 (Step 17), 247
EA: *Notebook Entry,* IG p. 246 (Step 20), *Review Notebook Entries*, IG p. 247 (Step 21)
BM: *Assessment Coding Guide*, pp. 4-5 (Items 5 and 6), pp. 14-15 (Items 2 and 3), pp. 18-19 (Items 6 and 7), pp. 20-21 (Item 9), pp. 24-25 (Item 4abc)
SRB: pp. 55-59, 60-63, 64- 68, 69-73, 74-78, 79-83, 84-87, 88-92, 104

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

FOSS Human Systems Interactions
IG: pp. 158, 167, 176, 179, 196, 207, 218, 227, 239, 247
TR: pp. C39-C41, C70-C73

Disciplinary Core Ideas

LS1.D: Information Processing

- Each sense receptor responds to different inputs (electromagnetic, mechanical, chemical), transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories.

FOSS Human Systems Interactions
IG: pp. 157, 159, 160-165, 166, 169, 175 (Step 6), 195 (Step 4), 206 (Step 16), 221 (Step 9), 227 (Step 21 and 22), 245 (Step 17), 247
SRB: pp. 55-59, 60-63, 64- 68, 69-73, 74-78, 79-83, 84-87, 88-92, 104
SNM: Nos. 8, 9, 13
DOR: *"Touch Menu"*
"Brain: Synapse Function"
"Smell Menu"
"Vision Menu"

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural systems.

FOSS Human Systems Interactions
IG: pp. 168, 194, 247
TR: pp. D11, D14-D15, D24-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

School Specialty. Delta Education

GRADE 8

Heredity: Inheritance and Variation of Traits

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.3

Students who demonstrate understanding can:
Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.

FOSS Heredity and Adaptation
IG: pp. 47, 51, 53, 150, 153, 181, 186-189, 190, 196, 197, 229, 244, 247, 251, 252, 253, 254, 280, 281, 294, 295
EA: *Notebook Entry,* IG p. 272 (Step 17), IG p. 293 (Step 13), *Response Sheet,* IG p. 293, Student Notebook Master No. 19**, I**G p. 207, Student Notebook Master No. 9, *Review Notebook Entries***,** IG pp. 229 (Step 19)
BM: *Assessment Coding Guide*, pp. 4-5 (Item 3), pp.16-17 (Item 1), pp. 24-25 (Item 1), pp. 26-27 (Item 3), pp. 28-29 (Item 6), pp. 36-37 (Item 5), pp. 42-43 (Item 9)

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Heredity and Adaptation
IG: pp. 203, 245, 254
SRB: pp. 26-27
TR: pp. C14-C17, C46-C51

Disciplinary Core Ideas

LS3.A: Inheritance of Traits
- Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes (mutations) to genes can result in changes to proteins, which can affect the structures and functions of the organism and thereby change traits.

FOSS Heredity and Adaptation
IG: pp. 150, 153, 181, 186-189, 190, 196, 197, 229, 280, 281, 294, 295
SRB: pp. 22-27
DOR: "Heredity Slideshow"

LS3.B: Variation of Traits
- In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. (MS-LS3-1)

FOSS Heredity and Adaptation
IG: pp. 244, 247, 251, 252, 253, 254

Crosscutting Concepts

Structure and Function
- Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

FOSS Heredity and Adaptation
IG: pp. 196 (G), 265 (H), 269 (L)
SRB: pp. 26-27, 47, 49, 51
TR: pp. D18, D44-D47

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

	SRB: pp. 39, 49, 50, 51, 52 **SNM:** No. 12	

GRADE 8

Heredity: Inheritance and Variation of Traits

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.4

Students who demonstrate understanding can:
Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.

FOSS Diversity of Life
IG: pp. 53, 63, 537 (Step 7), 548 (Step 12)
EA: *Notebook Entry*, IG p. 530 (Step 23), IG p. 547 (Step 10)
EA: *Review Notebook Entries,* IG p. 550 (Step 16)
BM: *Assessment Coding Guide*, pp. 8-9 (Item 7), pp. 36-37 (Item 5), pp. 42-43 (Items 1 and 2), pp. 44-45 (Items 3 and 4), pp. 46-47 (Item 6), pp. 56-57 (Item 9)

FOSS Heredity and Adaptations
IG: pp. 44, 247, 251, 254
EA: *Notebook Entry,* IG p. 272 (Step 17)
BM: *Assessment Masters, pp. 11 (Item 6), 15 (Item 8)*

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop and use a model to describe phenomena.

FOSS Diversity of Life
IG: pp. 506, 515, 535, 550
SNM: Nos. 59, 60
TR: pp. C14-C17, C44-C49

Disciplinary Core Ideas

LS1.B: Growth and Development of Organisms
- Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring.

FOSS Diversity of Life
IG: pp. 505, 507, 508-510, 514, 517, 521-522 (Steps 1-2), 525 (Steps 10-12), 526 (Step 14), 530 (Step 22), 549 (Steps 14-15), 550, 551 (Step 17)
SRB: pp. 73-80
DOR: *Genes and Heredity*

LS3.A: Inheritance of Traits
- Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore genes) inherited.

FOSS Diversity of Life
IG: pp. 505, 507, 508-513, 514, 517, 527 (Step 15), 535-536 (Step 5), 549 (Steps 14-15), 550
SRB: pp. 73-80
DOR: *Genes and Heredity*

Crosscutting Concepts

Cause and Effect
- Cause and effect relationships may be used to predict phenomena in natural systems.

FOSS Diversity of Life
IG: pp. 516, 528, 529, 536, 550
TR: pp. D11, D14-D15, D24-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

	LS3.B: Variation of Traits • In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and hence two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. ***FOSS Diversity of Life*** **IG:** pp. 505, 507, 510-513, 514, 517, 527 (Steps 15-16), 547-548 (Step 11), 549 (Steps 14-15), 550 **SRB:** pp. 73-80 **SNM:** Nos. 59, 60 **DOR:** *Genes and Heredity*	

GRADE 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.5

Students who demonstrate understanding can:
Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.

FOSS Heredity and Adaptation
IG: pp. 47, 53, 218 (Step 14), 244, 247, 302 (Step 2), 304
SRB: pp. 40, 84-88
EA: *Notebook Entry,* IG p. 306 (Step 9), P*erformance Assessment,* IG p. 304 (Step 5)
BM: *Assessment Coding Guide,* pp. 6-7 (Item 6), pp. 42-43 (Item 10ab), pp. 24-25 (Item 11abc)

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 experiences and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

FOSS Heredity and Adaptation
IG: pp. 245, 304, 305
SRB: pp. 84-88
TR: pp. C39-C41, C74-C79

Disciplinary Core Ideas

LS4.B: Natural Selection

- In *artificial* selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed onto offspring.

FOSS Heredity and Adaptation
IG: pp. 218 (Step 14), 244, 247, 302 (Step 2), 304
SRB: pp. 40, 84-88
DOR: *"Genetic Technology Resources"*

Crosscutting Concepts

Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

FOSS Heredity and Adaptation
IG: pp. 246, 303 (Step 3), 304
SRB: pp. 84-88
TR: pp. D10, D14, D22-D31

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

- Science knowledge can describe consequences of actions but does not make the decisions that society takes. (MS-LS4-5)

FOSS Heredity and Adaptation
IG: pp. 218 (Step 14), 246, 303 (Step 3)
SRB: pp. 36-40, 84-88

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 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.6

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. Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.

FOSS Heredity and Adaptation
IG: pp. 47, 49, 73, 75, 87, 93 (Step 3), 94 (Step 4), 95 (Steps 6-7), 96 (Step 10), 115 (Step 2), 132
EA: *Notebook Entry,* IG p. 107 (Step 19), *Performance Assessment,* IG p. 95 (Step 6)**,** IG p. 99 (Step 13), *Response Sheet,* IG p. 130**,** Student Notebook Master No.4, *Review Notebook Entries***,** IG pp. 132-133 (Step 24)
SRB: pp. 2-10, 73-77

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings.

FOSS Heredity and Adaptation
IG: pp. 73, 85, 94, 98, 103 (B), 116, 118, 123, 132
SRB: pp. 8-11, 73-77
TR: pp. C22-C24, C54-C59

Disciplinary Core Ideas

LS4.A: Evidence of Common Ancestry and Diversity

- The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth.

FOSS Heredity and Adaptation
IG: pp. 73, 75, 87, 93 (Step 3), 94 (Step 4), 95 (Steps 6-7), 96 (Step 10), 115 (Step 2), 132
SRB: pp. 2-10, 73-77
SNM: Nos. 1-2
DOR: *"Biodiveristy Slideshow"*
"Fossil Slideshow"
Fish with Fingers
Great Transitions: The Origin of the Tetrapods

Crosscutting Concepts

Patterns

- Graphs, charts, and images can be used to identify patterns in data.

FOSS Heredity and Adaptation
IG: pp. 86, 98, 118, 132
SRB: pp. 8-9, 73-77
TR: pp. D9, D13, D22-D27

Connections to the Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-LS4-1)

FOSS Heredity and Adaptation
IG: pp. 74, 85, 87, 128 (H)
SRB: pp. 14-16

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

Connections to the Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS4-1)

FOSS Heredity and Adaptation
IG: pp. 86, 98 (Step 11)
SRB: pp. 3-10

GRADE 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.7

Students who demonstrate understanding can:
Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.

FOSS Heredity and Adaptation
IG: pp. 47, 49, 51, 84, 87, 119, 124 128, 129, 132, 167-169 (Steps 11-14), 175 (Step 27)
EA: *Notebook Entry,* IG p. 175 (Step 28) Student Notebook Master No. 7, *Performance Assessment,* IG p. 119 (Step 11), *Response Sheet,* IG p. 130**,** Student Notebook Master No. 4, *Review Notebook Entries***,** IG pp. 132-133 (Step 24)**,** IG pp. 229 (Step 19)
BM: *Assessment Coding Guide*, pp. 8-9 (Item 7), pp. 12-13 (Item 4ab), pp. 14-15 (Item 7), pp. 20-21 (Item 4abc), pp. 30-31 (Item 9), pp. 34-35 (Item 2)
SRB: pp. 11-16, 78-81

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events.

FOSS Heredity and Adaptation
IG: pp. 85, 87, 117 (Step 8), 118, 119, 120, 131, 132
SRB: p. 15
TR: pp. C28-C31, C66-C71

Disciplinary Core Ideas

LS4.A: Evidence of Common Ancestry and Diversity

- Anatomical similarities and differences between various organisms living today and between them and organisms in the fossil record enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent.

FOSS Heredity and Adaptation
IG: pp. 84, 87, 119, 124 128, 129, 132, 167-169 (Steps 11-14), 175 (Step 27)
SRB: pp. 11-16, 78-81
SNM: Nos. 3-4
DOR: *Fish with Fingers*
Great Transitions: The Origin of the Tetrapods

Crosscutting Concepts

Patterns

- Patterns can be used to identify cause and effect relationships.

FOSS Heredity and Adaptation
IG: pp. 86, 98, 118, 120, 122, 123, 132, 152, 169, 175
SRB: pp. 17-21
TR: pp. D9, D13, D22-D27

Connections to Nature of Science

Scientific Knowledge Assumes an Order and Consistency in Natural Systems

- Science assumes that objects and events in natural systems occur in consistent patterns that are understandable through measurement and observation. (MS-LS4-2)

FOSS Heredity and Adaptation
IG: pp. 86, 152, 98 (Step 11), 169 (Step 14)
SRB: pp. 12-14, 20-21, 62-64

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 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.8

Students who demonstrate understanding can:
Analyze displays of pictorial data to compare patterns of similarities in the embryological development across multiple species to identify relationships not evident in the fully formed anatomy.

FOSS Heredity and Adaptation
IG: pp. 47, 51, 150, 173 (Steps 21-22), 174 (Step 26)
EA: *Notebook Entry,* IG p. 174 (Step 26)**,** IG p. 175 (Step 28), *Performance Assessment,* IG p. 173 (Step 22), *Review Notebook Entries***,** IG pp. 229 (Step 19)
BM: *Assessment Coding Guide,* pp. 22-23 (Item 5)**,** pp. 32-33 (Item 1)

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 experiences and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.
- Analyze displays of data to identify linear and nonlinear relationships.

FOSS Heredity and Adaptation
IG: pp. 151, 174 (Step 23), 175 (Step 28)
SRB: pp. 17-21
TR: pp. C22-C24, C54-C59

Disciplinary Core Ideas

LS4.A: Evidence of Common Ancestry and Diversity
- Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully formed anatomy.

FOSS Heredity and Adaptation
IG: pp. 150, 173 (Steps 21-22), 174 (Step 26)
DOR: *"Cladogram"*
TM: T

Crosscutting Concepts

Patterns
- Graphs, charts, and images can be used to identify patterns in data.

FOSS Heredity and Adaptation
IG: pp. 174 (Step 23), 175 (Step 28)
SRB: pp. 17-21
TR: pp. D9, D13, D22-D27

GRADE 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.9

Students who demonstrate understanding can:
Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.

FOSS Heredity and Adaptation
IG: pp. 47, 53, 150, 203, 213 (Step 3), 217 (Step 13), 229, 233, 235, 251 (Step 2), 264 (G), 266 (I), 270 (M), 272 (Step 18), 278 (Step 1), 280 (Step 5), 292 (Step 13), 295
EA: *Notebook Entry,* IG p. 217 (Step 12) Student Notebook Masters Nos. 10-11**,** IG p. 272 (Step 17), *Performance Assessment,* IG p. 207 (Step 9), *Response Sheet,* IG p. 207**,** Student Notebook Master No. 9, IG p. 293, Student Notebook Master No. 19
BM: *Assessment Coding Guide,* pp. 4-5 (Item 3), pp. 24-25 (Item 1), pp. 26-27 (Item 4), pp. 28-29 (Item 5), pp. 30-31 (Items 7-9)**,** pp. 36-37 (Item 6), pp. 38-39 (Item 7)
SRB: pp. 28-32, 49-51, 53-54

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific ideas, principles, and theories.

- Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena.

FOSS Heredity and Adaptation
IG: pp. 151, 207 (Step 9), 226 (H), 229, 233, 234, 286 (B), 294-296
SRB: pp. 28-31, 47-50, 60-68
TR: pp. C28-C31, C66-C71

Disciplinary Core Ideas

LS4.B: Natural Selection

- Natural selection leads to the predominance of certain traits in a population, and the suppression of others.

FOSS Heredity and Adaptation
IG: pp. 150, 203, 213 (Step 3), 217 (Step 13), 229, 233, 235, 251 (Step 2), 264 (G), 266 (I), 270 (M), 272 (Step 18), 278 (Step 1), 280 (Step 5), 292 (Step 13), 295
SNM: No. 17
DOR: *"A Model for Predicting Genetic Variation"*
"Larkey Impossible Traits"
"Larkey Punnett Squares"
"Walking Sticks"
SRB: pp. 28-32, 49-51, 53-54

Crosscutting Concepts

Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

FOSS Heredity and Adaptation
IG: pp. 152, 214, 217, 222 (C), 229, 253, 255, 267 (J), 269 (L), 271, 272, 280, 292, 295
SRB: pp. 33-35
TR: pp. D10, D14, D22-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

School Specialty. Delta Education

GRADE 8

Biological Evolution: Unity and Diversity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.10

Students who demonstrate understanding can:
Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.

FOSS Heredity and Adaptation
IG: pp. 47, 53, 280 (Step 5), 287 (C), 289 (E), 294-296
EA: *Notebook Entry,* IG pp. 294-295 (Step 17), *Performance Assessment,* IG pp. 282-283 (Steps 7-8)**,** IG p. 279 (Step 3), *Response Sheet,* IG p. 293, Student Notebook Master No. 19
BM: *Assessment Coding Guide***,** pp. 4-5 (Item 4)**,** pp. 6-7 (Item 5), pp. 24-25 (Item 2b), pp. 26-27 (Item 4), pp. 30-31 (Item 9)**,** pp. 36-37 (Items 4 and 5)**,** pp. 38-39 (Item 7b)
SRB: pp. 53-57

Science and Engineering Practices

Using Mathematics and Computational Thinking
Mathematical and computational thinking in 6–8 builds on K–5 experiences and progresses to identifying patterns in large data sets and using mathematical concepts to support explanations and arguments.

- Use mathematical representations to support scientific conclusions and design solutions.

FOSS Heredity and Adaptation
IG: pp. 245, 278, 283, 287 (C), 294-295
TR: pp. C25-C27, C60-C65

Disciplinary Core Ideas

LS4.C: Adaptation

- Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.

FOSS Heredity and Adaptation
IG: pp. 280 (Step 5), 287 (C), 289 (E), 294-296
DOR: *"Walking Sticks"*
"Larkey Natural Selection"
The Making of the Fittest: Natural Selection and Adaptation
The Origin of Species: The Beak of the Finch
SRB: pp. 53-57
SNM: Nos. 13-15

Crosscutting Concepts

Cause and Effect

- Phenomena may have more than one cause, and some cause and effect relationships in systems can only be described using probability.

FOSS Heredity and Adaptation
IG: pp. 280, 292, 294-296
SRB: pp. 58-59
TR: pp. D10, D14, D22-D31

GRADE 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.11

Students who demonstrate understanding can:
Develop models to describe the atomic composition of simple molecules and extended structures.

FOSS Chemical Interactions
IG: pp. 59, 77, 541, 543, 550, 553, 558-561, 563 (Step 11), 564 (Step15), 620
EA: *Notebook Entry,* IG p. 574 (Step 20), Student Notebook Masters Nos. 67-68, *Performance Assessment*, IG p. 588 (Step 13), *Review Notebook Entries*, IG p. 620 (Step 20)
BM: *Assessment Coding Guide,* pp. 52-53 (Item 4), pp. 54-55 (Items 6 and 7), pp. 64-65 (Item 6), pp. 66-67 (Items 8a and 9)
SRB: pp. 24-27, 110-117, 180-181

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop a model to predict and/or describe phenomena.

FOSS Chemical Interactions
IG: pp. 551, 558, 559, 560, 562, 563, 574, 587, 620
TR: pp. C14-C17, C44-C51

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter
- Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms.
- Solids may be formed from molecules, or they may be extended structures with repeating subunits (e.g., crystals).

FOSS Chemical Interactions
IG: pp. 541, 543, 550, 553, 558-561, 563 (Step 11), 564 (Step15), 620
SRB: pp. 24-27, 110-117, 180-181

Crosscutting Concepts

Scale, Proportion, and Quantity
- Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.

FOSS Chemical Interactions
IG: pp. 552, 589, 614, 617, 620
TR: pp. D15-D16, D32-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

School Specialty. Delta Education

GRADE 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.12

Students who demonstrate understanding can:
Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

FOSS Chemical Interactions
IG: pp. 59, 61, 63, 65, 73, 77, 79, 107, 109,117, 137 (Step 6), 140-141(Step 15), 146,147 (Step 33), 467, 448 (Step 5), 487 (Step 10), 497 (Step 14), 541, 550, 586 (Step 7), 587 (Step 12), 588-589 (Steps 14-16), 613-614 (Step 6), 617 (Step 12), 618 (Step 16), 620
EA: *Think Question*, IG p. 573 (K), *Review Notebook Entries***,** IG p. 147 (Step 33)**,** IG p. 198 (Step 16)**,** IG p. 255 (Step 10)**,** IG p. 464 (Step 19)**,** IG p. 620 (Step 20)
BM: *Assessment Coding Guide,* pp. 14-15 (Item 6), pp. 52-52 (Item 5)
SRB: pp. 3-5, 98-99, , 118-129, 132, 146, 165-173

Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information
Obtaining, evaluating, and communicating information in 6–8 builds on K–5 and progresses to evaluating the merit and validity of ideas and methods.

- Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence.

FOSS Chemical Interactions
IG: pp. 163, 170, 172, 174, 183, 193,194, 605
TR: pp. C39-C41, C74-C77

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.

FOSS Chemical Interactions
IG: pp.107, 109,117, 137 (Step 6), 140-141(Step 15), 146,147 (Step 33), 467, 448 (Step 5), 487 (Step 10), 497 (Step 14)
SRB: pp. 3-5, 98-99, 132, 165-173
DOR: "Explore Dissolving"
"Two-Substance Reactions"

PS1.B: Chemical Reactions

- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.

FOSS Chemical Interactions
IG: pp. 541, 550, 586 (Step 7), 587 (Step 12), 588-589 (Steps 14-16), 613-614 (Step 6), 617 (Step 12), 618 (Step 16), 620
SRB: pp. 118-129, 146
DOR: "Two-Substance Reactions"

Crosscutting Concepts

Structure and Function

- Structures can be designed to serve particular functions by taking into account properties of different materials, and how materials can be shaped and used.

FOSS Chemical Interactions
IG: pp. 164, 194, 552, 561, 565
TR: pp. D18, D44-D45

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 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.13

Students who demonstrate understanding can:
Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.

FOSS Chemical Interactions
IG: pp. 59, 65, 67, 69, 73, 75, 201, 210, 233 (Step 12), 236 (Step 17), 245-247 (Steps 1-4), 255, 259, 266, 274 (Step 1), 279-280 (Step 12), 289-290 (Step 9), 291 (Step 11), 467, 478, 488-489 (Step 11), 497, 533 (Step 6), 534 (Step 10), 537
EA: *Notebook Entry*, IG p. 254 (Step 9), IG p. 312 (Step 11), IG p. 338 (Step 13), IG p. 536 (Step 14), *Performance Assessment*, IG p. 276 (Step 7), IG p. 367 (Step 8), IG p. 487 (Step 8), *Response Sheet*, IG p. 302, Student Notebook Master No. 26, IG p. 358, Student Notebook Master No. 38, IG p. 511, Student Notebook Master No. 63, *Review Notebook Entries*, IG p. 255 (Step 10), IG p. 311 (Step 9), IG p. 370 (Step 15), IG. 464 (Step 19), IG. 537 (Step 15)
BM: *Assessment Coding Guide*, pp. 24-25 (Item 6), pp. 26-27 (Item 1), pp. 28-29 (Items 2 and 3), pp. 30-31 (Items 4 and 5), pp. 32-33 (Item 6), pp. 36-37 (Item 4), pp. 38-39 (Item 6), pp. 40-41 (Item 8), pp. 42-43 (Item 1), pp. 44-45 (Items 2 and 4), pp. 46-47 (Items 5 and 6), pp. 48-49 (Item 8), pp. 58-59 (Item 2), pp. 60-61 (Item 3), pp. 62-63 (Item 4), pp. 64-65 (Items 6 and 7), pp. 68-69 (Item 11)
SRB: pp. 28-32, 33-39, 89-100

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.

- Develop a model to predict and/or describe phenomena.

FOSS Chemical Interactions
IG: pp. 232, 233, 235, 241 (D), 246, 247, 255, 276, 279, 292, 302, 309, 311, 337, 339 (Step 15), 343, 344, 346, 368, 370, 488, 489, 497, 532, 533, 535
TR: pp. C14-C17, C44-C51

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Gases and liquids are made of molecules or inert atoms that are moving about relative to each other.
- In a liquid, the molecules are constantly in contact with others; in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and may vibrate in position but do not change relative locations.
- The changes of state that occur with variations in temperature or pressure can be described and predicted using these models of matter.

FOSS Chemical Interactions
IG: pp. 201, 210, 233 (Step 12), 236 (Step 17), 245-247 (Steps 1-4), 255, 259, 266, 274 (Step 1), 279-280 (Step 12), 289-290 (Step 9), 291 (Step 11), 467, 478, 488-489 (Step 11), 497, 533 (Step 6), 534 (Step 10), 537
SRB: pp. 28-32, 33-39, 89-100
SNM: Nos. 17, 18, 50, 63
DOR: "Gas in a Syringe"
"Energy Transfer by Collision"
"Mixing Hot and Cold Water"
Hoar Frost

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Chemical Interactions
IG: pp. 276, 279, 289, 290, 291, 302, 308, 311, 437, 447, 487, 497,498, 511, 525, 527, 535, 537
TR: pp. D10, D14-D15, D26-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

	"Particles in Solids, Liquids, and Gases" "Thermometer" **PS3.A: Definitions of Energy** • The term "heat" as used in everyday language refers both to thermal energy (the motion of atoms or molecules within a substance) and the transfer of that thermal energy from one object to another. In science, heat is used only for this second meaning; it refers to the energy transferred due to the temperature difference between two objects. • The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule (whichever is the appropriate building block for the system's material). The details of that relationship depend on the type of atom or molecule and the interactions among the atoms in the material. Temperature is not a direct measure of a system's total thermal energy. The total thermal energy (Sometimes called the total internal energy) of a system depends jointly on the temperature, the total number of atoms in the system, and the state of the material. ***FOSS Chemical Interactions*** **IG:** pp. 266, 279, (Step 12), 289 (Step 9), 311, 315, 326, 343-346 (Steps 4-11), 364 (Step 3), 365-366 (Step 5), 367 (Step 10), 368-369 (Step 12), 370 **SRB:** pp. 35-39, 46-55 **DOR:** "Energy Transfer by Collision" "Gas in a Syringe" "Energy Flow" "Mixing Hot and Cold Water" *Hoar Frost* "Particles in Solids, Liquids, and Gases" "Thermometer"	

GRADE 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.14

Students who demonstrate understanding can:
Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

FOSS Chemical Interactions
IG: pp. 59, 61, 63, 65, 73, 77, 79, 107, 109,117, 137 (Step 6), 140-141(Step 15), 146,147 (Step 33), 467, 448 (Step 5), 487 (Step 10), 497 (Step 14), 541, 550, 586 (Step 7), 587 (Step 12), 588-589 (Steps 14-16), 613-614 (Step 6), 617 (Step 12), 618 (Step 16), 620
EA: *Notebook Entry*, IG p. 147 (Step 33), IG p. 439 (Step 17), IG p. 464 (Step 19), *Performance Assessment***,** IG pp. 139-140 (Step 13)**,** IG p. 588 (Step 13)**,** IG p. 447 (Step 4), *Response Sheet***,** IG p. 619, Student Notebook Master No. 17, *Review Notebook Entries***,** IG p. 147 (Step 33)**,** IG p. 198 (Step 16)**,** IG p. 255 (Step 10)**,** IG p. 464 (Steps 19)**,** IG p. 620 (Steps 20)
BM: *Assessment Coding Guide,* pp. 12-13 (Item 4), pp. 16-17 (Item 7), pp. 22-23 (Items 4 and 5), pp. 44-45 (Item 3), pp. 48-49 (Item 7), pp. 50-51 (Item 1), pp. 56-57 (Item 8), pp. 58-59 (Item 1), pp. 60-61 (Item 3), pp. 68-69 (Item 10)
SRB: pp. 98-99, 118-129, 132, 146, 165-173

Science and Engineering Practices

Analyzing and Interpreting Data
Analyzing data in 6–8 builds on K–5 and progresses to extending quantitative analysis to investigations, distinguishing between correlation and causation, and basic statistical techniques of data and error analysis.

- Analyze and interpret data to determine similarities and differences in findings.

FOSS Chemical Interactions
IG: pp. 107, 115, 126 140, 147, 447, 451, 464, 487, 551, 584, 586, 616, 618
TR: pp. C22-C24, C56-C61

Disciplinary Core Ideas

PS1.A: Structure and Properties of Matter

- Each pure substance has characteristic physical and chemical properties (for any bulk quantity under given conditions) that can be used to identify it.

FOSS Chemical Interactions
IG: pp.107, 109,117, 137 (Step 6), 140-141(Step 15), 146,147 (Step 33), 467, 448 (Step 5), 487 (Step 10), 497 (Step 14)
SRB: pp. 98-99, 132, 165-173
SNM: Nos. 2-6
DOR: "Explore Dissolving"
"Two-Substance Reactions"

PS1.B: Chemical Reactions

- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. (MS-PS1-2)

FOSS Chemical Interactions
IG: pp. 541, 550, 586 (Step 7), 587 (Step 12), 588-589 (Steps 14-16), 613-614 (Step 6), 617 (Step 12), 618 (Step 16), 620
SRB: pp. 118-129, 146

Crosscutting Concepts

Patterns

- Macroscopic patterns are related to the nature of microscopic and atomic-level structure.

FOSS Chemical Interactions
IG: pp. 107, 116,137, 140, 141, 142, 147, 164, 171, 172, 428, 447 (Step 4), 480
TR: pp. D14, 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

	SNM: Nos. 69-71 **DOR:** "Two-Substance Reactions"	

Connections to Nature of Science

Scientific Knowledge is Based on Empirical Evidence

- Science knowledge is based upon logical and conceptual connections between evidence and explanations. (MS-PS1-2)

FOSS Chemical Interactions
IG: pp. 137 (Step 9) 140-142 (Steps 15-18), 145 (Step 28), 586-587 (Steps 7-9), 618 (Step 16)
SRB: pp. 134-140, 148-154, 155-160

GRADE 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.15

Students who demonstrate understanding can:
Develop and use a model to describe how the total number of atoms does not change in a chemical reaction and thus mass is conserved.

IG: pp. 59, 61, 65, 79, 541, 585-586 (Steps 5-7), 618-619 (Step 16), 620, 634, 637, 646-647 (Steps 11-12), 648
EA: *Notebook Entry*, IG p. 574 (Step 20), IG p. 648 (Step 15), Student Notebook Master No. 72, *Performance Assessment*, **IG:** p. 588 (Step 13), *Response Sheet*, IG p. 619, Student Notebook Master No. 71, *Review Notebook Entries*, IG p. 147 (Step 33), IG p. 255 (Step 10)
BM: *Assessment Coding Guide,* pp. 50-51 (Items 1- 3), pp. 56-57 (Item 9), pp. 63-63 (Item 5), pp. 66-67 (Item 8)
SRB: pp.118-129

Science and Engineering Practices

Developing and Using Models
Modeling in 6–8 builds on K–5 and progresses to developing, using and revising models to describe, test, and predict more abstract phenomena and design systems.
- Develop a model to describe unobservable mechanisms.

FOSS Chemical Interactions
IG: pp. 551, 559, 587, 588, 589, 590, 613, 620, 635, 645, 646, 653
TR: pp. C14-C17, C44-C51

Disciplinary Core Ideas

PS1.B: Chemical Reactions
- Substances react chemically in characteristic ways. In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants.
- The total number of each type of atom is conserved, and thus the mass does not change.

FOSS Chemical Interactions
IG: pp. 541, 585-586 (Steps 5-7), 618-619 (Step 16), 620, 634, 637, 646-647 (Steps 11-12), 648
SRB: pp.118-129
SNM: Nos. 69-71

Crosscutting Concepts

Energy and Matter
- Matter is conserved because atoms are conserved in physical and chemical processes.

FOSS Chemical Interactions
IG: pp. 552, 583, 584, 585, 586, 587, 588, 589, 590, 613, 616, 617, 618, 620, 636, 647, 648, 654
TR: pp. D12-D13, D17, D38-D43

Connections to Science

Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena
- Laws are regularities or mathematical descriptions of natural phenomena. (MS-PS1-5)

FOSS Chemical Interactions
IG: pp. 552, 553, 603 (Q), 619 (Step 16), 620, 655
SRB: p. 138

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 8

Matter and its Interactions

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.16

Students who demonstrate understanding can:
Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.*

FOSS Chemical Interactions
IG: pp. 59, 75, 467, 474-475, 478, 521, 523 (Steps 12-13), 524 (Step 15)
EA: *Performance Assessment*, IG p. 525 (Step 18), *Review Notebook Entries*, IG p. 537 (Step 15)
BM: *Assessment Coding Guide*, pp. 48-49 (Item 7)
SRB: p. 131, 183-184

Science and Engineering Practices

Constructing Explanations and Designing Solutions
Constructing explanations and designing solutions in 6–8 builds on K–5 experiences and progresses to include constructing explanations and designing solutions supported by multiple sources of evidence consistent with scientific knowledge, principles, and theories.

- Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints.

FOSS Chemical Interactions
IG: pp. 467, 478, 479, 523 (Step 13), 524, 525, 527
SRB: pp.183-184
TR: pp. C28-C32, C64-C73

Disciplinary Core Ideas

PS1.B: Chemical Reactions

- Some chemical reactions release energy, others store energy.

FOSS Chemical Interactions Module
***IG:** pp. 467, 474-475, 478, 521, 523 (Steps 12-13), 524 (Step 15)*
***SRB:** p. 131*
***SNM:** No. 64*

ETS1.B: Developing Possible Solutions

- A solution needs to be tested, and then modified on the basis of the test results, in order to improve it.

FOSS Chemical Interactions
***IG:** pp. 478, 524-527 (Steps 15-26)*
***SRB:** pp.183-184*
***SNM:** no. 65*

ETS1.C: Optimizing the Design Solution

- Although one design may not perform the best across all tests, identifying the characteristics of the design that performed the best in each test can provide useful information for the redesign process—that is, some of the characteristics may be incorporated into the new design.
- The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution.

Crosscutting Concepts

Energy and Matter

- The transfer of energy can be tracked as energy flows through a designed or natural system.

FOSS Chemical Interactions
IG: pp. 480, 527, 531, 532, 534, 535, 537
DOR: "Energy Flow"
TR: pp. D12-D13, D17, D38-D43

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

	FOSS Chemical Interactions Module ***IG:*** *pp. 478, 524-527 (Steps 15-26)* ***SRB:*** *pp.183-184* ***SNM:*** *No. 65*	

GRADE 8

Earth and Human Activity

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.17

Students who demonstrate understanding can:
Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

FOSS Planetary Science
IG: pp. 55, 57, 69, 436, 439, 473-488, 473, 474, 475, 476 (Step 13), 477, 478, 480 (B), 481 (D), 485 (L), 486 (N), 487, 488
EA: *Performance Assessment,* IG p. 475 (Step 10) SNM No. 51, *Review Notebook Entries*, IG p. 488 (Step 22)
BM: *Assessment Coding Guide,* pp. 2-3 (Item 2b), pp. 48-49 (Item 6), pp. 56-57 (Item 8)
SRB: p. 166

FOSS Electromagnetic Force
IG: pp. 51, 59, 259, 266, 285 (Step 2), 288, 289, 291 (Steps 16-17), 292 (Step 22)
EA: *Notebook Entry,* IG p. 301 (Step 27), *Performance Assessment,* IG pp. 292-293 (Step 19)
BM: *Assessment Coding Guide,* pp. 34-35 (Item 4), pp. 48-49 (Item 14)
SRB: pp. 54-55, 62

Science and Engineering Practices

Engaging in Argument from Evidence
Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world(s).

- Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem.

FOSS Planetary Science
IG: pp. 437, 473 (Step 6), 474 (Step 8), 475 (Step 10), 476 (Step 12)
SRB: p. 104
DOR: "Earth Images Comparison Database"

FOSS Electromagnetic Force
IG: pp. 292, 300 (M)
TR: pp. C33-C38, C72-C73

Disciplinary Core Ideas

ESS3.C: Human Impacts on Earth Systems

- Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

FOSS Planetary Science Module
IG: pp. 436, 439, 473-488, 473, 474, 475, 476 (Step 13), 477, 478, 480 (B), 481 (D), 485 (L), 486 (N), 487, 488
SRB: p. 166
SNM: No. 51
DOR: *"World Population"*
"Earth Images Comparison Database"

FOSS Electromagnetic Force
IG: pp. 259, 266, 285 (Step 2), 288, 289, 291 (Steps 16-17), 292 (Step 22)
SRB: pp. 54-55, 62

Crosscutting Concepts

Cause and Effect

- Cause and effect relationships may be used to predict phenomena in natural or designed systems.

FOSS Planetary Science
IG: pp. 438, 475, 477, 482, 483 (H), 486 (N), 488
SRB: pp. 97-104

FOSS Electromagnetic Force
IG: pp. 292
TR: pp. D10, D14, D22-D31

Connections to Nature of Science

Science Addresses Questions About the Natural and Material World

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

- Science knowledge can describe consequences of actions but does not necessarily prescribe the decisions that society takes. (MS-ESS3-4)

FOSS Planetary Science
IG: pp. 438, 473 (Step 5), 474-475 (Steps 8, 9), 476 (Step 12), 482 (Notes E, F), 484 (J), 487 (Steps 19, 21), 488
SRB: pp. 97-104

FOSS Electromagnetic Force
IG: pp. 287 (Step 10), 288, 289
SRB: pp. 49-51

GRADE 8

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.18

Students who demonstrate understanding can:
Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.

FOSS Gravity and Kinetic Energy
IG: pp. 51, 57, *46, 264, 275, 287 (Step 29)*
EA: *Notebook Entry,* IG p. 275 (Step 12), IG p. 276 (Step 14)
EA: *Performance Assessment,* IG p. 277 (Step 20)
EA: *Review Notebook Entries***,** IG p. 189 (Step 26)
BM: *Assessment Coding Guide***,** pp. 38-39 (Item 8)

FOSS Electromagnetic Force
IG: pp. 248 (Steps 4-5)

FOSS Chemical Interactions
IG: pp. 387-413
SRB: pp. 56-63

FOSS Waves
IG: pp. 49, 53
EA: *Notebook Entry,* IG p. 155 (Step 13), IG p. 167 (Step 14)
EA: *Performance Assessment,* IG pp. 167-168 (Steps 15-16)

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence Engaging in argument from evidence in 6–8 builds on K–5 experiences and progresses to constructing a convincing argument that supports or refutes claims for either explanations or solutions about the natural and designed world. • Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 276 (Step 18), 277 **TR:** pp. C33-C38, C72-C73 ***FOSS Chemical Interactions*** **IG:** pp. 392	**ETS1.B: Developing Possible Solutions** • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. • There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. ***FOSS Electromagnetic Force*** ***IG:*** *pp. 248 (Steps 4-5)* ***FOSS Gravity and Kinetic Energy*** ***IG:*** *pp. 46, 264, 275, 287 (Step 29)* ***SRB:*** *pp. 52,53, 55* ***DOR:*** *Understanding Car Crashes-It's Basic Physics*	

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 8

Engineering Design

The following FOSS program elements address the standards indicated below. References are selected and do not reflect every possible alignment to a standard.

Standard S.8.19

Students who demonstrate understanding can:
Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.

FOSS Gravity and Kinetic Energy
IG: pp. 49, 57
EA: *Notebook Entry,* IG p. 277 (Step 19), IG p. 279 (Step 24)
EA: *Performance Assessment,* IG p. 277 (Step 20)
BM: *Assessment Coding Guide*, pp. 38-39 (Item 8)

FOSS Waves
IG: pp. 49, 53
EA: *Notebook Entry,* IG p. 155 (Step 13), IG p. 167 (Step 14)
EA: *Performance Assessment,* IG pp. 167-168 (Steps 15-16)

FOSS Chemical Interactions
IG: pp. 387-413
SRB: pp. 56-63

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in 6–8 builds on K–5 experiences and progresses to developing, using, and revising models to describe, test, and predict more abstract phenomena and design systems. • Develop a model to generate data to test ideas about designed systems, including those representing inputs and outputs ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 257, 265, 277, 279 (Step 24) **SRB:** pp. 50-56, 71 ***FOSS Waves Module*** **IG:** pp. 123, 161, 164, 167 **TR:** pp. C14-C17, C46-C51	**ETS1.B: Developing Possible Solutions** • A solution needs to be tested, and then modified on the basis of the test results, in order to improve it. • Models of all kinds are important for testing solutions. ***Electromagnetic Force*** **IG:** pp. 248-251 ***FOSS Gravity and Kinetic Energy*** **IG:** pp. 257, 259, 264, 267, 275-276 (Step 13), 277, 287 (Step 29) **SRB:** pp. 50-56 **DOR:** *Understanding Car Crashes-It's Basic Physics* ***FOSS Waves*** **IG:** pp. 121, 151 (C), 147,172 (Step 26-27), 173 **SRB:** pp. 15, 23, 83 **ETS1.C: Optimizing the Design Solution**	

	• The iterative process of testing the most promising solutions and modifying what is proposed on the basis of the test results leads to greater refinement and ultimately to an optimal solution. ***FOSS Electromagnetic Force*** **IG:** pp. 250-251 (Step 12), 255 **SRB:** p. 74	