



FULL OPTION SCIENCE SYSTEM

Grades K-8

Correlation With

Rhode Island Grade Span Expectations



Rhode Island Grade Span Expectations

Correlation to

Full Option Science System (FOSS)

The following is a correlation of the grades K-2, 3-4 and 5-6, and 7-8 portions of the Rhode Island Grade Span Expectations to the Full Option Science System. This correlation shows representative examples of investigations and activities from the FOSS program that address the expectations. A citation does not include all of the investigations or activities from FOSS that might address a particular expectation.

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Earth and Space Science Grades K-2

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (K-4) INQ –1

Given certain earth materials (soils, rocks or minerals) use physical properties to sort, classify, and describe them.

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS1 (K-2)–1 Students demonstrate an understanding of earth materials by ...</p> <p>1a describing, comparing, and sorting rocks and soils by similar or different physical properties (e.g., size, shape, color, texture, smell, weight).</p> <p>1b recording observations/data about physical properties.</p> <p>1c using attributes of properties to state why objects are grouped together (e.g., rocks that are shiny or not shiny).</p> | <p>Pebbles, Sand and Silt Investigation 1, Parts 1-5, pp. 8-29 Investigation 2, Parts 1-4, pp. 8-29 Investigation 4, Parts 1-3, pp. 8-25 Science Stories, pp. 3-9</p> <p>Pebbles, Sand and Silt Investigation1, Parts 2, 4, pp. 13-17, 22-25 Investigation 2, Parts 1-4, pp. 8-29 Investigation 4, Part 1, pp. 8-14</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 3-4, pp. 18-25 Investigation 2, Part 2, pp. 14-17</p> |

ESS1 (K-4) INQ –2

Use results from an experiment to draw conclusions about how water interacts with earth materials (e.g., percolation, erosion, frost heaves).

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (K-2) –2 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>2a. conducting tests on how different soils retain water (e.g., how fast does the water drain through?).</p> | <p>Pebbles, Sand and Silt Investigation 4, Home/School Connection, p. 28</p> |

ESS 1 (K-4) NOS –3

Explain how the use of scientific tools helps to extend senses and gather data about weather. (i.e., weather/wind vane: direction; wind sock: wind intensity; anemometer: speed; thermometer: temperature; meter sticks/rulers: snow depth; rain gauges: rain amount in inches).

| Grade Span Expectations | FOSS |
|--|--|
| <p>ESS 1(K-2)–3 Students demonstrate an understanding of how the use of scientific tools helps to extend senses and gather data by...</p> <p>3a using scientific tools to extend senses and gather data about weather (e.g., weather/wind vane: direction; wind sock: wind intensity; anemometer: speed; thermometer: temperature; meter sticks/rulers: snow depth;</p> | <p>Trees Tools for Observing Weather, pp.6-24</p> <p>Air and Weather Investigation 2, Parts 2, 4, pp. 14-19, 24-27 Investigation 3, Parts 2, 4, pp. 12-16, 22-27</p> |

| | |
|--------------------------------------|--|
| rain gauges: rain amount in inches). | |
|--------------------------------------|--|

ESS1 (K-4) INQ+SAE –4

Explain how wind, water, or ice shape and reshape the earth.

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS1 (K-2) –4 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>4a observing and recording seasonal and weather changes throughout the school year.</p> | <p>Air and Weather Investigation 2, Part 1, pp. 8-13 Investigation 4, Parts 1-2, pp. 8-11</p> |

ESS1 (K-4) POC –5

Based on data collected from daily weather observations, describe weather changes or weather patterns.

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS1 (K-2) –5 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>5a observing, recording, and summarizing local weather data.</p> <p>5b observe how clouds are related to forms of precipitation (e.g., rain, sleet, snow).</p> | <p>Air and Weather Investigation 2, Part 1, pp. 8-13 Investigation 4, Parts 1-2, pp. 8-11</p> <p>Air and Weather Investigation 2, Part 3, pp. 20-23</p> |

ESS1 (K-4) FAF -6

Given information about earth materials explain how their characteristics lend themselves to specific uses

| Grade Span Expectations | FOSS |
|--|--|
| <p>ESS1 (K-2) –6 Students demonstrate an understanding of properties of earth materials by...</p> <p>6a identifying which materials are best for different uses (e.g., soils for growing plants, sand for the sand box).</p> | <p>Pebbles, Sand and Silt Investigation 3, Parts -5, pp. 8-29 Science Stories, pp. 16-19, 24-25</p> |

ESS2 - The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

No further targets for EK ESS2 at the K-4 Grade Span

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS2 (K-2) –7 Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by ...</p> <p>7a observing that the sun can only be seen in the daytime, but the moon can be seen sometimes at night and sometimes during the day.</p> <p>7b observing that the sun and moon appear to move slowly across the sky.</p> | <p>Air and Weather Investigation 4, Part 3, pp. 19-24</p> <p>Air and Weather Investigation 4, Part 3, pp. 19-24</p> |

| | |
|--|--|
| 7c observing that the moon looks slightly different from day to day. | Air and Weather Investigation 4, Part 3, pp. 19-24 |
|--|--|

No further targets for EK ESS2 at the K-4 Grade Span

| Grade Span Expectations | FOSS |
|--|------|
| ESS2 (K-2)-8 Students demonstrate an understanding of characteristics of the solar system by ... No GSEs for this Assessment Target | |

ESS3 - The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time

No further targets for EK ESS2 at the K-4 Grade Span *The GSEs listed below are assessed at the local level only.*

| Grade Span Expectations | FOSS |
|---|--|
| ESS3 (K-2) –9 Students demonstrate understanding of processes and change over time within the system of the universe (Scale, Distances, Star Formation, Theories, Instrumentation) by... 9a observing that there are more stars in the sky than can easily be counted, but they are not scattered evenly and not all the same in brightness. | Air and Weather Investigation 4, Part 3, pp. 19-24 |

Earth and Space Science Grades 3-4

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (K-4) INQ –1

Given certain earth materials (soils, rocks or minerals) use physical properties to sort, classify, and describe them.

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (3-4) –1 Students demonstrate an understanding of earth materials by ...</p> <p>1a describing, comparing, and sorting rocks, soils, and minerals by similar or different physical properties (e.g., size, shape, color, texture, smell, weight, temperature, hardness, composition).</p> <p>1b recording and analyzing observations/data about physical properties (e.g., within a grouping, which characteristics are the same and which are different).</p> <p>1c citing evidence (e.g., prior knowledge, data) to support why rocks, soils, or minerals are classified/not classified together.</p> <p>1d identifying the four basic materials of the earth (water, soil, rocks, air).</p> | <p>Earth Materials Investigation 1, Parts 1-3, pp. 8-29 Investigation 2, Parts 1-2, pp. 8-21 Investigation 4, Part 1, pp. 8-13 FOSS Web, Activity: Rock Database</p> <p>Earth Materials Investigation 1, Parts 2-3, pp. 16-29 Investigation 2, Parts 1-2, pp. 8-21 Investigation 4, Part 1, pp. 8-13</p> <p>Earth Materials Investigation 2, Parts 1-2, pp. 8-21 Investigation 4, Part 1, pp. 8-13</p> <p>FOSS provides the opportunity to address this expectation. See below: Earth Materials Investigations 1-4 Science Stories, pp. 12-15, 30-37 Water Investigations 1-3 Science Stories, pp. 1-2, 4-9, 12-17</p> |

ESS1 (K-4) INQ –2

Use results from an experiment to draw conclusions about how water interacts with earth materials (e.g., percolation, erosion, frost heaves).

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS1 (3-4)–2 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>2a conducting investigations and using observational data to describe how water moves rocks and soils.</p> | <p>See grade 5 module <u>Landforms</u>.</p> |

ESS 1 (K-4) NOS –3

Explain how the use of scientific tools helps to extend senses and gather data about weather. (i.e., weather/wind vane: direction; wind sock: wind intensity; anemometer: speed; thermometer: temperature; meter sticks/rulers: snow depth; rain gauges: rain amount in inches).

| Grade Span Expectations | FOSS |
|---|------|
| <p>ESS 1(3-4) –3 Students demonstrate an understanding of</p> | |

| | |
|---|---|
| <p>how the use of scientific tools helps to extend senses and gather data by...</p> <p>3a <u>explaining</u> how the use of scientific tools helps to extend senses and gather data about weather (i.e., weather/wind vane: direction; wind sock: wind intensity; anemometer: speed; thermometer: temperature; meter sticks/rulers: snow depth; rain gauges: rain amount in inches).</p> <p>3b <u>selecting</u> appropriate tools for a given task and <u>describing</u> the information they will provide.</p> | <p>See grade 2 module <u>Air and Weather</u>.</p> <p>See grade 2 module <u>Air and Weather</u>.</p> |
|---|---|

ESS1 (K-4) INQ+SAE –4

Explain how wind, water, or ice shape and reshape the earth.

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS1 (3-4) –4 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>4a <u>investigating local landforms and how wind, water, or ice have shaped and reshaped them (e.g. severe weather).</u></p> <p>4b <u>using or building models to simulate the effects of how wind and water shape and reshape the land (e.g., erosion, sedimentation, deposition, glaciation).</u></p> <p>4c <u>identifying sudden and gradual changes that affect the Earth (e.g. sudden change = flood; gradual change = erosion caused by oceans).</u></p> | <p>Earth Materials Science Stories, pp. 5-7</p> <p>See grade 5 module <u>Landforms</u>.</p> <p>Water Science Stories, pp. 22-23 See grade 5 module <u>Landforms</u>.</p> |

ESS1 (K-4) POC –5

Based on data collected from daily weather observations, describe weather changes or weather patterns.

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (3-4) –5 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>5a <u>observing, recording, comparing, and analyzing weather data to describe weather changes or weather patterns.</u></p> <p>5b <u>describing water as it changes into vapor in the air and reappears as a liquid when it's cooled.</u></p> <p>5c <u>explaining how this cycle of water relates to weather and the formation of clouds.</u></p> | <p>See grade 2 module <u>Air and Weather</u>.</p> <p>Water Investigation 3, Parts 1-4, pp. 8-26 Science Stories, p. 13-16 FOSS Web, Activity: Evaporation</p> <p>Water Science Stories, pp. 14-16</p> |

ESS1 (K-4) FAF -6

Given information about earth materials explain how their characteristics lend themselves to specific uses

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS1 (3-4)-6 Students demonstrate an understanding of properties of earth materials by...</p> <p>6a <u>determining and supporting explanations of their uses (e.g., best soils to grow plants, best building material for a specific purpose, determining which rock size will best prevent erosion).</u></p> | <p>Earth Materials Science Stories, pp. 12-13, 24-29</p> <p>Water Science Stories, p.23</p> |

ESS2 – The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

No further targets for EK ESS2 at the K-4 Grade Span

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS2 (3-4)-7 Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by ...</p> <p>7a <u>observing that the sun, moon, and stars appear to move slowly across the sky.</u></p> <p>7b <u>observing that the moon looks slightly different from day to day, but looks the same again in about 4 weeks.</u></p> <p>7c <u>recognizing that the rotation of the Earth on its axis every 24 hours produces the day/night cycle.</u></p> | <p>Ideas and Inventions Science Stories, pp. 33-34, 37</p> <p>Sun, Moon and Stars Investigation 1-3, all parts Science Resources, pp. 1-6, 10-11, 14, 30-32, 37, 48-49</p> <p>Ideas and Inventions Science Stories, pp. 34-36</p> <p>Sun, Moon and Stars Investigation 2, parts 1-2, pp. 79-100 Science Resources, pp. 19-32</p> <p>Sun, Moon and Stars Science Resources, p. 3</p> |

No further targets for EK ESS2 at the K-4 Grade Span

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS2 (3-4)-8 Students demonstrate an understanding of characteristics of the solar system by ...</p> <p>8a <u>recognizing that: the sun is the center of our solar system; the Earth is one of several planets that orbits the sun; and the moon orbits the Earth.</u></p> <p>8b <u>recognizing that it takes approximately 365 days for the Earth to orbit the sun.</u></p> | <p>Sun, Moon and Stars Science Resources, pp. 16-17</p> |

No further targets for EK ESS2 at the
 K-4 Grade Span *The GSEs listed below are assessed at the local level only.*

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS3 (3-4)-9 Students demonstrate understanding of processes and change over time within the system of the universe (Scale, Distances, Star Formation, Theories, Instrumentation) by...</p> <p>9a <u>recognizing that throughout history people have identified patterns of stars that we call constellations.</u></p> | <p>Ideas and Inventions Science Stories, p. 37 Sun, Moon and Stars Investigation 3, Parts 1-2, pp. 114-130 Science Resources, pp. 35-39, 49</p> |

Earth and Space Science Grades 5-6

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (5-8) INQ+ POC –1

Use geological evidence provided to support the idea that the Earth’s crust/lithosphere is composed of plates that move.

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (5-6)–1 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>1a <u>identifying and describing the layers of the earth.</u></p> <p>1b <u>plotting location of volcanoes and earthquakes and explaining the relationship between the location of these phenomena and faults.</u></p> | <p>Landforms Science Stories, pp. 22-23</p> <p>Earth History Resources, pp. 100-103</p> |

ESS1 (5-8) SAE–2

Explain the processes that cause the cycling of water into and out of the atmosphere and their connections to our planet’s weather patterns.

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (5-6)–2 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>2a <u>diagramming, labeling and explaining the processes of the water cycle including evaporation, precipitation, and run-off, condensation, transpiration, and groundwater.</u></p> <p>2b <u>explaining how condensation of water vapor forms clouds which affects climate and weather.</u></p> <p>2c <u>developing models to explain how humidity, temperature, and altitude affect air pressure and how this affects local weather.</u></p> <p>2d <u>identifying composition and layers of earth’s atmosphere.</u></p> | <p>Solar Energy Science Stories, pp. 22-24</p> <p>Water Planet Investigation 4, Part 1, pp. 184-197 Science Resources, pp. 67-70</p> <p>Weather and Water Investigation 7, Parts 1-2, pp. 232-243 CD, Cycles: Water Cycle</p> <p>Solar Energy Science Stories, pp. 22-24</p> <p>Water Planet Science Resources, pp. 33-37, 68-70</p> <p>Weather and Water Investigation 6, Part 4, pp. 206-213 Resources, pp. 33, 37-42</p> <p>Water Planet Investigation 3, Part 3, pp. 145-157 Science Resources, pp. 52-57</p> <p>Weather and Water Investigation 8, Part 2, pp. 258-264 Resources, pp. 48-55</p> <p>Weather and Water Investigation 2, Part 2, pp. 76-80 Resources, pp. 6-11</p> |

ESS1 (5-8) POC –3

Explain how earth events (abruptly and over time) can bring about changes in Earth’s surface: landforms, ocean floor, rock features, or climate.

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS1 (5-6)–3 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>3a <u>describing events and the effect they may have on climate (e.g. El Nino, deforestation, glacial melting, and an increase in greenhouse gases).</u></p> | <p>Weather and Water Investigation 9, Part 4, pp. 315-318 Resources, pp. 63-65</p> |

ESS1 (5-8) SAE+ POC –4

Explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS1 (5-6)–4 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>4a <u>explaining how differential heating and convection affect Earth’s weather patterns.</u></p> <p>4b <u>describing how differential heating of the oceans affects ocean currents which in turn influence weather and climate.</u></p> <p>4c <u>explaining the relationship between differential heating/convection and the production of winds.</u></p> <p>4d <u>analyzing global patterns of atmospheric movements to explain effects on weather.</u></p> <p>4e <u>predicting temperature and precipitation changes associated with the passing of various fronts.</u></p> | <p>Solar Energy Science Stories, pp. 22-24</p> <p>Water Planet Investigation 3, Part 2, pp. 136-144 Science Resources, pp. 42-51</p> <p>Weather and Water Resources, pp. 53-55</p> <p>Solar Energy Science Stories, p. 23</p> <p>Water Planet Science Resources, pp. 77, 79</p> <p>Solar Energy Science Stories, p. 23</p> <p>Water Planet Investigation 3, Part 2, pp. 136-144 Science Resources, pp. 42-51</p> <p>Weather and Water Investigation 8, Part 2, pp. 265-270 Resources, pp. 63-55 CD, Climate Factors: Local Winds</p> <p>Solar Energy Science Stories, pp. 22-24</p> <p>Water Planet Science Resources, pp. 46-51</p> <p>Weather and Water Resources, pp. 53-55</p> <p>Solar Energy Science Stories, p. 25</p> <p>Water Planet Science Resources, pp. 84-85</p> <p>Weather and Water Investigation 9, Part 2, pp. 303-310 Resources, pp. 85-86</p> |

ESS1 (5-8) INQ+ POC –5

Using data about a rock’s physical characteristics make and support an inference about the rock’s history and connection to rock cycle.

| Grade Span Expectations | FOSS |
|---|--|
| <p><i>ESS1 (5-6)-5</i> <i>Students demonstrate an understanding of processes and change over time by ...</i></p> <p>5a <u>representing the processes of the rock cycle in words, diagrams, or models.</u></p> | <p>Earth History Investigation 4, Parts 5-6, pp. 150-162 Investigation 5, Parts 1-2, pp. 175-182 Investigation 8, Parts 1-2, pp. 254-265 Resources, pp. 93-97</p> |

| | |
|--|---|
| <p>5b <u>citing evidence and developing a logical argument to explain the formation of a rock, given its characteristics and location. (e.g. classifying rock type using identification resources).</u></p> | <p>CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks</p> <p>Earth History Investigation 4, Parts 5-6, pp. 150-162 Investigation 5, Parts 1-2, pp. 175-182 Investigation 8, Parts 1-2, pp. 254-265 Resources, pp. 93-97 CD, Geology Lab: Formation of Metamorphic, Sedimentary and Igneous Rocks CD, Rock Database</p> |
|--|---|

ESS2 - The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

ESS2 (5-8) MAS –6

Compare and contrast planets based on data provided about size, composition, location, orbital movement, atmosphere, or surface features (includes moons).

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS2 (5-6)-6 Students demonstrate an understanding of characteristics of the solar system by ...</p> <p>6a <u>identifying and comparing the size, location, distances, and movement (e.g. orbit of planets, path of meteors) of the objects in our solar system.</u></p> <p>6b <u>comparing the composition, atmosphere, and surface features of objects in our solar system.</u></p> | <p>Solar Energy Science Stories, pp. 40-43</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, pp. 1-13</p> <p>Planetary Science Resources, pp. 84-89 CD, Notebooks: Solar System</p> <p>Solar Energy Science Stories, pp. 40-43</p> <p>Water Planet Investigation 1, Part 1, pp. 50-58 Science Resources, pp. 4-13</p> <p>Planetary Science Investigation 10, pp. 318-324 Resources, pp. 84-89 CD, Notebooks: Solar System</p> |

ESS2 (5-8) NOS –7 Explain how technological advances have allowed scientists to re-evaluate or extend existing ideas about the solar system.

| Grade Span Expectations | FOSS |
|--|------|
| <p>ESS2 (5-6)-7 <i>Students demonstrate an understanding of how technological advances have allowed scientists to re-evaluate or extend existing ideas about the solar system by...</i></p> <p style="text-align: center;">No GSEs for the ESS2 (5-8) NOS-7 Assessment Target</p> | |

ESS2 (5-8) SAE+ POC –8

Explain temporal or positional relationships between or among the Earth, sun, and moon (e.g., night/day, seasons, year, tides) or how gravitational force affects objects in the solar system (e.g., moons, tides, orbits, satellites).

| Grade Span Expectations | FOSS |
|--|---|
| <p><i>ESS2 (5-6)-8 Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by ...</i></p> <p>8a <u>using models to describe the relative motion/position of the Earth, sun and moon.</u></p> <p>8b <u>explaining night/day, seasons, year, and tides as a result of the regular and predictable motion of the Earth, sun, and moon.</u></p> <p>8c <u>using a model of the Earth, sun and moon to recreate the phases of the moon.</u></p> <p>ESS2 (5-6) -8 Students demonstrate an understanding of gravitational relationships between or among objects of the solar system by ...</p> <p>8d <u>defining the Earth’s gravity as a force that pulls any object on or near the Earth toward its center without touching it.</u></p> | <p>Planetary Science Investigation 3, Part 2, pp. 94-98 Investigation 9, Parts 2-4, pp. 288-301 CD, Day/Night Simulation</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98 CD, Day/Night Simulation</p> <p>Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 9, Parts 2-4, pp. 288-301 CD, Phases of the Moon</p> <p>Models and Designs Science Stories, pp. 40-41</p> <p>Water Planet Investigation 1, Part 2, pp. 59-66 Science Resources, pp. 16-17</p> <p>Force and Motion Investigation 7, Part 1, pp. 256-261 Resources, pp. 62-69</p> <p>Planetary Science Resources, p. 70</p> |

ESS3 - The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.

No further targets for EK ESS3 at the 5-8 Grade Span

The GSEs listed below are assessed at the local level only

| Grade Span Expectations | FOSS |
|---|---|
| <p>ESS3 (5-6)–9 Students demonstrate an understanding of the structure of the universe by ...</p> <p>9a <u>describing the apparent motion/position of the objects in the sky. (e.g. constellations, planets).</u></p> <p>9b <u>identifying the sun as a medium-sized star located near the edge of a disk-shaped galaxy</u></p> | <p>Planetary Science Investigation 10, Part 1, pp. 312-317</p> <p>Solar Energy Science Stories, p. 40</p> |

of stars.

Planetary Science
Resources, pp. 84-85, 100

Earth and Space Science Grades 7-8

ESS1 - The earth and earth materials as we know them today have developed over long periods of time, through continual change processes.

ESS1 (5-8) INQ+ POC –1

Use geological evidence provided to support the idea that the Earth’s crust/lithosphere is composed of plates that move.

| Grade Span Expectations | FOSS |
|---|--|
| <p>ESS1 (7-8)–1 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>1a <u>citing evidence and developing a logical argument for plate movement using fossil evidence, layers of sedimentary rock, location of mineral deposits, and shape of the continents.</u></p> | <p>Earth History Resources, pp. 100-102</p> |

ESS1 (5-8) SAE–2

Explain the processes that cause the cycling of water into and out of the atmosphere and their connections to our planet’s weather patterns.

| Grade Span Expectations | FOSS |
|---|------|
| <p>ESS1 (7-8)–2 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p style="text-align: center;">No GSEs for the ESS1 (5-8) SAE-2 Assessment Target</p> | |

ESS1 (5-8) POC –3

Explain how earth events (abruptly and over time) can bring about changes in Earth’s surface: landforms, ocean floor, rock features, or climate.

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS1 (7-8)–3 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p>3a <u>evaluating slow processes (e.g. weathering, erosion, mountain building, sea floor spreading) to determine how the earth has changed and will continue to change over time.</u></p> <p>3b <u>evaluating fast processes (e.g. erosion, volcanoes and earthquakes) to determine how the earth has changed and will continue to change over time.</u></p> <p>3c <u>investigating the effect of flowing water on</u></p> | <p>Earth History Investigation 4, Parts 3-4, pp. 138-149 Resources, pp. 73-75, 81-82, 93-97, 100-105 CD, Geology Lab CD, Earth Processes</p> <p>Earth History Investigation 4, Parts 3-4, pp. 138-149 Resources, pp. 64-67, 102-103 CD, Geology Lab: Stream Tables CD, Earth Processes: Volcanoes</p> <p>Earth History</p> |

| | |
|---|---|
| landforms (e.g. stream table, local environment). | Investigation 4, Parts 3-4, pp. 138-149 Resources, pp. 64-67 CD, Geology Lab: Stream Tables |
|---|---|

ESS1 (5-8) SAE+ POC –4

Explain the role of differential heating or convection in ocean currents, winds, weather and weather patterns, atmosphere, or climate.

| Grade Span Expectations | FOSS |
|---|------|
| <p>ESS1 (7-8)–4 Students demonstrate an understanding of processes and change over time within earth systems by ...</p> <p style="text-align: center;">No GSEs for the ESS1 (5-8) SAE+POC=4 Assessment Target</p> <p>4a explaining cause and effect relationships between global climate and energy transfer.</p> <p>4b using evidence to make inferences or predictions about global climate issues.</p> | |

ESS1 (5-8) INQ+ POC –5

Using data about a rock’s physical characteristics make and support an inference about the rock’s history and connection to rock cycle.

| Grade Span Expectations | FOSS |
|--|------|
| <p>ESS1 (7-8)-5 Students demonstrate an understanding of processes and change over time by ...</p> <p style="text-align: center;">No GSEs for the ESS1 (5-8) INQ+POC-5 Assessment Target</p> | |

ESS2 - The earth is part of a solar system, made up of distinct parts that have temporal and spatial interrelationships.

ESS2 (5-8) MAS –6

Compare and contrast planets based on data provided about size, composition, location, orbital movement, atmosphere, or surface features (includes moons).

| Grade Span Expectations | FOSS |
|--|------|
| <p>ESS2 (7-8) -6 Students demonstrate an understanding of characteristics of the solar system by ...</p> <p style="text-align: center;">No GSEs for the ESS2 (7-8)-6 Assessment Target</p> | |

ESS2 (5-8) NOS –7

Explain how technological advances have allowed scientists to re-evaluate or extend existing ideas about the solar system.

| Grade Span Expectations | FOSS |
|--|------|
| <p>ESS2 (7-8) -7 Students demonstrate an understanding of how technological advances have</p> | |

| | |
|---|---|
| <p>allowed scientists to re-evaluate or extend existing ideas about the solar system by...</p> <p>7a <u>identifying major discoveries from different scientists and cultures and describing how these discoveries have contributed to our understanding of the solar system (e.g. timeline, research project, picture book).</u></p> | <p>Planetary Science Resources, pp. 71-7990-96</p> |
|---|---|

ESS2 (5-8) SAE+ POC –8

Explain temporal or positional relationships between or among the Earth, sun, and moon (e.g., night/day, seasons, year, tides) or how gravitational force affects objects in the solar system (e.g., moons, tides, orbits, satellites).

| Grade Span Expectations | FOSS |
|--|--|
| <p><i>ESS2 (7-8) -8</i> Students demonstrate an understanding of temporal or positional relationships between or among the Earth, sun, and moon by ...</p> <p>8a <u>using or creating a model of the Earth, sun and moon system to show rotation and revolution.</u></p> <p>8b <u>explaining night/day, seasons, year, and tides as a result of the regular and predictable motion of the Earth, sun, and moon.</u></p> <p>8c <u>using a model of the Earth, sun and moon to recreate the phases of the moon.</u></p> <p><i>ESS2 (7-8) -8</i> Students demonstrate an understanding of gravitational relationships between or among objects of the solar system by...</p> <p>8d <u>describing the relationship between mass and the gravitational force between objects.</u></p> <p>8e <u>describing the relationship between distance and the gravitational force between objects.</u></p> <p>8f <u>explaining that the sun’s gravitational pull holds the Earth and other planets in their orbits, just as the planet’s gravitational pull keeps their moons in orbit.</u></p> | <p>Planetary Science Investigation 3, Part 2, pp. 94-98 Investigation 9, Parts 2-4, pp. 288-301 CD, Day/Night Simulation</p> <p>Planetary Science Investigation 3, Part 2, pp. 94-98 CD, Day/Night Simulation Weather and Water Investigation 3, Part 2, pp. 97-102</p> <p>Planetary Science Investigation 9, Parts 2-4, pp. 288-301 CD, Phases of the Moon</p> <p>Force and Motion Investigation 7, Part 1, pp. 256-261 Resources, pp. 62-63 Planetary Science Resources, p. 70</p> <p>Planetary Science Resources, p. 84 Force and Motion Resources, pp. 67-69</p> |

ESS3 - The origin and evolution of galaxies and the universe demonstrate fundamental principles of physical science across vast distances and time.

No further targets for EK ESS3 at the
5-8 Grade Span

The GSEs listed below are assessed at the local level only

| Grade Span Expectations | FOSS |
|--|---|
| <p>ESS3 (7-8)-9 Students demonstrate an understanding of the structure of the universe by...</p> <p>9a <u>describing the universe as containing many billions of galaxies, and each galaxy contains many billions of stars.</u></p> | <p>Planetary Science Resources, p. 100</p> |

| | |
|---------|---|
| shell). | <p>Trees Investigation 2, Part 1-3, pp. 6-19 Investigation 3, Part 1, p. 10-11</p> <p>Insects Investigation 1, Parts 1-2, pp. 8-21 Investigation 4, Parts 3-4, pp. 19-27</p> <p>New Plants Investigation 1, Part 3, pp. 23-30 Investigation 3, Parts 1-3, pp. 8-25</p> <p>Insects and Plants Investigation 2, Part 3, pp. 105-115 Investigation 3, Parts 1-3, pp. 129-151 Science Resources, pp. 15-19, 30-33</p> <p>Plants and Animals Investigation 2, Parts 1-3, pp. 87-108 Investigation 3, Parts 1-2, pp. 120-134 Investigation 4, Parts 1-2, pp. 120-134 Science Resources, pp. 3-7, 16-19</p> |
|---------|---|

LS1 (K-4) – SAE–2

Identify the basic needs of plants and animals in order to stay alive. (i.e., water, air, food, space).

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS1 (K-2)-2 Students demonstrate an understanding of structure and function survival requirements by ...</p> <p>2a observing that plants need water, air, food, and light to grow; observe that animals need water, air, food and shelter to grow.</p> | <p>Animals Two by Two Investigation 1, Part 2, pp. 17-21 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 6-7, 12, 20</p> <p>Trees Investigation 1, Parts 2, 8, pp. 15-19, 35-37</p> <p>Insects Investigation 1, Part 1, pp.8-15 Investigation 2, Part 1, pp. 8-13 Investigation 5, Part1, pp. 10-15</p> <p>New Plants Investigation 1, Part 2, pp. 13-22 Science Stories, pp. 3-7</p> <p>Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 5, Part 1, pp. 206-211</p> <p>Plants and Animals Investigation 1, Part 1, pp. 47-57 Investigation 3, Parts 1-2, pp. 120-134 Science Resources, pp. 3-7, 21-23 Video: How Plants Get Food</p> |

LS1 (K-4) – POC–3

Predict, sequence or compare the life stages of organisms – plants and animals (e.g., put images of life stages of an organism in order, predict the next stage in sequence, compare two organisms).

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS1 (K-2)-2 Students demonstrate an understanding of reproduction by ...</p> <p>3a observing and scientifically drawing (e.g., recording shapes, prominent feature, relative proportions, organizes and differentiates</p> | <p>Insects Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-3, pp. 8-24</p> |

| | |
|--|---|
| <p>significant parts observed) and labeling the stages in the life cycle of a familiar plant and animal.</p> <p>3b sequencing the life cycle of a plant or animal when given a set of pictures.</p> | <p>Investigation 3, Parts 1-3, pp. 8-26 Investigation 4, Parts 1-5 pp. 10-31 Investigation 5, Parts 1-3, pp. 10-24 New Plants Investigation 1, Part 3, pp. 23-30 Insects and Plants Investigation 1-5, all parts</p> <p>Insects Investigation 1, Part 3, pp. 22-25 Investigation 2, Part 3, pp. 20-24 Investigation 3, Part 3, pp. 21-26 Insects and Plants Investigation 1, Part 3, pp. 71-75 Investigation 3, Part 3, pp. 145-151 Investigation 5, Part 3, pp. 219-225</p> |
|--|---|

LS1 (K-4) – FAF–4

Identify and explain how the physical structures of an organism (plants or animals) allow it to survive in its habitat/environment (e.g., roots for water; nose to smell fire).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS1 (K-2)-4 Students demonstrate an understanding of structure and function survival requirements by ...</p> <p>4a identifying the specific functions of the physical structures of a plant or an animal (e.g. roots for water; webbed feet for swimming).</p> | <p>Animals Two by Two Investigation 1, Part 1, pp. 10-16 Investigation 2, Part 1, pp. 9-13 Investigation 3, Parts 1, 3, pp. 8-12, 17-20 Science Stories, pp. 5-6, 9-10, 17-18, 21</p> <p>Trees Investigation 1, Parts 5-6, p. 25-30 Science Stories, pp. 3, 9</p> <p>Insects Investigation 1, Parts 1-2, pp. 8-21 Investigation 2, Parts 1-2, pp. 8-19 Investigation 4, Parts 4-5, pp. 23-31 Science Stories, pp. 8-13</p> <p>New Plants Investigation 1, Part 3, pp. 23-30 Science Stories, pp. 4-14, 23-24, 26-39</p> <p>Plants and Animals Investigation 2, Parts 1-3, pp. 87-108 Investigation 4, Parts 1-2, pp. 157-165 Science Resources, pp. 4-7, 47-50</p> <p>Insects and Plants Investigation 1, Parts 1-3, pp. 47-72 Investigation 2, Parts 1-3, pp. 179-191 Science Resources, pp. 15-19</p> |

LS2 – Matter cycles and energy flows through an ecosystem.

LS2 (K-4) – SAE–5

Recognize that energy is needed for all organisms to stay alive and grow or identify where a plant or animal gets its energy.

| Grade Span Expectations | FOSS |
|---|------|
| <p>LS2 (K-2)-5 Students demonstrate an understanding of energy flow in an ecosystem by ...</p> | |

| | |
|---|---|
| <p>5a caring for plants and/or animals by identifying and providing for their needs; experimenting with a plant's growth under different conditions, including light and no light.</p> | <p>Animals Two by Two Investigation 1, Part 2, pp. 17-21 Investigation 4, Part 4, pp. 20-23 Science Stories, pp. 6-7, 12, 20</p> <p>Trees Investigation 1, Parts 2, 8, pp. 15-19, 35-37</p> <p>Insects Investigation 1, Part 1, pp.8-15 Investigation 2, Part 1, pp. 8-13 Investigation 5, Part 1, pp. 10-15</p> <p>New Plants Investigation 1, Part 2, pp. 13-22 Investigation 2, Science Extension, p. 30 Science Stories, pp. 3-7 Video: How Plants Get Food</p> <p>Insects and Plants Investigation 1, Part 1, pp. 52-61 Investigation 5, Part 1, pp. 206-211</p> <p>Plants and Animals Investigation 1, Part 1, pp. 47-57 Investigation 3, Parts 1-2, pp. 120-134 Investigation 1, Science Extension, pp. 76-77 Science Resources, pp. 3-7, 21-23</p> |
|---|---|

LS2 (K-4) – SAE–6

Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).

| Grade Span Expectations | FOSS |
|--|------|
| <p>LS2 (K-2)-6 Students demonstrate an understanding of food webs in an ecosystem by ...</p> <p>6a acting out or constructing simple diagrams (pictures or words) that shows a simple food web.</p> <p>6b using information about a simple food web to determine how basic needs (e.g. shelter and water) are met by the habitat/environment.</p> | |

LS3 - Groups of organisms show evidence of change over time (structures, behaviors, and biochemistry).

LS3 (K-4) – SAE–7

Using information (data and scenario), explain how changes in the environment can cause organisms to respond (e.g., survive there and reproduce, move away, die).

| Grade Span Expectations | FOSS |
|--|------|
| <p>LS3 (K-2)-7 Students demonstrate an understanding of equilibrium in an ecosystem by ...</p> <p>Currently no GSEs for this target at K-2 Grade Span</p> | |

LS4 (K-4) – POC-9

Distinguish between characteristics of humans that are inherited from parents (i.e., hair color, height, skin color, eye color) and others that are learned (e.g., riding a bike, singing a song, playing a game, reading).

| Grade Span Expectations | FOSS |
|---|-------------|
| <p>LS4 (K-2)-9 Students demonstrate an understanding of human heredity by ...</p> <p>9a observing and comparing their physical features with those of parents, classmates and other organisms.</p> <p>9b identifying that some behaviors are learned.</p> | |

Life Science

Grades 3-4

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS1 (K-4) – INQ+POC –1

Sort/classify different living things using similar and different characteristics. Describe why organisms belong to each group or cite evidence about how they are alike or not alike.

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS1 (3-4)-1 Students demonstrate an understanding of classification of organisms by...</p> <p>1a <u>citing evidence to distinguish</u> between living and non-living things.</p> <p>1b identifying, sorting and comparing based on similar <u>and/or different external features</u>.</p> <p>1c recording and analyzing observations/data about external features (e.g., within a grouping, which characteristics are the same and which are different).</p> <p>1d <u>citing evidence</u> (e.g., prior knowledge, data) <u>to draw conclusions explaining why organisms are grouped/not grouped together</u> (e.g., mammal, bird, fish).</p> | <p>FOSS provides the opportunity to address this expectation. See below: Structures of Life Investigations 1-4 Science Stories, pp. 1-48</p> <p>Structures of Life Investigation 3, Part 1, pp. 8-15 Investigation 4, Parts 1-2, pp. 8-19 Science Stories, pp. 17-18, 41-42 Human Body Science Stories, p. 11</p> <p>Structures of Life Investigation 4, Part 2, pp. 14-19</p> <p>Structures of Life Investigation 4, Part 2, pp. 14-19 Human Body Science Stories, p. 11</p> |

LS1 (K-4) – SAE –2

Identify the basic needs of plants and animals in order to stay alive (i.e., water, air, food, space).

| Grade Span Expectations | FOSS |
|--|--|
| <p>LS1 (3-4)-2 Students demonstrate an understanding of structure and function survival requirements by...</p> <p>2a observing that plants need water, air, food, light and <u>space</u> to grow <u>and reproduce</u>; observe that animals need water, air, food, and shelter/space to grow <u>and reproduce</u>.</p> | <p>Structures of Life Investigation 1, Part 2, pp. 18-27 Investigation 2, Part 2, pp. 14-17 Investigation 3, Part 2, pp. 16-19 Science Stories, pp. 4-5, 10-11, 18, 22-34</p> |

LS1 (K-4) – POC –3

Predict, sequence or compare the life stages of organisms – plants and animals (e.g., put images of life stages of an organism in order, predict the next stage in sequence, compare two organisms).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS1 (3-4)-3 Students demonstrate an understanding of reproduction by...</p> <p>3a observing changes and <u>recording data</u> to scientifically <u>draw</u> and label the stages in the life cycle of a familiar plant and animal.</p> <p>3b sequencing the life cycle of a plant or animal when given a set of <u>data/pictures</u>.</p> <p>3c <u>comparing the life cycles of 2 plants or 2 animals when given a set of pictures</u>.</p> | <p>Structures of Life Investigation 2, Part 3, pp. 18-22</p> <p>Structures of Life Investigation 2, Part 3, pp. 18-22 FOSS web, Activity: Life Cycles</p> <p>Structures of Life Investigation 2, Part 3, pp. 18-22 FOSS web, Activity: Life Cycles</p> |

LS1 (K-4) – FAF –4

Identify and explain how the physical structures of an organism (plants or animals) allow it to survive in its habitat/environment (e.g., roots for water; nose to smell fire).

| Grade Span Expectations | FOSS |
|---|--|
| <p>LS1 (3-4)-4 Students demonstrate an understanding of structure and function survival requirements by...</p> <p>4a identifying and explaining <u>how</u> the physical structure/characteristic of an organism allows it to survive and <u>defend itself</u> (e.g., of a characteristic – the coloring of a fiddler crab allows it to camouflage itself in the sand and grasses of its environment so that it will be protected from predators).</p> <p>4b analyzing the structures needed to for survival of <u>populations</u> of plants and animals in a <u>particular</u> habitat/environment (e.g., populations of desert plants and animals require structures that enable them to obtain/conserves/retain water</p> | <p>Structures of Life Investigation 3, Part 1, pp. 8-15 Investigation 4, Part 1-2, pp. 8-19 Science Stories, pp. 3, 17-18, 20-21, 22-34, 37-39</p> <p>Structures of Life Science Stories, pp. 20-21, 22-34</p> |

LS2 – Matter cycles and energy flows through an ecosystem.**LS2 (K-4) – SAE –5**

Recognize that energy is needed for all organisms to stay alive and grow or identify where a plant or animal gets its energy.

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS2 (3-4)-5 Students demonstrate an understanding of energy flow in an ecosystem by...</p> <p>5a identifying <u>sources of energy for survival of organisms</u> (i.e. light or food).</p> | <p>Structures of Life Science Stories, p. 43</p> |

LS2 (K-4) – SAE –6

Describe ways plants and animals depend on each other (e.g., shelter, nesting, food).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS2 (3-4)-6 Students demonstrate an understanding of food webs in an ecosystem by...</p> <p>6a <u>demonstrating in a food web that all animals' food begins with the sun.</u></p> <p>6b <u>use information about organisms to design a habitat and explain how the habitat provides for the needs of the organisms that live there.</u></p> <p>6c <u>explaining the way that plants and animals in that habitat depend on each other.</u></p> | <p>Structures of Life Science Stories, p. 43</p> <p>Structures of Life Investigation 3, Part 2, pp. 16-19</p> <p>FOSS provides the opportunity to address this expectation. See citation above.</p> |

LS3 – Groups of organisms show evidence of change overtime (structures, behaviors, and biochemistry).

LS3 (K-4) – SAE –7

Using information (data or scenario), explain how changes in the environment can cause organisms to respond (e.g., survive there and reproduce, move away, die).

| Grade Span Expectations | FOSS |
|--|--|
| <p>LS3 (3-4)-7 Students demonstrate an understanding of equilibrium in an ecosystem by...</p> <p>7a <u>explaining what plants or animals might do if their environment changes (e.g., changing food supply or habitat due to fire, human impact, sudden weather related changes).</u></p> <p>7b <u>explaining how the balance of the ecosystem can be disturbed (e.g., how does overpopulation of a species affect the rest of the ecosystem).</u></p> | <p>Structures of Life Science Stories, pp. 35-36</p> <p>See grade 5 module <u>Environments</u>.</p> |

LS4 – Humans are similar to other species in many ways, and yet are unique among Earth's life forms.

LS4 (K-4) – FAF –8

Identify what the physical structures of humans do (e.g., senses – eyes, ears, skin, etc.) or compare physical structures of humans to similar structures of animals.

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS4 (3-4)-8 Students demonstrate an understanding of human body systems by...</p> <p>8a <u>showing connections between external and internal body structures (i.e., organs and systems) and how they help humans survive.</u></p> <p>8b <u>comparing and analyzing external features and characteristics of humans and other animals.</u></p> | <p>Human Body Investigation 1, Parts 1-2, pp. 8-20 Investigation 3, Parts 1-3, pp. 8-21 Science Stories, pp. 1-3, 12-16, 28-29</p> <p>Human Body Investigation 1, Parts 1-3, pp. 8-25 Investigation 2, Parts 1-4, pp. 8-25 Investigation 3, Parts 1-3, pp. 8-21 Science Stories, pp. 1-3, 10-11</p> |

LS4 (K-4) – POC –9

Distinguish between characteristics of humans that are inherited from parents (i.e., hair color, height, skin color, eye color) and others that are learned (e.g., riding a bike, singing a song, playing a game, reading).

| Grade Span Expectations | FOSS |
|--|------|
| <p>LS4 (3-4)-9 Students demonstrate an understanding of human heredity by...</p> <p>9a <u>identifying similarities that are inherited from a biological parent.</u></p> <p>9b <u>identifying that some behaviors are learned and some behaviors are instinctive.</u></p> | |

Life Science

Grades 5-6

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS1 (5-8) – INQ + SAE –1

Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.

| Grade Span Expectations | FOSS |
|---|--|
| <p>LS1 (5-6)-1 Students demonstrate an understanding of biodiversity by...</p> <p>1a recognizing that organisms have different features and behaviors for meeting their needs to survive (e.g. fish have gills for respiration, mammals have lungs, bears hibernate).</p> | <p>Environments Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p> <p>Living Systems Investigation 1, Parts 1-3, pp. 51-70 Science Resources, pp. 2-13</p> <p>Diversity of Life Investigation 3, Parts 2-3, pp. 108-122 Investigation 5, Part 3, pp. 165-170 Investigation 7, Parts 1-2, pp. 218-229 Investigation 8, Part 1, pp. 239-243 Resources, pp. 24-26, 31-54</p> <p>Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Resources, pp. 42-45 CD, Octopus Color Change</p> |

LS1 (5-8) – SAE + FAF –2

Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS1 (5-6)-2 Students demonstrate an understanding of structure and function survival requirements by...</p> <p>2a describing structures or behaviors that help organisms survive in their environment (e.g., defense, obtaining <u>nutrients</u>, reproduction, and <u>eliminating waste</u>).</p> | <p>Environments Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p> <p>Diversity of Life Investigation 3, Parts 2-3, pp. 108-122 Investigation 5, Part 3, pp. 165-170 Investigation 7, Parts 1-2, pp. 218-229 Investigation 9, Part 1, pp. 273-277 Resources, pp. 24-26, 31-54</p> <p>Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Resources, pp. 42-45 CD, Octopus Color Change</p> |

LS1 (5-8) – POC–3

Compare and contrast sexual reproduction with asexual reproduction.

| Grade Span Expectations | FOSS |
|---|--|
| <p>LS1 (5-6)-3 Students demonstrate an understanding of reproduction by...</p> <p>3a <u>defining reproduction as a process through which organisms produce offspring.</u></p> <p>3b <u>describing reproduction in terms of being essential for the continuation of a species.</u></p> <p>3c <u>investigating and comparing a variety of plant and animal life cycles.</u></p> | <p>Diversity of Life Investigation 7, Part 1, pp. 218-223 Resources, pp. 26, 40-44, 53-54, 58-59</p> <p>Populations and Ecosystems Resources, pp. 53-54</p> <p>Diversity of Life Investigation 7, Part 1, pp. 218-223 Resources, pp. 26, 53-54, 58-59</p> |

LS1 (5-8) – FAF–4

Explain relationships between or among the structure and function of cells, tissues, organs, and organ systems in an organism.

| Grade Span Expectations | FOSS |
|---|--|
| <p>LS1 (5-6)-4 Students demonstrate an understanding of differentiation by...</p> <p>4a <u>identifying cells as the building blocks of organisms.</u></p> <p>4b <u>recognizing and illustrating (e.g., flow chart) the structural organization of an organism from cell to tissue to organs to organ system to organism.</u></p> | <p>Food and Nutrition Science Stories, p. 40</p> <p>Living Systems Investigation 1, Part 1, pp. 51-59 Science Resources, pp. 2-3</p> <p>Diversity of Life Investigation 4, Parts 1-2, pp. 133-141 Resources, pp. 27-30</p> <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Food and Nutrition Science Stories, p. 40</p> <p>Living Systems Investigation 1, Parts 1-3, pp. 51-70 Science Resources, pp. 2-13</p> <p>Diversity of Life Investigation 4, Parts 1-2, pp. 133-141 Investigation 3, Part 3, pp. 165-170 Investigation 7, Part 1, pp. 218-223 Resources, pp. 27-45</p> |

LS2 - Matter and energy flows through an ecosystem.**LS2 (5-8) –SAE–5**

Using data and observations, predict outcomes when abiotic/biotic factors are changed in an ecosystem.

| Grade Span Expectations | FOSS |
|--|------|
| <p>LS2 (5-6)-5 Students demonstrate an understanding of equilibrium in an ecosystem by...</p> | |

| | |
|------------|---|
| ecosystem. | Science Stories, pp. 38-41 Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Resources, pp. 19-20 CD, Mono Lake Food Web |
|------------|---|

LS3 – Groups of organisms show evidence of change over time (structure, behaviors, biochemistry).

LS3 (5-8) – MAS + FAF–8

Use a model, classification system, or dichotomous key to illustrate, compare, or interpret possible relationships among groups of organisms (e.g., internal and external structures, anatomical features).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS3 (5-6)-8 Students demonstrate an understanding of classification of organisms by...</p> <p><u>8a stating the value of, or reason for, classification systems.</u></p> <p><u>8b following a taxonomic key to identify a given organism (e.g., flowering and non-flowering plants).</u></p> | <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Living Systems Investigation 2, Part 2, pp. 99-106 Science Resources, pp. 21-22</p> <p>Diversity of Life Resources, pp. 16-17</p> <p>Diversity of Life Investigation 3, Part 3, pp. 116-122 Resources, pp. 16-17</p> |

LS3 (5-8) – POC - 9

Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS3 (5-6)-9 Students demonstrate an understanding of Natural Selection/evolution by...</p> <p><u>9a explaining how a population's or species' traits affect their ability to survive over time.</u></p> <p><u>9b researching or reporting on possible causes for the extinction of an animal or plant.</u></p> <p><u>9c explaining how fossil evidence can be used to understand the history of life on earth.</u></p> | <p>Environments Science Stories, pp. 1-8, 11-17, 20, 22, 32, 53-54</p> <p>Diversity of Life Investigation 8, Part 1, pp. 239-243 Resources, pp. 33-36, 46-54</p> <p>Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Investigation 10, Part 3, pp. 315-317 Resources, pp. 42-45, 59-61</p> <p>Planetary Science Resources, pp. 67-68</p> <p>Populations and Ecosystems Resources, p. 61</p> <p>Earth History Investigation 6, Parts 2-3, pp. 209-219 Investigation 7, Parts 1-2, pp. 234-243 Resources, pp. 83-86 CD, Time Room</p> |

LS4 – Humans are similar to other species in many ways, and yet are unique among Earth’s life forms.

LS4 (5-8) – INQ –10

Use data and observations to support the concept that environmental or biological factors affect human body systems (biotic & abiotic).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS4 (5-6)-10 Students demonstrate an understanding of human body systems by...</p> <p>10a <u>identifying the biotic factors (e.g., microbes, parasites, food availability, aging process) that have an effect on human body systems.</u></p> <p>10b <u>identifying the abiotic factors (e.g., drugs, altitude, weather, pollution) that have an effect on human body systems.</u></p> <p>Students demonstrate an understanding of patterns of human health/disease by...</p> <p>10c <u>identifying the biotic (e.g., microbes, parasites, food availability, aging process) and abiotic (e.g., radiation, toxic materials, carcinogens) factors that cause disease and affect human health.</u></p> | <p>Food and Nutrition Science Stories, pp. 16-19, 24-25, 34-36</p> <p>Diversity of Life Resources, pp. 66-68</p> <p>Food and Nutrition Science Stories, pp. 34-36</p> <p>Diversity of Life Resources, pp. 66-68</p> |

LS4 (5-8) – INQ + POC–11

Using data provided, select evidence that supports the concept that genetic information is passed on from both parents to offspring.

| Grade Span Expectations | FOSS |
|---|--|
| <p>LS4 (5-6)-11 Students demonstrate an understanding of human heredity by...</p> <p>11a <u>differentiating between inherited and acquired traits.</u></p> <p>11b <u>observing, recording and comparing differences in inherited traits (e.g., connected earlobe, tongue rolling).</u></p> | <p>Populations and Ecosystems Investigation 9, Part 1, pp. 262-266</p> |

Life Science

Grades 7-8

LS1 – All living organisms have identifiable structures and characteristics that allow for survival (organisms, populations, & species).

LS1 (5-8) – INQ + SAE –1

Using data and observations about the biodiversity of an ecosystem make predictions or draw conclusions about how the diversity contributes to the stability of the ecosystem.

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS1 (7-8)-1 Students demonstrate an understanding of biodiversity by...</p> <p>1a <u>giving examples of adaptations or behaviors that are specific to a niche (role) within an ecosystem.</u></p> <p>1b <u>explaining how organisms with different structures and behaviors have roles that contribute to each other’s survival and the stability of the ecosystem.</u></p> | <p>Diversity of Life Investigation 7, Part 2, pp. 224-229 Resources, pp. 46-50</p> <p>Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Resources, pp. 42-45 CD, Octopus Color Change</p> <p>Diversity of Life Investigation 7, Part 2, pp. 224-229 Resources, pp. 46-50</p> <p>Populations and Ecosystems Investigation 8, Parts 1-2, pp. 228-243 Resources, pp. 42-45</p> |

LS1 (5-8) – SAE + FAF–2

Describe or compare how different organisms have mechanisms that work in a coordinated way to obtain energy, grow, move, respond, provide defense, enable reproduction, or maintain internal balance (e.g., cells, tissues, organs and systems).

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS1 (7-8)-2 Students demonstrate an understanding of structure and function survival requirements by...</p> <p>2a <u>explaining how cells, as the basic unit of life, has the same survival needs as an organism (i.e., obtain energy, grow, eliminate waste, reproduce, provide for defense).</u></p> <p>2b <u>observing and describing (e.g., drawing, labeling) individual cells as seen through s microscope targeting cell membrane, cell wall, nucleus, and chloroplasts.</u></p> <p>2c <u>observing, describing and charting the growth, motion, responses of living organisms.</u></p> | <p>Diversity of Life Investigation 4, Parts 1-2, pp. 133-141 Resources, pp. 24-30</p> <p>Diversity of Life Investigation 4, Part 1, pp. 133-136</p> <p>Diversity of Life Investigation 1, Part 2, pp. 52-63 Investigation 3, Parts 1-3, pp. 102-122 Investigation 5, Part 2, pp. 157-164 Investigation 6, Part 3, pp. 198-202 Investigation 8, Part 1, pp. 239-243 Investigation 9, Part 2, pp. 278-285 Investigation 10, Parts 1-2, pp. 302-316</p> |

LS1 (5-8) – POC–3

Compare and contrast sexual reproduction with asexual reproduction.

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS1 (7-8)-3 Students demonstrate an understanding of reproduction by...</p> <p>3a <u>explaining reproduction as a fundamental process by which the new individual receives genetic information from parent(s).</u></p> <p>3b <u>describing forms of asexual reproduction that involves the genetic contribution of only one parent (e.g., binary fission, budding, vegetative propagation, regeneration).</u></p> <p>3c <u>describing sexual reproduction as a process that combines genetic material of two parents to produce a new organism (e.g., sperm/egg, pollen/ova).</u></p> | <p>Populations and Ecosystems Resources, pp. 46-55</p> <p>Populations and Ecosystems Resources, pp. 49-55 Diversity of Life Resources, pp. 43-44</p> |

LS1 (5-8) – FAF–4

Explain relationships between or among the structure and function of the cells, tissues, organs, and organ systems in an organism.

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS1 (7-8)-4 Students demonstrate an understanding of differentiation by...</p> <p>4a <u>explaining that specialized cells perform specialized functions (e.g., muscle cells contract, nerve cells transmit impulses, skin cells provide protection).</u></p> <p>4b <u>comparing individual cells of tissues and recognizing the similarities of cells and how they work together to perform specific functions.</u></p> <p>4c <u>explaining how each type of cell, tissue, and organ has a distinct structure and set of functions that serve the organism as a whole.</u></p> | <p>Diversity of Life Investigation 5, Part 3, pp. 165-170 Investigation 6, Part 2, pp. 193-197 Investigation 7, Part 1, pp. 218-223 Resources, pp. 32-33, 37-39, 40-44</p> <p>Diversity of Life Investigation 5, Part 3, pp. 165-170 Investigation 6, Part 2, pp. 193-197 Investigation 7, Part 1, pp. 218-223 Resources, pp. 32-33, 37-39, 40-44</p> <p>FOSS provides the opportunity to address this expectation. See below: Diversity of Life Investigation 5, Part 3, pp. 165-170 Investigation 6, Part 2, pp. 193-197 Investigation 7, Part 1, pp. 218-223 Resources, pp. 32-33, 37-39, 40-44</p> |

LS2 – Matter cycles and energy flows through an ecosystem.**LS2 (5-8) – INQ + SAE–5**

Using data and observations, predict outcomes when abiotic/biotic factors are changed in an ecosystem.

| Grade Span Expectations | FOSS |
|---|------|
| <p>LS2 (7-8)-5 Students demonstrate an understanding of equilibrium in an ecosystem by...</p> | |

| | |
|---|--|
| <p>5a <u>identifying which biotic (e.g., bacteria, fungi, plants, animals) and biotic (e.g., weather, climate, light, water, temperature, soil composition, catastrophic events) factors affect a given ecosystem.</u></p> | <p>Populations and Ecosystems Investigation 6, Parts 1-3, pp. 179-197 Investigation 7, pp. 210-215 Resources, pp. 31-41</p> |
| <p>5b <u>analyzing how biotic and abiotic factors affect a given ecosystem.</u></p> | <p>Populations and Ecosystems Investigation 6, Parts 1-3, pp. 179-197 Investigation 7, pp. 210-215 Resources, pp. 31-41</p> |
| <p>5c <u>predicting the outcome of a given change in biotic and abiotic factors in an ecosystem.</u></p> | |
| <p>5d <u>using a visual model (e.g., graph) to track population changes in an ecosystem.</u></p> | <p>Populations and Ecosystems Investigation 6, Part 4, pp. 191-197</p> |

LS2 (5-8) – INQ + SAE–6

Given a scenario trace the flow of energy through an ecosystem, beginning with the sun, through organisms in the food web, and into the environment (includes photosynthesis and respiration).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS2 (7-8)-6 Students demonstrate an understanding of energy flow in an ecosystem by...</p> <p>6a <u>explaining the transfer of the sun’s energy through living systems and its effect upon them.</u></p> <p>6b <u>describing the basic processes and recognizing the names and chemical formulas of the substances involved in photosynthesis and respiration.</u></p> <p>6c <u>explaining the relationship between photosynthesis and respiration.</u></p> <p>Students demonstrate an understanding of food webs in an ecosystem by...</p> <p>6d <u>creating or interpreting a model that traces the flow of energy in a food web.</u></p> | <p>Diversity of Life Resources, pp. 36-37</p> <p>Populations and Ecosystems Investigation 5, Parts 2-4, pp. 155-169 Resources, pp. 14-16</p> <p>Diversity of Life Resources, pp. 36-73</p> <p>Populations and Ecosystems Resources, pp. 14-15</p> <p>Populations and Ecosystems Investigation 5, Part 4, pp. 161-169</p> |

LS2 (5-8) –SAE–7

Given an ecosystem, trace how matter cycles among and between organisms and the physical environment (includes water, oxygen, food web, decomposition, recycling but **not** carbon cycle or nitrogen cycle).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS2 (7-8)-7 Students demonstrate an understanding of recycling in an ecosystem by...</p> <p>7a <u>diagramming or sequencing a series of steps showing how matter cycles among and between organisms and the physical environment.</u></p> | <p>Populations and Ecosystems Investigation 4, Part 2, pp. 122-129 Resources, pp. 17-21 CD, Mono Lake Food Web</p> |

| | |
|--|---|
| <p>7b <u>developing a model for a food web of local aquatic and local terrestrial environments.</u></p> <p>7c <u>explaining the inverse nature or complementary aspects of photosynthesis/respiration in relation to carbon dioxide, water and oxygen exchange.</u></p> <p>7d <u>conducting a controlled investigation that shows that the total amount of matter remains constant, even through its form and location change as matter is transferred among and between organisms and the physical environment (e.g., bottle biology, mass of a closed system over time.</u></p> | <p>FOSS provides the opportunity to address this expectation. See below: Populations and Ecosystems Investigation 3, Parts 1-3, pp. 90-107 Investigation 4, Part 2, pp. 122-129 Resources, pp. 17-21 CD, Mono Lake Food Web</p> |
|--|---|

LS3 - Groups of organisms show evidence of change over time (structure, behaviors, biochemistry).

LS3 (5-8) – MAS + FAF–8

Use a model, classification system, or dichotomous key to illustrate, compare, or interpret possible relationships among groups of organisms (e.g., internal and external structures, anatomical features).

| Grade Span Expectations | FOSS |
|---|---|
| <p>LS3 (7-8)-8 Students demonstrate an understanding of classification of organisms by...</p> <p>8a <u>sorting organisms with similar characteristics into groups based on internal and external structures.</u></p> <p>8b <u>explaining how species with similar evolutionary histories/characteristics are classified more closely together with some organisms than others (e.g., a fish and human have more in common with each other than a fish and jelly fish).</u></p> <p>8c <u>recognizing the classification system used in modern biology.</u></p> | <p>Diversity of Life Investigation 8, Part 3, pp. 253-259 Investigation 9, Part 1, pp. 273-277 Resources, pp. 55-58</p> <p>Diversity of Life Resources, pp. 16-17</p> |

LS3 (5-8) – POC–9

Cite examples supporting the concept that certain traits of organisms may provide a survival advantage in a specific environment and therefore, an increased likelihood to produce offspring.

| Grade Span Expectations | FOSS |
|--|---|
| <p>LS3 (7-8)-9 Students demonstrate an understanding of Natural Selection/evolution by...</p> <p>9a <u>explaining the genetic variation/traits of organisms are passed on through reproduction and random genetic changes.</u></p> | <p>Populations and Ecosystems Investigation 9, Parts 2-4, pp. 267-291</p> |

| | |
|---|--|
| <p><u>Queen Victoria-hemophilia or hypothetical example) to demonstrate the passage of traits.</u></p> <p>11c <u>identifying that genetic materials (i.e., chromosomes and genes) are located in the cell's nucleus.</u></p> | <p>Populations and Ecosystems Investigation 9, Part 2, pp. 267-273 Resources, pp. 49-55</p> |
|---|--|

LS4 (5-8) – POC–12

Describe the major changes that occur over time in human development from single cell through embryonic development to new born (i.e., trimesters: 1st – group of cells, 2nd – organs form, 3rd – organs mature.

| Grade Span Expectations | FOSS |
|---|------|
| <p>LS4 (7-8)-12 Students demonstrate an understanding of patterns of human development by...</p> <p>12a <u>identifying and sequencing the stages of human embryonic development.</u></p> <p>12b <u>describing the changes from one stage of embryonic development to the next.</u></p> <p>12c <u>comparing and contrasting embryonic development in various life forms (e.g., humans, frogs, chickens, sea urchins).</u></p> <p>12d <u>comparing the patterns of human development after birth to life stages of other species.</u></p> | |

Physical Science Grades K-2

PS1- All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).

PS1 (K-4) – INQ–1

Collect and organize data about physical properties in order to classify objects or draw conclusions about objects and their characteristic properties (e.g., temperature, color, size, shape, weight, texture, flexibility).

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (K-2)-1 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>1a identifying, comparing, and sorting objects by similar or different physical properties (e.g., size, shape, color, texture, smell, weight).</p> <p>1b recording observations/data about physical properties.</p> <p>1c using attributes of properties to state why objects are grouped together (e.g., things that roll, things that are rough).</p> | <p>Wood and Paper Investigation 1, Parts 1-2, pp. 8-19 Investigation 3, Part 1, pp. 8-12</p> <p>Fabric Investigation 1, Parts 1-2, pp. 6-15</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 1-4, pp. 8-25 Investigation 2, Part1-2, pp. 8-17</p> <p>Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-3, pp. 10-27</p> <p>Pebbles, Sand and Silt Investigation 1, Part 2, pp. 18-21 Investigation 2, Part1-2, pp. 8-17</p> <p>Solids and Liquids Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 2-3, pp. 15-27</p> <p>Pebbles, Sand and Silt Investigation 1, Parts 3-4, pp. 18-25 Investigation 2, Part1-4, pp. 8-29</p> <p>Solids and Liquids Investigation 1, Part 2, pp. 17-20</p> |

PS1 (K-4) – POC–2

Make a prediction about what might happen to the state of common materials when heated or cooled or categorize materials as solid, liquid, or gas.

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (K-2)-2 Students demonstrate an understanding of states of matter by...</p> <p>2a describing properties of solids and liquids.</p> <p>2b identifying and comparing solids and liquids.</p> | <p>Solids and Liquids Investigation 1, Parts 1-3, pp. 8-24 Investigation 2, Parts 1-3, pp. 10-27 Science Stories, pp. 3-13</p> <p>Solids and Liquids Investigation 1, Parts 1-3, pp. 8-24 Investigation 2, Parts 1-3, pp. 10-27 Science Stories, pp. 3-13</p> |

| | |
|---|---|
| <p>2c making logical predictions about the changes in the state of matter when adding or taking away heat (e.g., ice melting, water freezing).</p> | <p>Solids and Liquids Investigation 2, Science Extension, p. 31 Science Stories, pp. 14-17 FOSS Web, Activity: Change It Air and Weather Investigation 2, Science Extension, p. 32</p> |
|---|---|

PS1 (K-4) – SAE–3

Use measures of weight (data) to demonstrate that the whole equals the sum of its parts.

| Grade Span Expectations | FOSS |
|--|---|
| <p>PS1 (K-2)-3 Students demonstrate an understanding of conservation of matter by...</p> <p>3a using simple tools (e.g., balance scale, see-saw) to explore the property of weight.</p> | <p>Balance and Motion Investigation 1, Math Extension, p. 30</p> |

PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

PS2 (K-4) – SAE–4

Given a specific example or illustration (e.g., simple closed circuit, rubbing hands together), predict the observable effects of energy (i.e., light bulb lights, a bell rings, hands warm up (i.e. a test item might ask, “what will happen when....?”)

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS2 (K-2)-4 Students demonstrate an understanding of energy by...</p> <p>4a describing observable effects of light using a variety of light sources.</p> <p>4b experimenting and describe how vibrating objects make sound (e.g., guitar strings, seeing salt bounce on a drum skin).</p> <p>4c identifying the sun as a source of heat energy.</p> | <p>New Plants Investigation 1, Parts 1-3, pp. 8-30 Investigation 2, Science Extension, p. 30</p> <p>Air and Weather Investigation 2, Part 2, pp. 14-19 Science Stories, p. 21</p> |

PS2 (K-4) – SAE–5

Use observations of light in relation to other objects/substances to describe the properties of light (can be reflected, refracted, or absorbed).

| Grade Span Expectations | FOSS |
|---|------|
| <p>PS2 (K-2)-5 Students demonstrate an understanding of energy by...</p> <p>5a demonstrate when a shadow will be created using sunny versus cloudy days.</p> | |

PS2 (K-4) – SAE + INQ–6

Experiment, observe, or predict how heat might move from object to another.

| Grade Span Expectations | FOSS |
|--|------|
| <p>PS2 (K-2)-6 Students demonstrate an understanding of energy by...</p> | |

| | |
|--|--|
| 6a describing that the sun warms land and water. | Air and Weather Investigation 2, Part 2, pp. 14-19 Science Stories, p. 21 |
| 6b describing that objects change in temperature by adding or subtracting heat. | Air and Weather Investigation 2, Part 2, pp. 14-19 |

PS3 – The motion of an object is affected by forces.

PS3 (K-4) – INQ + SAE–7

Use data to predict how a change in force (greater/less) might affect the position, direction of motion, or speed of an object (e.g., ramps and balls).

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS3 (K-2)-7 Students demonstrate an understanding of motion by...</p> <p>7a showing how pushing and pulling moves or does not move an object.</p> <p>7b predicting the direction an object will or will not move if a force is applied to it.</p> <p>Students demonstrate an understanding of force by...</p> <p>7c showing that different objects fall to earth unless something is holding them up.</p> | <p>Wood and Paper Investigation 2, Part 1, pp. 8-11 Investigation 5, Part 2, p. 12-17</p> <p>Fabric Investigation 1, Parts 4-6, pp. 20-33</p> <p>Balance and Motion Investigation 2, Parts 1-3, pp. 8-25</p> <p>Solids and Liquids Investigation 2, Part 1, pp. 10-14</p> <p>Air and Weather Investigation 1, Parts 4-5, pp. 21-33 Investigation 3, Part 3, pp. 17-21</p> <p>FOSS provides the opportunity to address this expectation. See citations above.</p> <p>Wood and Paper Investigation 1, Parts 4-5, p. 24-32</p> <p>Balance and Motion Investigation 1, Parts 1-4, pp. 8-28 Investigation 3, Parts 1-3, pp. 6-25</p> |

PS3 (K-4) – INQ + SAE–8

Use observations of magnets in relation to other objects to describe the properties of magnetism (i.e., attract or repel certain objects or has no effect).

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS3 (K-2)-8 Students demonstrate an understanding of (magnetic) force by...</p> <p>8a observing and sorting objects that are and are not attracted to magnets.</p> | <p>Fabric Investigation 1, Science Extension, p. 36</p> <p>Balance and Motion Science Stories pp. 18-21</p> <p>Solids and Liquids Investigation 3, Science Extension, p. 31</p> |

Physical Science

Grades 3-4

PS1- All living and nonliving things are composed of matter having characteristic properties that distinguish one substance from another (independent of size or amount of substance).

PS1 (K-4) – INQ–1

Collect and organize data about physical properties in order to classify objects or draw conclusions about objects and their characteristic properties (e.g., temperature, color, size, shape, weight, texture, flexibility).

| Grade Span Expectations | FOSS |
|--|---|
| <p>PS1 (3-4)-1 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>1a identifying, comparing, and sorting objects by similar or different physical properties (e.g., size, shape, color, texture, smell, weight, temperature, flexibility).</p> <p>1b <u>citing evidence (e.g., prior knowledge, data) to support conclusions about why objects are grouped together.</u></p> <p>Students demonstrate an understanding of physical changes by...</p> <p>1c <u>observing and describing physical changes (e.g., freezing, thawing, torn piece of paper).</u></p> | <p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Investigation 2, Part 3, pp. 20-25</p> <p>Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19</p> <p>Earth Materials Investigation 1, Parts 1-2, pp. 8-23 Investigation 2, Parts 1-2, pp. 8-21</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 2-13</p> <p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Investigation 2, Part 3, pp. 20-25</p> <p>Ideas and Inventions Investigation 2, Parts 1-2, pp. 8-19</p> <p>Earth Materials Investigation 1, Parts 1-2, pp. 8-23 Investigation 2, Parts 1-2, pp. 8-21</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 2-13</p> <p>Water Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 Foss Web, Activity: Evaporation</p> <p>Ideas and Inventions Investigation 1, Parts 1-2, pp. 8-17 Investigation 3, Parts 1-2, pp. 8-17</p> <p>Measurement Investigation 2, Part 3, pp. 18-24</p> <p>Matter and Energy Investigation 4, Part 2, pp. 181-192</p> |

PS1 (K-4) – POC–2

Make a prediction about what might happen to the state of common materials when heated or cooled or categorize materials as solid, liquid, or gas.

| Grade Span Expectations | FOSS |
|--|---|
| <p>PS1 (3-4)-2 Students demonstrate an understanding of states of matter by...</p> <p>2a describing properties of solids, liquids, and <u>gases</u>.</p> <p>2b identifying and comparing solids, liquids, and gases.</p> <p>2c making logical predictions about the changes in the state of matter when adding heat (e.g., ice melting, <u>water boiling</u> or freezing, <u>condensation/evaporation</u>).</p> | <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Water Investigation 1, Part 1, pp. 8-13 Investigation 2, Part 3, pp. 19-24 Science Stories, pp. 1-3, 8-9, 13</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 2-13</p> <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Water Investigation 1, Part 1, pp. 8-13 Investigation 2, Part 3, pp. 19-24 Science Stories, pp. 1-3, 8-9, 13</p> <p>Matter and Energy Investigation 3, Part 1, pp. 129-138 Science Resources, pp. 2-13</p> <p>Water Investigation 2, Part 3, pp. 19-24 Investigation 3, Parts 1-4, pp. 8-26 FOSS Web, Activity: Evaporation</p> <p>Matter and Energy Investigation 4, Part 2, pp. 181-192 Science Resources, pp. 54-56</p> |

PS1 (K-4) – SAE–3

Use measures of weight (data) to demonstrate that the whole equals the sum of its parts.

| Grade Span Expectations | FOSS |
|---|--|
| <p>PS1 (3-4)-3 Students demonstrate an understanding of conservation of matter by...</p> <p>3a <u>measuring the weight of objects to prove that all matter has weight</u>.</p> <p>3b <u>using measures of weight to prove that the whole equals the sum of its parts</u>.</p> <p>3c showing that the weight of an object remains the same despite a change in its shape.</p> | <p>Measurement Investigation 2, Parts 1-3, pp. 8-24</p> <p>Water Investigation 2, Part 2, pp. 14-18</p> <p>Matter and Energy Investigation 3, Part 2, pp. 139-150</p> <p>Measurement Investigation 2, Part 2, pp. 14-17</p> <p>Matter and Energy Science Resources, p. 70</p> |

PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

PS2 (K-4) – SAE–4

Given a specific example or illustration (e.g., simple closed circuit, rubbing hands together), predict the observable effects of energy (i.e., light bulb lights, a bell rings, hands warm up (i.e. a test item might ask, “what will happen when....?”)

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS2 (3-4)-4 Students demonstrate an understanding of energy by...</p> <p>4a <u>experimenting to identify and classify different pitches and volumes of sounds produced by different objects</u></p> <p>4b <u>using data to explain what causes sound to have different pitch or volume.</u></p> <p>4c <u>describing or showing that heat can be produced in many ways (i.e., electricity, friction, burning).</u></p> <p>4d drawing, <u>diagramming</u>, building, and explaining a complete <u>electrical circuit</u>.</p> <p>4e <u>using experimental data to classify a variety of materials as conductors or insulators.</u></p> | <p>Physics of Sound Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 1-3, pp. 8-24 Investigation 4, Part 1, pp. 6-15</p> <p>Physics of Sound Investigation 2, Parts 1-3, pp. 8-24</p> <p>Magnetism and Electricity Investigation 2, Parts 1-2, pp. 8-19 Investigation 3, Parts 1-2, pp. 10-21</p> <p>Magnetism and Electricity Investigation 2, Part 3, pp. 20-25</p> |

PS2 (K-4) – SAE–5

Use observations of light in relation to other objects/substances to describe the properties of light (can be reflected, refracted, or absorbed).

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS2 (3-4)-5 Students demonstrate an understanding of energy by...</p> <p>5a <u>investigating observable effects of light using a variety of light sources (e.g., light travels in a straight line until it interacts with an object, blocked light rays produce shadows).</u></p> <p>5b <u>predicting, describing and investigating how light rays are reflected, refracted, or absorbed.</u></p> | <p>Idea and Inventions Investigation 4, Parts 1-3, pp. 8-21</p> <p>Matter and Energy Investigation 2, Parts 1-2, pp. 93-114 Science Resources, pp. 24-36</p> <p>Idea and Inventions Investigation 4, Parts 1-3, pp. 8-21 Science Stories, pp. 28-32</p> <p>Matter and Energy Investigation 2, Parts 1-2, pp. 93-114 Science Resources, pp. 24-36</p> |

PS2 (K-4) – SAE + INQ–6

Experiment, observe, or predict how heat might move from one object to another.

| Grade Span Expectations | FOSS |
|--|------|
| <p>PS2 (3-4)-6 Students demonstrate an understanding of energy by...</p> <p>6a <u>describing how heat moves from warm</u></p> | |

| | |
|---|---|
| <p>objects to cold objects until both objects are the same temperature.</p> <p>6b showing that heat moves from one object to another causing temperature change (e.g., when land heats up it warms the air).</p> | <p>Water Investigation 2, Parts 2-3, pp. 14-24 Science Stories, pp. 14-16</p> <p>Matter and Energy Investigation 4, Part 1, pp. 174-180</p> |
|---|---|

PS3 – The motion of an object is affected by forces.

PS3 (K-4) – INQ + SAE–7

Use data to predict how a change in force (greater/less might affect the position, direction of motion, or speed of an object (e.g., ramps and balls)

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS3 (3-4)-7 Students demonstrate an understanding of motion by...</p> <p>7a predicting the direction and <u>describing the motion</u> of objects (<u>of different weights, shapes, sizes, etc</u>) if a force is applied to it.</p> <p>7b <u>describing change in position relative to other objects or background.</u></p> <p>Students demonstrate an understanding of force (e.g., push-pull, gravitational) by...</p> <p>7c <u>investigating and describing that different amounts of force can change direction/speed of an object in motion.</u></p> <p>7d <u>conducting experiments to demonstrate that different objects fall to earth unless something is holding them up.</u></p> | <p>Water Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 2, pp. 14-18</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Water Investigation 1, Part 3, pp. 19-23 Investigation 4, Part 2, pp. 14-18</p> <p>Human Body Investigation 3, Parts 1-3, pp. 8-21</p> <p>Structures of Life Investigation 4, Part 3, pp. 20-24</p> <p>Ideas and inventions Investigation 3, Parts 1-2, pp. 8-17</p> <p>Water Investigation 4, Part 2, pp. 14-18</p> <p>Physics of Sound Investigation 1, Part 1, pp. 8-15</p> |

PS3 (K-4) – INQ -SAE–8

Use observations of magnets in relation to other objects to describe the properties of magnetism (i.e., attract or repel certain objects or has no effect).

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS3 (3-4)-8 Students demonstrate an understanding of (magnetic) force by...</p> <p>8a <u>using prior knowledge and investigating to</u></p> | <p>Magnetism and Electricity</p> |

| | |
|---|--|
| <p><u>predict whether or not an object will be attracted to a magnet.</u></p> <p>8b <u>describing what happens when like and opposite poles of a magnet are placed near each other. relative to other objects or background.</u></p> <p>8c <u>exploring relative strength of magnets (e.g., size of magnets, number of magnets, properties of materials).</u></p> | <p>Investigation 1, Part 1, pp. 8-17</p> <p>Magnetism and Electricity Investigation 1, Part 1, pp. 8-17 Science Stories, pp. 6-8</p> <p>Magnetism and Electricity Investigation 1, Part 3, pp. 23-29</p> |
|---|--|

Physical Science

Grades 5-6

PS1- All living and nonliving things are composed of matter having characteristics properties that distinguish one substance from another (independent of size or amount of substance).

PS1 (5-8) – INQ–1

Investigate the relationship among mass, volume and density.

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS1 (5-6)-1 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>1a <u>comparing the masses of objects of equal volumes made of different materials.</u></p> | <p>Variables Science Stories, pp. 10-11</p> <p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p> <p>Weather and Water Investigation 5, Part 1, pp. 152-162 Resources, pp. 29-30</p> |

PS1 (5-8) – INQ + POC–2

Given data about the characteristics of matter (e.g., melting and boiling points, density, solubility) identify, compare, or classify different substances.

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (5-6)-2 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>2a <u>recognizing that different substances have properties which allow them to be identified regardless of the size of the sample.</u></p> <p>2b <u>classifying and comparing substances using characteristic properties (e.g., solid, liquid, gas).</u></p> | <p>Mixtures and Solutions Investigation 2, Part 4, pp. 26-28</p> <p>Food and Nutrition Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 2-3, pp. 18-25 Investigation 3, Parts 2-3, pp. 16-25</p> <p>Chemical Interactions Investigation 1, Parts 1-2, pp. 41-45 Investigation 2, Parts 1-2, pp. 70-80 Investigation 8, Part 1, pp. 248-255 Resources, pp. 3-6, 69-71</p> <p>Mixtures and Solutions Investigation 2, Part 4, pp. 26-28</p> <p>Food and Nutrition Investigation 1, Parts 1-2, pp. 8-20 Investigation 2, Parts 2-3, pp. 18-25 Investigation 3, Parts 2-3, pp. 16-25</p> <p>Chemical Interactions Investigation 1, Parts 1-2, pp. 41-45 Investigation 2, Parts 1-2, pp. 70-80 Resources, pp. 2-6, 42-47</p> |

PS1 (5-8) – INQ + SAE–3

Collect data or use data provided to infer or predict that the total amount of mass in a closed system stays the same, regardless of how substances interact (conservation of matter).

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS1 (5-6)-3 Students demonstrate an understanding of conservation of matter by...</p> <p>3a explaining that regardless of how parts of an object are arranged, <u>the mass of the whole is always the same as the sum of the masses of its parts.</u></p> | <p>Mixtures and Solutions Investigation 1, Part 2, pp. 16-20 Chemical Interactions Investigation 9, Part 2, pp. 288-297 Resources, pp. 63-71</p> |

PS1 (5-8) – SAE + MAS–4

Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (5-6)-4 Students demonstrate an understanding of states of matter by...</p> <p>4a <u>differentiate among the characteristics of solids, liquids, and gases.</u></p> <p>4b predicting the effects of heating and cooling on the physical state, <u>volume and mass</u> of a substance.</p> | <p>Chemical Interactions Resources, pp. 42-48, 104-106</p> <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 7, Parts 2-5, pp. 210-234 Resources, pp. 26-31, 42-48</p> |

PS1 (5-8) –MAS–5

Given graphic or written information, classify matter as atom/molecule or element/compound (Not the structure of an atom).

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (5-6)-5 Students demonstrate an understanding of the structure of matter by...</p> <p>5a distinguishing between solutions, mixtures, and “pure” substances, i.e., compounds and elements</p> | <p>Mixtures and Solutions Investigation 1, Parts 1-2, pp. 8-20 Investigation 4, Parts 1-3, pp. 8-24 Science Stories, pp. 1-6, 11-12, 28, 32-42 Chemical Interactions Investigation 2, Parts 1-2, pp. 70-80 Investigation 8, Part 1, pp. 248-262 Investigation 9, Parts 1-4, pp. 280-312 Resources, pp. 3-13, 49-53, 63-68</p> |

PS2 – Energy is necessary for change to occur in matter. Energy can be stored, transferred, transformed, but cannot be destroyed.

PS2 (5-8) – SAE + POC–6

Given a real-world example, show that within a system, energy transforms from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical)

| Grade Span Expectations | FOSS |
|---|----------------------------|
| <p>PS2 (5-6)-6 Students demonstrate an understanding of energy by...</p> <p>6a <u>differentiating among the properties of</u></p> | <p>Solar Energy</p> |

| | |
|--|--|
| <p>various forms of energy.</p> <p>6b <u>explaining how energy may be stored in various ways</u> (e.g., batteries, springs, height in terms of potential energy).</p> <p>6c describing sound as the transfer of energy through various materials (e.g., solids, liquids, gases).</p> | <p>Investigation 2, Parts 1-2, pp. 8-24 Investigation 3, Parts 1-2, pp. 8—23 Science Stories, pp. 1-5, 16-17, 29-33 Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 37-43 Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-23 Science Stories, pp. 8-9 Electronics Investigation 1, Part 1, pp. 55-60 Resources, pp. 1-2, 12-14</p> <p>FOSS provides the opportunity to address this expectation. See below: Models and Designs Investigation 2, Parts 1-2, pp. 8-21 Investigation 3, Parts 1-3, pp. 8-23 Variables Investigation 1, Parts 1-3, pp. 8-27 Investigation 3, Parts 1-3, pp. 8-23 Electronics Investigation 1, Parts 1-2, pp. 55-65 Resources, pp. 12-14 Populations and Ecosystems Resources, pp. 14-16</p> <p>Human Brain and Senses Resources, p. 69</p> |
|--|--|

PS2 (5-8) – INQ + SAE + POC–7

Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation).

| Grade Span Expectations | FOSS |
|---|--|
| <p>PS2 (5-6)-7 Students demonstrate an understanding of heat energy by...</p> <p>7a <u>identifying real world applications where heat energy is transferred and showing the direction that the heat energy flows.</u></p> | <p>Solar Energy Investigation 2, Parts 1-2, pp. 8-24 Investigation 3, Parts 1-2, pp. 8—23 Investigation 4, Parts 1-3, pp. 8-28 Science Stories, pp. 1-3, 29-33, 35-37</p> |

PS3 – The motion of an object is affected by forces.

PS3 (5-8) – INQ + POC–8

Use data to determine or predict the overall net effect of multiple forces (e.g., friction, gravitational, magnetic) on the position, speed, and direction of motion of objects.

| Grade Span Expectations | FOSS |
|---|--|
| <p>PS3 (5-6)-8 Students demonstrate an understanding of motion by...</p> <p>8a using data or graphs to compare the relative speed of objects.</p> | <p>Variables Investigation 1, Part 2, pp. 16-22 Force and Motion</p> |

Physical Science

Grades 7-8

PS1- All living and nonliving things are composed of matter having characteristics properties that distinguish one substance from another (independent of size or amount of substance).

PS1 (5-8) – INQ–1

Investigate the relationship among mass, volume and density.

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS1 (7-8)-1 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>1a measuring mass and volume of both regular and irregular objects and using those values as well as the <u>relationship $D=m/v$ to calculate density.</u></p> | <p>Planetary Science Investigation 8, Parts 3-4, pp. 260-270</p> <p>Weather and Water Investigation 5, Part 1, pp. 152-162</p> |

PS1 (5-8) – INQ + POC–2

Given data about the characteristics of matter (e.g., melting and boiling points, density, solubility) identify, compare, or classify different substances.

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (7-8)-2 Students demonstrate an understanding of characteristic properties of matter by...</p> <p>2a <u>identifying an unknown substance given its characteristic properties.</u></p> <p>2b classifying and comparing substances using characteristic properties (e.g., solid, liquid, gas; <u>metal, non-metal</u>).</p> | <p>Chemical Interactions Investigation 1, Parts 1-2, pp. 41-58</p> <p>Chemical Interactions Investigation 1, Parts 1-2, pp. 41-45 Investigation 2, Parts 1-2, pp. 70-80 Resources, pp. 2-6, 42-47</p> |

PS1 (5-8) – INQ + SAE–3

Collect data or use data provided to infer or predict that the total amount of mass in a closed system stays the same, regardless of how substances interact (conservation of matter).

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (7-8)-3 Students demonstrate an understanding of conservation of matter by...</p> <p>3a citing evidence to conclude that the amount of matter before and after undergoing a physical or chemical change in a closed system remains the same.</p> | <p>Chemical Interactions Investigation 9, Part 2, pp. 288-297 Resources, pp. 63-71</p> |

PS1 (5-8) – SAE + MAS–4

Represent or explain the relationship between or among energy, molecular motion, temperature, and states of matter.

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS1 (7-8)-4 Students demonstrate an understanding of states of matter by...</p> <p>4a <u>creating diagrams or models that represent</u></p> | <p>FOSS provides the opportunity to address this</p> |

| | |
|--|---|
| <p><u>the states of matter at the molecular level.</u></p> <p>4b <u>explaining the effect of increased and decreased heat energy on the motion and arrangement of molecules.</u></p> <p>4c <u>observing the physical processes of evaporation and condensation, or freezing and melting, and describe these changes in terms of molecular motion and conservation of mass.</u></p> | <p>expectation. See below: Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 7, Parts 2-5, pp. 210-234 Resources, pp. 42-43</p> <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 5, Part 2, pp. 159-164 Investigation 7, Parts 2-5, pp. 210-234 Resources, pp. 23-27, 32-37, 42-46 CD, Particles in Solid, Liquid and Gas</p> <p>Chemical Interactions Investigation 7, Parts 2-5, pp. 210-234 Resources, pp. 42-48</p> |
|--|---|

PS1 (5-8) –MAS–5

Given graphic or written information, classify matter as atoms/molecules or element/compound (Not the structure of an atom)

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS1 (7-8)-5 Students demonstrate an understanding of the structure of matter by...</p> <p>5a <u>using models or diagrams to show the difference between atoms and molecules.</u></p> <p>5b <u>classifying common elements and compounds using symbols and simple chemical formulas.</u></p> <p>5c <u>interpreting the symbols and formulas of simple chemical equations.</u></p> <p>5d <u>using symbols and chemical formulas to show simple chemical arrangements that produce new substances (chemical change).</u></p> <p>5e <u>explaining that when substances undergo physical changes, the appearance may change but the chemical make-up and chemical properties do not.</u></p> <p>5f <u>explaining that when substances undergo chemical changes to form new substances, the properties of the new combinations may be very different from those of the old.</u></p> | <p>Chemical Interactions Investigation 9, Parts 1-3, pp. 280-307 Resources, pp. 63-68, 73-77 Video: Atoms and Molecules</p> <p>Chemical Interactions Investigation 2, Parts 1-2, pp. 70-80 Resources, pp. 4-6, 64-67</p> <p>Chemical Interactions Investigation 9, Parts 1-3, pp. 280-307 Resources, pp. 63-68, 73-77</p> <p>Chemical Interactions Investigation 9, Parts 1-3, pp. 280-307 Resources, pp. 63-68, 73-77</p> <p>FOSS provides the opportunity to address this expectation. See below: Chemical Interactions Investigation 7, Parts 1-5, pp. 204-234 Investigation 8, Part 1, pp. 248-255 Resources, pp. 42-53</p> <p>Chemical Interactions Investigation 9, Parts 1-4, pp. 280-312 Investigation 10, Parts 1-2, pp. 323-336 Resources, pp. 63-68, 73-77</p> |

PS2 – Energy is necessary for change in matter. Energy can be stored, transferred, and transformed, but cannot be destroyed.

PS2 (5-8) –SAE + POC–6

Given a real-world example, show that within a system, energy transforms from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical).

| Grade Span Expectations | FOSS |
|--|--|
| <p>PS2 (7-8)-6 Students demonstrate an understanding of energy by...</p> <p>6a using a real world example to explain the <u>transfer of potential energy to kinetic energy.</u></p> <p>6b constructing a model to explain the transformation of energy from one form to another. (e.g., an electrical circuit changing electrical energy to light energy in a light bulb).</p> <p>6c explaining that while energy may be stored transferred, or transformed, <u>the total amount of energy is conserved.</u></p> <p>6d describing the effect of <u>changing voltage</u> in an electrical circuit.</p> | <p>FOSS provides the opportunity to address this expectation. See below:</p> <p>Force and Motion Investigation 1, Part 1, pp. 47-56 Investigation 2, Part 3, pp. 89-99 Resources, pp. 32-33, 62-63</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Resources, pp. 12-14</p> <p>Electronics Investigation 1, Parts 1-3, pp. 55-70 Resources, pp. 12-14</p> <p>Populations and Ecosystems</p> <p>Chemical Interactions Investigation 5, Part 3, pp. 165-171 Resources, p. 33</p> <p>Electronics Investigation 1, Part 3, pp. 66-70 Investigation 3, Parts 1-4, pp. 119-135</p> |

PS2 (5-8) –INQ + SAE + POC–7

Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation).

| Grade Span Expectations | FOSS |
|---|---|
| <p>PS2 (7-8)-7 Students demonstrate an understanding of heat energy by...</p> <p>7a <u>designing a diagram, model, or analogy to show or describe the motion of molecules for a material in a warmer and cooler state.</u></p> <p>7b explaining the difference among <u>conduction, convection and radiation and creating a diagram to explain how heat energy travels in different directions and through different materials by each of these methods.</u></p> | <p>Chemical Interactions Investigation 4, Parts 1-3, pp. 122-141 Investigation 5, Part 2, pp. 159-164 Investigation 7, Parts 2-5, pp. 210-234 Resources, pp. 23-27, 32-37, 42-46 CD, Particles in Solid, Liquid and Gas</p> <p>Weather and Water Resources, pp. 22-26</p> <p>Weather and Water Investigation 4, Part 2, pp. 131-139 Investigation 5, Parts 2-3, pp. 163-174 Resources, pp. 22-26 Video: Convection Chamber Video: Conduction Through Metals</p> |

PS3 – The motion of an object is affected by forces.

PS3 (5-8) –INQ + POC–8

Use data to determine or predict the overall net effect of multiple forces (e.g., friction, gravitational, magnetic) on the position, speed, and direction of motion of objects.

| Grade Span Expectations | FOSS |
|--|---|
| <p>PS3 (7-8)-7 Students demonstrate an understanding of motion by...</p> <p>8a <u>measuring distance and time for a moving object and using those values as well as the relationship $s=d/t$ to calculate speed and graphically represent data.</u></p> <p>8b <u>solving for any unknown in the expression $s=d/t$ given values for the other two variables.</u></p> <p>8c <u>differentiating among speed, velocity and acceleration.</u></p> <p>Students demonstrate an understanding of force (e.g., friction, gravitational, magnetic) by...</p> <p>8d <u>making and testing predictions on how unbalanced forces acting on objects change speed or direction of motion, or both.</u></p> <p>8e <u>describing or graphically representing that the acceleration of an object is proportional to the force on the object and inversely proportional to the object's mass.</u></p> <p>8f. <u>differentiating between mass and weight.</u></p> | <p>Force and Motion Investigation 2, Parts 2-3, pp. 83-99 Investigation 3, Parts 1-3, pp. 111-127</p> <p>FOSS provides the opportunity to address this expectation. See below: Force and Motion Investigation 2, Parts 2-3, pp. 83-99 Investigation 3, Parts 1-3, pp. 111-127</p> <p>Force and Motion Investigation 5, Parts 1-3, pp. 169-193 Resources, pp. 4-5, 24-26, 32-40</p> <p>Force and Motion Investigation 6, Parts 1-4, p. 218-245 Investigation 8, Parts 1-2, pp. 284-301</p> <p>FOSS provides the opportunity to address this expectation. See below: Force and Motion Investigation 6, Parts 3-4, pp. 236-245 Investigation 8, Part 1, pp. 284-293 Resources, pp. 50-52</p> <p>FOSS provides the opportunity to address this expectation. See below: Force and Motion Investigation 7, Part 1, pp. 256-261 Resources, pp. 62-63</p> |

PS3 (5-8) –SAE + INQ–Local Assessment Only

Experiment. Observe, or predict how energy might be transferred by means of waves.

| Grade Span Expectations | FOSS |
|---|------|
| <p>PS3 (7-8)-LA Students demonstrate an understanding of visible spectrum of light by...</p> <p>LAa <u>experiment how light from the sun is made up of a mixture of many different colors of light (e.g., using prisms, spectrometers, crystals).</u></p> <p>LAB <u>representing in words, diagrams, or other models the visible spectrum as part of the electromagnetic spectrum (consisting of visible</u></p> | |

light, infrared, and ultra violet radiation) and composed of all colors of light.

LAc differentiating between electromagnetic and mechanical waves.