SRA Life, Earth, and Physical Science Laboratories
correlation to
Vermont Grade Expectations for Science
Grade 6

SRA Life, Earth, and Physical Science Laboratories provide core science content in an alternate reading format. Each *SRA Science Lab* contains 180 Science Cards covering key science concepts and vocabulary. Each lab covers 90 different science topics presented at two different reading levels to meet varied student abilities. The *Teacher's Handbook* includes hands-on inquiry activities as well as vocabulary building exercises. The *Classroom Resource CD-ROM* includes Writing Strategies in Science along with tests and vocabulary games.

Scientific Questioning
S5-6:1 Students demonstrate their understanding of SCIENTIFIC QUESTIONING by:
• **Distinguishing between observational, experimental, and research questions (e.g., Observational-How does a cricket chirp? Experimental-Does the amount of light affect how a cricket chirps? Research-Do all crickets chirp? Why do crickets chirp?).**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 8, 15

Scientific Questioning
S5-6:1 Students demonstrate their understanding of SCIENTIFIC QUESTIONING by:
• **Identifying multiple variables that affect a system and using the variables to generate experimental questions that include cause and effect relationships.**
Life Science Lab Teacher's Handbook: Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83 **Classroom Resource CD-ROM:** Writing Strategy 23

Predicting and Hypothesizing
S5-6:2 Students demonstrate their understanding of PREDICTING AND HYPOTHESIZING by:
• **Using logical inferences derived from evidence to predict what may happen or be observed in the future.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 17

Predicting and Hypothesizing
S5-6:2 Students demonstrate their understanding of PREDICTING AND HYPOTHESIZING by:
• **Providing an explanation (hypothesis) that is reasonable in terms of available evidence.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

Designing Experiments
S5-6:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question and prediction that includes:**
a. A list of materials needed that specifies quantities (e.g., 250 ml water).
Classroom Resource CD-ROM: Writing Strategy 15

Designing Experiments
S5-6:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question and prediction that includes:**
b. A procedure that lists significant steps sequentially and describes which variable will be manipulated or changed and which variables will remain the same ("Fair Test").
Classroom Resource CD-ROM: Writing Strategy 15, 23

Designing Experiments
S5-6:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question and prediction that includes:**
c. An appropriate format for recording data.
Classroom Resource CD-ROM: Writing Strategy 15, 16, 22, 24

Designing Experiments
S5-6:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question and prediction that includes:**
d. A strategy for conducting multiple trials ("Fair Test").
Classroom Resource CD-ROM: Writing Strategy 15

Conducting Experiments
S5-6:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Choosing appropriate measurements for the task and measuring accurately.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99

Conducting Experiments
S5-6:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Collecting data and recording accurate and complete data from multiple trials.**
Life Science Lab Teacher's Handbook: Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 16, 22, 24

Conducting Experiments
S5-6:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Drawing scientifically:**
a. Selecting an appropriate perspective (e.g., cross section, top view, side view) and recording precise proportions.
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 5, *Making a Potato Battery,* pages 93-95 **Classroom Resource CD-ROM:** Writing Strategy 27

Representing Data and Analysis
S5-6:5 Students demonstrate their ability to REPRESENT DATA by:
• **Determining an appropriate representation (line graph in addition to prior examples) to represent their findings accurately.**
Life Science Lab Teacher's Handbook: Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 16

Representing Data and Analysis
S5-6:5 Students demonstrate their ability to REPRESENT DATA by:
• **Selecting a scale that is appropriate for range of data to be plotted, label units, and presents data in an objective way.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 4, *Reducing Friction,* pages 89-91

Representing Data and Analysis

S5-6:5 Students demonstrate their ability to REPRESENT DATA by:

- **Including clearly labeled keys and symbols, when necessary.**

Life Science Lab Teacher's Handbook: Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

Physical Science Lab Teacher's Handbook: Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 6, *Making Sound*, pages 97-99

Classroom Resource CD-ROM: Writing Strategy 16

Representing Data and Analysis

S5-6:5 Students demonstrate their ability to REPRESENT DATA by:

- **Using correct scientific terminology to label representations.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

Physical Science Lab Teacher's Handbook: Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

Representing Data and Analysis

S5-6:6 Students demonstrate their ability to ANALYZE DATA by:

- **Identifying relationships of variables based upon evidence.**

Life Science Lab Teacher's Handbook: Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

Physical Science Lab Teacher's Handbook: Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83

Classroom Resource CD-ROM: Writing Strategy 23

Representing Data and Analysis

S5-6:6 Students demonstrate their ability to ANALYZE DATA by:

- **Questioning data that might not seem accurate or does not fit into the pattern of other findings.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103

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Representing Data and Analysis

S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Explaining data using correct scientific terminology.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

Earth Science Lab Teacher's Handbook: Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103

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Representing Data and Analysis

S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Using experimental results to support or refute original hypothesis.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Representing Data and Analysis
S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:
• **Considering all data when developing an explanation/conclusion.**
Life Science Lab Teacher's Handbook: Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 22 24

Representing Data and Analysis
S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:
• **Using additional resources (e.g., books, journals, databases, interviews, etc.) to strengthen an explanation.**
Life Science Lab Teacher's Handbook: Hands-On Activity 2, *Culturing Bacteria,* pages 81-83 **Classroom Resource CD-ROM:** Writing Strategy 9, 25

Representing Data and Analysis
S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:
• **Identifying problems/flaws with the experimental design.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99

Representing Data and Analysis
S5-6:7 Students demonstrate their ability to EXPLAIN DATA by:
• **Preparing a conclusion statement/summary.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 1, 18

Applying Results
S5-6:8 Students demonstrate their ability to APPLY RESULTS by:
• **Explaining how experimental findings can be generalized to other situations.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 1, 18

Physical Science: Properties of Matter
S5-6:9 Students demonstrate their understanding of the Properties of Matter by:
• **Investigating and explaining how the relative volume or mass of an object affects the density of the object.**
a. All substances have a unique density that depends on the volume (amount of space) that the substance is packed into.
Physical Science Lab, Level A: Card 2 **Physical Science Lab, Level B:** Card 2

Physical Science: Properties of Matter
S5-6:9 Students demonstrate their understanding of the Properties of Matter by:
• **Investigating and explaining how the relative volume or mass of an object affects the density of the object.**
b. The relative densities of substances can be observed and described.
Physical Science Lab, Level A: Card 2 **Physical Science Lab, Level B:** Card 2

Physical Science: Properties of Matter
S5-6:13 Students demonstrate their understanding of the Properties of a Gas by:
• **Measuring the mass of a gas (e.g., air in a basketball).**
a. Gas is a state of matter that has mass.
Physical Science Lab, Level A: Cards 5, 7 **Physical Science Lab, Level B:** Cards 5, 7

Physical Science: Properties of Matter
S5-6:14 Students demonstrate their understanding of Physical Change by:
• **Predicting the effect of heating and cooling on the physical state and the mass of a substance.**
a. Energy is required to transform the physical state of a substance from solid to liquid to gas, while conserving mass. Physical changes are reversible.
Physical Science Lab, Level A: Cards 5, 6, 7, 8, 42 **Physical Science Lab, Level B:** Cards 5, 6, 7, 8, 42

Physical Science: Chemical Change
S5-6:15 Students demonstrate their understanding of Chemical Change by:
• **Observing evidence of simple chemical change to identify that new substances are formed when a chemical reaction has occurred (e.g., rusted nail, vinegar combined with baking soda).**
a. Simple chemical reactions will produce new substances that might be indicated by a different state of matter, a color change, or a temperature change of the substance.
Physical Science Lab, Level A: Cards 9, 27, 28, 29, 30 **Physical Science Lab, Level B:** Cards 9, 27, 28, 29, 30 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-

Physical Science: Motion
S5-6:19 Students demonstrate their understanding of Motion by:
• **Measuring and calculating speed (the distance an object moves over a measured amount of time).**
a. Speed indicates the rate at which an object is traveling.
Physical Science Lab, Level A: Card 51 **Physical Science Lab, Level B:** Card 51

Physical Science: Motion
S5-6:19 Students demonstrate their understanding of Motion by:
• **Measuring and calculating speed (the distance an object moves over a measured amount of time).**
b. Speed is a relationship between the distance an object travels and time elapsed.
Physical Science Lab, Level A: Card 51 **Physical Science Lab, Level B:** Card 51

Physical Science: Motion
S5-6:20 Students demonstrate their understanding of Motion by:
• **Investigating and identifying evidence of an object's inertia and explaining their observations in terms of the object's tendency to resist a change in motion.**
a. Inertia is the tendency of an object that depends on the object's mass. The inertia (mass) of an object resists change in the object's motion (stationary objects remain stationary; moving objects continue moving: Newton's First Law).
Physical Science Lab, Level A: Cards 53, 54, 55 **Physical Science Lab, Level B:** Cards 53, 54, 55

Physical Science: Force
S5-6:21 Students demonstrate their understanding of Force by:
• **Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.**
a. A force applied to a moving object will change the object's speed, direction, or both.
Physical Science Lab, Level A: Cards 54, 55, 56, 58 **Physical Science Lab, Level B:** Cards 54, 55, 56, 58 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 4, *Reducing Friction*, pages 89-91

Physical Science: Force
S5-6:21 Students demonstrate their understanding of Force by:
• **Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.**
b. Friction is a force that often opposes motion.
Physical Science Lab, Level A: Cards 54, 58 **Physical Science Lab, Level B:** Cards 54, 58 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 4, *Reducing Friction*, pages 89-91

Physical Science: Force
S5-6:21 Students demonstrate their understanding of Force by:
• **Investigating variables that change an object's speed, direction, or both, and identifying and describing the forces that cause the change in motion.**
c. Gravity and magnetism are examples of long-range forces that do not require direct contact of the interacting objects.
Physical Science Lab, Level A: Cards 57, 59, 66, 67, 74, 75, 76 **Physical Science Lab, Level B:** Cards 57, 59, 66, 67, 74, 75, 76

Physical Science: Force
S5-6:22 Students demonstrate their understanding of Gravitational Force by:
• **Predicting the effect of gravitational forces between pairs of objects (i.e., earth and objects on the surface, earth and moon, earth and sun).**
a. Gravity is the force that holds objects to the earth's surface, keeps planets in orbit around the sun and governs the rest of the motion in the solar system.
Physical Science Lab, Level A: Cards 57, 59 **Physical Science Lab, Level B:** Cards 57, 59

Physical Science: Force
S5-6:22 Students demonstrate their understanding of Gravitational Force by:
• **Predicting the effect of gravitational forces between pairs of objects (i.e., earth and objects on the surface, earth and moon, earth and sun).**
b. The force of gravity pulls toward the center of mass of an object.
Physical Science Lab, Level A: Cards 57, 59 **Physical Science Lab, Level B:** Cards 57, 59

Physical Science: Energy and Energy Transformation
S5-6:23 Students demonstrate their understanding of Heat Energy by:
• **Identifying real-world applications where heat energy is transferred and by showing the direction that the heat energy flows.**
a. Heat energy only flows from high temperature to lower temperature in order to reach equilibrium (same temperature).
Physical Science Lab, Level A: Cards 42, 43, 44 **Physical Science Lab, Level B:** Cards 42, 43, 44

Physical Science: Energy and Energy Transformation
S5-6:23 Students demonstrate their understanding of Heat Energy by:
• **Identifying real-world applications where heat energy is transferred and by showing the direction that the heat energy flows.**
b. Heat can move from one object to another by conduction.
Earth Science Lab, Level A: Card 38 **Earth Science Lab, Level B:** Card 38 **Physical Science Lab, Level A:** Cards 43, 44 **Physical Science Lab, Level B:** Cards 43, 44

Physical Science: Energy and Energy Transformation
S5-6:24 Students demonstrate their understanding of Electrical Energy by:
• **Investigating charged objects (static electricity) and describing their observations in terms of behavior of charges and equilibrium.**
a. Unbalanced charges produce a potential for a flow of electricity (Static).
Physical Science Lab, Level A: Cards 66, 67 **Physical Science Lab, Level B:** Cards 66, 67

Physical Science: Energy and Energy Transformation
S5-6:24 Students demonstrate their understanding of Electrical Energy by:
• **Investigating charged objects (static electricity) and describing their observations in terms of behavior of charges and equilibrium.**
b. Unbalanced charges will more toward equilibrium because like charges repel and opposite charges attract.
Physical Science Lab, Level A: Cards 66, 67 **Physical Science Lab, Level B:** Cards 66, 67

Physical Science: Energy and Energy Transformation
S5-6:25 Students demonstrate their understanding of Magnetism by:
• **Identifying real-world objects that demonstrate and utilize a magnetic force field acting over a distance.** • **Distinguishing between objects affected by magnetic force and objects affected by other non-contact forces.**
a. Magnetism is a force field that acts over a distance.
Physical Science Lab, Level A: Cards 74, 75, 76 **Physical Science Lab, Level B:** Cards 74, 75, 76

Physical Science: Energy and Energy Transformation
S5-6:26 Students demonstrate their understanding of Electromagnetic Forces by:
• **Investigating devices that demonstrate the magnetic effects of electricity and the electric effect of moving magnets.** • **Identifying relationship between the device and the magnetic or electrical effect it produces.**
a. Moving electrical charges (electricity) produce magnetic force (magnetism) (i.e., electromagnet, motor).
Physical Science Lab, Level A: Card 76 **Physical Science Lab, Level B:** Card 76

Physical Science: Energy and Energy Transformation
S5-6:26 Students demonstrate their understanding of Electromagnetic Forces by:
• **Investigating devices that demonstrate the magnetic effects of electricity and the electric effect of moving magnets.** • **Identifying relationship between the device and the magnetic or electrical effect it produces.**
b. Moving magnets produce electricity (e.g., generator).
Physical Science Lab, Level A: Card 76 **Physical Science Lab, Level B:** Card 76

Physical Science: Energy and Energy Transformation
S5-6:28 Students demonstrate their understanding of Light Energy by:
• **Designing demonstrations that represent the characteristics of light energy transfer.**
a. Light travels from an energy source (such as the sun) in straight lines.
Physical Science Lab, Level A: Cards 82, 83, 85, 86 **Physical Science Lab, Level B:** Cards 82, 83, 85, 86

Physical Science: Energy and Energy Transformation
S5-6:28 Students demonstrate their understanding of Light Energy by:
• **Designing demonstrations that represent the characteristics of light energy transfer.**
b. When light hits an object, it is absorbed, reflected, transmitted or some combination.
Physical Science Lab, Level A: Cards 85, 86, 87, 88 **Physical Science Lab, Level B:** Cards 85, 86, 87, 88

Physical Science: Energy and Energy Transformation
S5-6:28 Students demonstrate their understanding of Light Energy by:
• **Designing demonstrations that represent the characteristics of light energy transfer.**
c. Objects can be seen only when light waves are emitted from or reflected off the object and enter into the eye.
Physical Science Lab, Level A: Card 89 **Physical Science Lab, Level B:** Card 89

Physical Science: Energy and Energy Transformation
S5-6:29 Students demonstrate their understanding of Sound Energy by:
• **Generating a sound and identifying the path of vibration from the source to the ear.**
a. Sound is produced by vibrations in materials that set up wavelike disturbances that spread away from the source.
Physical Science Lab, Level A: Cards 77, 78, 79, 80 **Physical Science Lab, Level B:** Cards 77, 78, 79, 80 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 6, *Making Sound,* pages 97-99

Life Science: Survival of Organisms and Cells
S5-6: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Explaining that the cell, as the basic unit of life, has the same survival needs as the organism.** • **Identifying and drawing individual cells seen through a microscope and recognizing that most cells are microscopic.** • **Diagramming the exchange of materials through a cell membrane.**
a. All organisms are made of one or more cells. Cells are the basic unit of structure and function in an organism. o **All cells carry out the same basic functions to survive** o **Obtain food (energy) and materials for growth and repair** o **Eliminate (recycle) waste** o **Reproduce** o **Provide for defense.**
Life Science Lab, Level A: Cards 1, 5, 6, 7, 8, 9, 10 **Life Science Lab, Level B:** Cards 1, 5, 6, 7, 8, 9, 10 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells,* pages 77-79

Life Science: Survival of Organisms and Cells
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• **Explaining that the cell, as the basic unit of life, has the same survival needs as the organism.** • **Identifying and drawing individual cells seen through a microscope and recognizing that most cells are microscopic.** • **Diagramming the exchange of materials through a cell membrane.**
b. All cells are enclosed in a membrane that allows materials to pass into and out of the cell.
Life Science Lab, Level A: Card 8 **Life Science Lab, Level B:** Card 8

Life Science: Survival of Organisms and Cells
S5-6: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Explaining that the cell, as the basic unit of life, has the same survival needs as the organism.** • **Identifying and drawing individual cells seen through a microscope and recognizing that most cells are microscopic.** • **Diagramming the exchange of materials through a cell membrane.**
c. Most cells are microscopic.
Life Science Lab, Level A: Cards 5, 6, 7, 8, 9, 10 **Life Science Lab, Level B:** Cards 5, 6, 7, 8, 9, 10 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells,* pages 77-79

Life Science: Cell and Tissue Differentiation
S5-6: 32 Students demonstrate their understanding of how Differentiation by:
• **Explaining the relationship between cell, tissue, organ, and system.** • **Observing plant or animal tissue and explaining how "specialized" cells help to support the specialized function of tissue (e.g., muscle cells form muscle tissue, skin cells for skin tissue, nerve cells form brain tissue).**
a. In addition to basic functions, cells carry out "specialized" functions that support the survival of groups of cells and the organism.
Life Science Lab, Level A: Cards 5, 6, 7, 8, 9, 10 **Life Science Lab, Level B:** Cards 5, 6, 7, 8, 9, 10 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells,* pages 77-79

Life Science: Cell and Tissue Differentiation
S5-6: 32 Students demonstrate their understanding of how Differentiation by:
• **Explaining the relationship between cell, tissue, organ, and system.** • **Observing plant or animal tissue and explaining how "specialized" cells help to support the specialized function of tissue (e.g., muscle cells form muscle tissue, skin cells for skin tissue, nerve cells form brain tissue).**
b. Groups of similar cells connect and work together to form tissue, groups of tissue form organs, and groups of organs form systems.
Life Science Lab, Level A: Cards 44, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 **Life Science Lab, Level B:** Cards 44, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58

Life Science: Chemical Reactions within Cells
S5-6: 33 Students demonstrate their understanding of how Energy Flow within Cells Supports an Organism's Survival by:
• **Demonstrating through drawings, stories or models that cells take in food and oxygen to produce energy and send out waste materials.**
a. In order to obtain energy for all the functions of survival, individual cells take in food and oxygen to produce energy and send out waste materials.
Life Science Lab, Level A: Cards 8, 9 **Life Science Lab, Level B:** Cards 8, 9

Life Science: Interdependence within Ecosystems
S5-6: 34 Students demonstrate their understanding of Energy Flow in an Ecosystem by:
• **Developing a model that shows how the flow of energy from the sun is transferred to organisms as food in order to sustain life.**
a. Energy within an ecosystem originates from the sun. Plants use energy from the sun, carbon dioxide, and water to make energy rich food and oxygen. Plants are producers.
Life Science Lab, Level A: Cards 16, 17, 76, 77 **Life Science Lab, Level B:** Cards 16, 17, 76, 77

Life Science: Interdependence within Ecosystems
S5-6: 34 Students demonstrate their understanding of Energy Flow in an Ecosystem by:
• **Developing a model that shows how the flow of energy from the sun is transferred to organisms as food in order to sustain life.**
b. Animals eat food that plants make combined with oxygen to produce energy, carbon dioxide, and water. Animals are consumers.
Life Science Lab, Level A: Cards 16, 17, 76, 77 **Life Science Lab, Level B:** Cards 16, 17, 76, 77 **Life Science Lab Teacher's Handbook:** Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99

Life Science: Interdependence within Ecosystems
S5-6: 35 Students demonstrate their understanding of Food Webs in an Ecosystem by:
• **Developing a model for a food web of a local aquatic and local terrestrial environment.**
a. Food webs model the interdependent relationships that organisms engage in as they acquire their food and energy needs. Aquatic food webs (fresh water and marine) are supported by microscopic ocean plants. Land food webs are supported by land plants.
Life Science Lab, Level A: Cards 76, 77, 81, 82 **Life Science Lab, Level B:** Cards 76, 77, 81, 82 **Life Science Lab Teacher's Handbook:** Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99 **Earth Science Lab, Level A:** Card 89 **Earth Science Lab, Level B:** Card 89

Life Science: Interdependence within Ecosystems
S5-6: 36 Students demonstrate their understanding of Equilibrium in an Ecosystem by:
• **Experimenting with a closed system, describing how an environmental change affects the system (e.g., bottle biology).**
a. The number of organisms an ecosystem can support depends on the kinds of organisms present and the availability of biotic and abiotic resources (i.e., quantity of light and water, range of temperatures, and soil composition).
Life Science Lab, Level A: Cards 70, 71, 72 **Life Science Lab, Level B:** Cards 70, 71, 72

Life Science: Interdependence within Ecosystems
S5-6: 37 Students demonstrate their understanding of Recycling in an Ecosystem by:
• **Identifying the recycling role of decomposers in a variety of situations.**
a. Decomposers, primarily bacteria and fungi, are consumers that use waste material and dead organisms for food.
Life Science Lab, Level A: Cards 12, 13, 76, 77 **Life Science Lab, Level B:** Cards 12, 13, 76, 77

Life Science: Natural Selection/Evolution
S5-6: 39 Students demonstrate their understanding of Evolution/Natural Selection by:
• **Explaining through engaging in simulations, how a variation in a characteristic (trait) enables an organism to survive in a changing environment.**
a. When the environment changes some plants and animals with advantageous traits are able to survive; others with less-advantageous traits, either move to new locations or die.
Life Science Lab, Level A: Cards 65, 66, 67, 86 **Life Science Lab, Level B:** Cards 65, 66, 67, 86 **Earth Science Lab, Level A:** Cards 60, 61, 86 **Earth Science Lab, Level B:** Cards 60, 61, 86

Human Body: Heredity
S5-6:40 Students demonstrate their understanding of Human Heredity by:
• **Identifying that an offspring's traits are determined by combining the sex cells (female egg and male sperm) of the parents.**
a. Organisms can reproduce sexually when a female egg cell is fertilized by a male sperm cell to produce an offspring that has the traits of both parents.
Life Science Lab, Level A: Cards 58, 61 **Life Science Lab, Level B:** Cards 58, 61

Human Body: Body Systems
S5-6:41 Students demonstrate their understanding of Human Body Systems by:
• **Investigating circumstances that affect more than one body system and explaining the interconnected relationship between the body systems (e.g., the effects of exercise on several independent body systems, such as respiration, circulatory, digestive, nervous, skeletal systems).**
a. The digestive, respiratory and circulatory systems are connected. o **The digestive system processes the food that cells need.** o **The excretory system disposes of cellular waste and the intestinal tract removes solid waste.** o **The respiratory system exchanges oxygen and carbon dioxide.** o **The circulatory system moves all these substances to and from the cells.**
Life Science Lab, Level A: Cards 47, 48, 50, 51, 52 **Life Science Lab, Level B:** Cards 47, 48, 50, 51, 52 **Life Science Lab Teacher's Handbook:** Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91

Human Body: Body Systems
S5-6:41 Students demonstrate their understanding of Human Body Systems by:
• **Investigating circumstances that affect more than one body system and explaining the interconnected relationship between the body systems (e.g., the effects of exercise on several independent body systems, such as respiration, circulatory, digestive, nervous, skeletal systems).**
b. A change in one system can have an effect on other systems (e.g., exercise changing heart rate and breathing rate).
Life Science Lab, Level A: Cards 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 **Life Science Lab, Level B:** Cards 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58 **Life Science Lab Teacher's Handbook:** Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91

Human Body: Human Disease
S5-6:42 Students demonstrate their understanding of the Patterns of Human Health/Disease by:
• **Connecting the specialized functions of white blood cells to their location in the circulatory system.**
a. White blood cells engulf invading microbes or produce antibodies that attack them.
Life Science Lab, Level A: Cards 48, 49 **Life Science Lab, Level B:** Cards 48, 49

Human Body: Patterns of Human Development
S5-6:43 Students demonstrate their understanding of the Patterns of Human Development by:
• **Drawing/diagramming/modeling the life span of humans in a timeline highlighting major points in the cycle (e.g., one cells grows into a many-celled embryo, composed of different types of cells—grows into a fetus—baby is born—grows into a toddler—grows into a child—grows into a teenager—grows into an adult).** • **Explaining what occurs in the processes of fertilization and early embryo development (e.g., sperm + egg combine to produce a new individual).**
a. Following fertilization, cell division produces a small cluster of cells that then differentiate by appearance and function to form the basic tissues and organs of an embryo, which eventually grows into an adult organism.
Life Science Lab, Level A: Cards 40, 61, 68 **Life Science Lab, Level B:** Cards 40, 61, 68

Universe, Earth, Environment: Solar System
S5-6:44 Students demonstrate their understanding of Characteristics of the Solar System by:
• **Creating a diagram or model of the orbit of the earth around the sun and the moon around the earth.**
a. The earth orbits the sun in a near circular path that takes a year to complete.
Earth Science Lab, Level A: Cards 62, 68 **Earth Science Lab, Level B:** Cards 62, 68

Universe, Earth, Environment: Solar System
S5-6:44 Students demonstrate their understanding of Characteristics of the Solar System by:
• **Creating a diagram or model of the orbit of the earth around the sun and the moon around the earth.**
b. The moon's orbit around the earth once in about 28 says changes the portion of the moon visible to us, as a result of the sun's reflected light (phases of the moon).
Earth Science Lab, Level A: Card 64 **Earth Science Lab, Level B:** Card 64

Universe, Earth, Environment: Scale, Distance, Star Formation, Theories, Instrumentation
S5-6:45 Students demonstrate their understanding of Processes and Change over Time within Systems of the Universe by:
• **Explaining (after viewing a picture or illustration with sun/moon showing true relative size) why the sun and moon appear to be the same size when seen from the earth.** • **Relating this phenomenon to lunar and solar eclipses.**
a. From earth the moon and sun appear to be the same size, because the moon is so much closer to the earth than the sun.
Earth Science Lab, Level A: Cards 62, 63, 67 **Earth Science Lab, Level B:** Cards 62, 63, 67

Universe, Earth, Environment: Scale, Distance, Star Formation, Theories, Instrumentation
S5-6:45 Students demonstrate their understanding of Processes and Change over Time within Systems of the Universe by:
• **Explaining (after viewing a picture or illustration with sun/moon showing true relative size) why the sun and moon appear to be the same size when seen from the earth.** • **Relating this phenomenon to lunar and solar eclipses.**
b. Telescopes magnify the appearance of some very distant objects in the sky, including the moon and the planets. The number of stars that can be seen through telescopes is dramatically greater than can be seen by the unaided eye.
Earth Science Lab, Level A: Cards 75, 79, 80, 81 **Earth Science Lab, Level B:** Cards 75, 79, 80, 81

Universe, Earth, Environment: Earth Materials and the Rock Cycle
S5-6:46 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Explaining the process of how rocks are formed (Rock Cycle).** • **Creating a model of the earth's structure explaining the nature of the layers.**
a. Rocks come from magma or lava, as well as from sediments that build up in layers. As all rocks from earth's surface weather, form sediments and become buried and heated (through pressure of direct heat), they may crystallize into new rock. Eventually those new rocks may be brought to the surface by forces that drive plate motions (The Rock Cycle).
Earth Science Lab, Level A: Cards 6, 7, 8, 9, 17 **Earth Science Lab, Level B:** Cards 6, 7, 8, 9, 17

Universe, Earth, Environment: Earth Materials and the Rock Cycle
S5-6:46 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Explaining the process of how rocks are formed (Rock Cycle).** • **Creating a model of the earth's structure explaining the nature of the layers.**
b. The earth is layered with a rigid shell, a hot mantle, and a dense metallic core.
Earth Science Lab, Level A: Cards 1, 2 **Earth Science Lab, Level B:** Cards 1, 2

Universe, Earth, Environment: Forces and Changes on the Earth's Surface
S5-6:47 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by: • **Identifying examples of geologic changes on the earth's surface, where possible in the local environment (include slow and fast changes).** • **Plotting locations of volcanoes and earthquakes and explaining the relationship between location and plate movements.** • **Explaining the processes that occur when rocks are changed from one form to another.** • **Determining the relative age of fossils within sedimentary rocks from their location in the strata (i.e., which fossils within a sequence are older).**
a. Some changes on the earth can be very slow, such as weathering and mountain-building, and come can be very fast, such as volcanoes and earthquakes.
Earth Science Lab, Level A: Cards 10, 11, 12, 13, 14, 15, 16, 17, 22, 24, 25, 26, 27, 28, 88 **Earth Science Lab, Level B:** Cards 10, 11, 12, 13, 14, 15, 16, 17, 22, 24, 25, 26, 27, 28, 88 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79

Universe, Earth, Environment: Forces and Changes on the Earth's Surface
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b. Earth's rigid shell is composed of large plates that move at rates of centimeters a year. Major geologic events, such as earthquakes, volcanic eruptions and mountain building, result from these plate motions.
Earth Science Lab, Level A: Cards 10, 11, 12, 13, 14, 15, 16, 17, 88 **Earth Science Lab, Level B:** Cards 10, 11, 12, 13, 14, 15, 16, 17, 88 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79

Universe, Earth, Environment: Forces and Changes on the Earth's Surface
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c. Thousands of layers of sedimentary rock confirm the long history of the changing surface of the earth and the changing life forms whose remains are found in successive layers (land forms—coastlines, mountains, rivers, canyons, deltas).
Life Science Lab, Level A: Card 67 **Life Science Lab, Level B:** Card 67 **Earth Science Lab, Level A:** Cards30, 31, 32, 33, 34 **Earth Science Lab, Level B:** Cards 30, 31, 32, 33, 34

Universe, Earth, Environment: Atmosphere, Water Cycle, Weather, Seasons
S5-6:48 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Diagramming, labeling, and explaining the process of the water cycle (e.g., evaporation, precipitation, run-off).**
a. The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. Water evaporates from the surface of the earth, rises and cools, and falls again to the surface as rain. The water falling on land collects in rivers and lakes, soil and porous layers of rock and much of it flows back into the ocean.
Earth Science Lab, Level A: Cards 47, 48, 49, 55, 56, 57, 58, 60, 82, 83, 84, 87 **Earth Science Lab, Level B:** Cards 47, 48, 49, 55, 56, 57, 58, 60, 82, 83, 84, 87 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103

Universe, Earth, Environment: Natural Resources
S5-6:49 Students demonstrate their understanding of Processes and Change within Natural Resources by:
• **Identifying examples of good and poor management of natural resources.** • **Explaining how overpopulation of living things can degrade an environment due to increased use of resources.**
a. Responsible management of the earth's resources (air, soil, water, trees) is beneficial for the environment and for human use.
Life Science Lab, Level A: Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab, Level A:** Cards 29, 35, 37, 42, 59, 60, 61, 85, 86 **Earth Science Lab, Level B:** Cards 29, 35, 37, 42, 59, 60, 61, 85, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?*, pages 89-91 **Physical Science Lab, Level A:** Cards 38, 47, 48, 49 **Physical Science Lab, Level B:** Cards 38, 47, 48, 49

SRA Life, Earth, and Physical Science Laboratories
correlation to
Vermont Grade Expectations for Science
Grades 7-8

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Scientific Questioning
S7-8:1 Students demonstrate their understanding of SCIENTIFIC QUESTIONING by:
• **Developing questions that reflect prior knowledge.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 8, 15

Scientific Questioning
S7-8:1 Students demonstrate their understanding of SCIENTIFIC QUESTIONING by:
• **Refining and focusing broad ill-defined questions.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 8, 15

Predicting and Hypothesizing
S7-8:2 Students demonstrate their understanding of PREDICTING AND HYPOTHESIZING by:
• **Predicting results (evidence) that support the hypothesis.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99 **Classroom Resource CD-ROM:** Writing Strategy 8, 15

Predicting and Hypothesizing
S7-8:2 Students demonstrate their understanding of PREDICTING AND HYPOTHESIZING by:
• **Proposing a hypothesis based upon a scientific concept or principle, observation, or experience that identifies the relationship between variables.**
Life Science Lab Teacher's Handbook: Hands-On Activity 3, *Investigating Arthropods*, pages 85-87 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87 **Classroom Resource CD-ROM:** Writing Strategy 8, 15

Designing Experiments
S7-8:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question, hypothesis, and prediction that includes:**
a. A diagram labeled using scientific terminology that supports procedures and illustrates the setup.
Classroom Resource CD-ROM: Writing Strategy 15

Designing Experiments
S7-8:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question, hypothesis, and prediction that includes:**
b. A procedure that lists significant steps that identify manipulated (independent) and responding (dependent) variables.
Classroom Resource CD-ROM: Writing Strategy 15, 23

Designing Experiments
S7-8:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question, hypothesis, and prediction that includes:**
c. A control for comparing data when appropriate.
Classroom Resource CD-ROM: Writing Strategy 15, 23

Designing Experiments
S7-8:3 Students demonstrate their understanding of EXPERIMENTAL DESIGN by:
• **Writing a plan related to the question, hypothesis, and prediction that includes:**
d. Identification of tools and procedures for collecting data and reducing error.
Classroom Resource CD-ROM: Writing Strategy 15, 16, 22, 24

Conducting Experiments
S7-8:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Accurately quantifying observations using appropriate measurement tools.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99

Conducting Experiments
S7-8:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Using technology to collect, quantify, organize, and store observations (e.g., use of probe).**
Life Science Lab Teacher's Handbook: Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 6, *Making Sound,* pages 97-99

Conducting Experiments
S7-8:4 Students demonstrate their ability to CONDUCT EXPERIMENTS by:
• **Drawing scientifically:**
a. Recording multiple perspectives to scale (e.g., magnification, cross section, top view, side view, etc.).
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 5, *Making a Potato Battery,* pages 93-95

Representing Data and Analysis
S7-8:5 Students demonstrate their ability to REPRESENT DATA by:
• **Representing independent variable on the "X" axis and dependent variable on the "Y" axis.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83

Representing Data and Analysis
S7-8:5 Students demonstrate their ability to REPRESENT DATA by:
• **Determining a scale for a diagram that is appropriate to the task.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83

Representing Data and Analysis
S7-8:5 Students demonstrate their ability to REPRESENT DATA by:
• **Using technology to enhance a representation.**

Representing Data and Analysis
S7-8:5 Students demonstrate their ability to REPRESENT DATA by:
• **Using color, texture, symbols and other graphic strategies to clarify trends/patterns within a representation.**
Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83

Representing Data and Analysis
S7-8:6 Students demonstrate their ability to ANALYZE DATA by:
• **Identifying, considering and addressing experimental errors (e.g., errors in experimental design, errors in data collection procedures.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells*, pages 77-79; Hands-On Activity 2, *Culturing Bacteria*, pages 81-83; Hands-On Activity 3, *Investigating Arthropods*, pages 85-87; Hands-On Activity 4, *Your Cardiovascular System*, pages 89-91; Hands-On Activity 5, *Making Fossils*, pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?*, pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain*, pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action*, pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map*, pages 81-83; Hands-On Activity 4, *Using Sound Waves*, pages 85-87; Hands-On Activity 5, *What is in the Air?*, pages 89-91; Hands-On Activity 6, *Modeling a Tornado*, pages 93-95; Hands-On Activity 7, *Sizes in the Solar System*, pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density*, pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases*, pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83; Hands-On Activity 3, *Energy Conversion*, pages 85-87; Hands-On Activity 4, *Reducing Friction*, pages 89-91; Hands-On Activity 5, *Making a Potato Battery*, pages 93-95; Hands-On Activity 6, *Making Sound*, pages 97-99

Representing Data and Analysis

S7-8:6 Students demonstrate their ability to ANALYZE DATA by:

- **Identifying limitations and/or sources of error within the experimental design.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Representing Data and Analysis

S7-8:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Using scientific concepts, models, and terminology to report results, discuss relationships, and propose new explanations.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Representing Data and Analysis

S7-8:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Generating alternative explanations.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Representing Data and Analysis

S7-8:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Documenting and explaining changes in experimental design.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Representing Data and Analysis

S7-8:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Sharing conclusion/summary with appropriate audience beyond the research group.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Classroom Resource CD-ROM: Writing Strategy 1, 18

Representing Data and Analysis

S7-8:7 Students demonstrate their ability to EXPLAIN DATA by:

- **Using mathematical analysis as an integral component of the conclusion.**

Life Science Lab Teacher's Handbook: Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Applying Results

S7-8:8 Students demonstrate their ability to APPLY RESULTS by:

- **Identifying additional data that would strengthen an investigation.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Applying Results

S7-8:8 Students demonstrate their ability to APPLY RESULTS by:

- **Explaining limitations for generalizing findings.**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Applying Results

S7-8:8 Students demonstrate their ability to APPLY RESULTS by:

- **Explaining relevance of findings (e.g., So what?) to local environment (community, school, classroom).**

Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103

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Applying Results
S7-8:8 Students demonstrate their ability to APPLY RESULTS by:
• **Devising recommendations for further investigation and making decisions based on evidence.**
Life Science Lab Teacher's Handbook: Hands-On Activity 1, *Examining Cells,* pages 77-79; Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87; Hands-On Activity 4, *Your Cardiovascular System,* pages 89-91; Hands-On Activity 5, *Making Fossils,* pages 93-95; Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99; Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale,* pages 73-75; Hands-On Activity 2, *Plate Boundaries in Action,* pages 77-79; Hands-On Activity 3, *Interpreting a Topographic Map,* pages 81-83; Hands-On Activity 4, *Using Sound Waves,* pages 85-87; Hands-On Activity 5, *What is in the Air?,* pages 89-91; Hands-On Activity 6, *Modeling a Tornado,* pages 93-95; Hands-On Activity 7, *Sizes in the Solar System,* pages 97-99; Hands-On Activity 8, *Temperature, Salinity, and Water Density,* pages 101-103 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 1, *Measuring pH of Acids and Bases,* pages 77-79; Hands-On Activity 2, *Chemical Reaction Rates,* pages 81-83; Hands-On Activity 3, *Energy Conversion,* pages 85-87; Hands-On Activity 4, *Reducing Friction,* pages 89-91; Hands-On Activity 5, *Making a Potato Battery,* pages 93-95; Hands-On Activity 6, *Making Sound,* pages 97-99

Physical Science: Properties of Matter
S7-8:9 Students demonstrate their understanding of the Properties of Matter by:
• **Calculating the density of regularly and irregularly shaped objects.** • **Explaining why all three states of matter can be observed in a room that has a uniform temperature.**
a. The density of a substance can be measured and quantified as the mass (amount of the substance) that is contained per unit volume of that substance.
Physical Science Lab, Level A: Card 2 **Physical Science Lab, Level B:** Card 2

Physical Science: Properties of Matter
S7-8:9 Students demonstrate their understanding of the Properties of Matter by:
• **Calculating the density of regularly and irregularly shaped objects.** • **Explaining why all three states of matter can be observed in a room that has a uniform temperature.**
b. Changing the temperature of materials will change the density of the material.
Physical Science Lab, Level A: Card 2 **Physical Science Lab, Level B:** Card 2

Physical Science: Properties of Matter
S7-8:10 Students demonstrate their understanding of the Properties of Matter by:
• **Illustrating through words or representations, the differences between atoms and molecules.** • **Recognizing that all living things and non-living things are formed from combinations of about 100 elements.**
a. All matter is made up of atoms that are too small to see.
Physical Science Lab, Level A: Cards 3, 4, 10, 11 **Physical Science Lab, Level B:** Cards 3, 4, 10, 11

Physical Science: Properties of Matter
S7-8:10 Students demonstrate their understanding of the Properties of Matter by:
• **Illustrating through words or representations, the differences between atoms and molecules.** • **Recognizing that all living things and non-living things are formed from combinations of about 100 elements.**
b. Atoms bound together to form molecules.
Physical Science Lab, Level A: Cards 3, 4, 10, 11 **Physical Science Lab, Level B:** Cards 3, 4, 10, 11

Physical Science: Properties of Matter
S7-8:10 Students demonstrate their understanding of the Properties of Matter by:
• **Illustrating through words or representations, the differences between atoms and molecules.** • **Recognizing that all living things and non-living things are formed from combinations of about 100 elements.**
c. An element is a substance in which the atoms are all the same.
Physical Science Lab, Level A: Card 10 **Physical Science Lab, Level B:** Card 10

Physical Science: Properties of Matter
S7-8:10 Students demonstrate their understanding of the Properties of Matter by:
• **Illustrating through words or representations, the differences between atoms and molecules.** • **Recognizing that all living things and non-living things are formed from combinations of about 100 elements.**
d. All living and non-living things are formed from combinations of about 100 elements.
Life Science Lab, Level A: Cards 4, 46 **Life Science Lab, Level B:** Cards 4, 46 **Earth Science Lab, Level A:** Cards 3, 4 **Earth Science Lab, Level B:** Cards 3, 4 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 1, *Identifying Minerals with the Mohs Scale*, pages 73-75 **Physical Science Lab, Level A:** Cards 10, 17, 18, 19, 20 **Physical Science Lab, Level B:** Cards 10, 17, 18, 19, 20

Physical Science: Properties of Matter
S7-8:12 Students demonstrate their understanding of the Properties of Matter by:
• **Modeling (plays, models, diagrams) molecular motion of the three states of matter and explaining how that motion defines each state.**
a. Atoms and molecules are in perpetual motion.
Physical Science Lab, Level A: Cards 3, 4, 6, 7, 8, 42 **Physical Science Lab, Level B:** Cards 3, 4, 6, 7, 8, 42

Physical Science: Properties of Matter
S7-8:12 Students demonstrate their understanding of the Properties of Matter by:
• **Modeling (plays, models, diagrams) molecular motion of the three states of matter and explaining how that motion defines each state.**
b. The atoms in solids only vibrate closely together.
Physical Science Lab, Level A: Cards 5, 6, 42 **Physical Science Lab, Level B:** Cards 5, 6, 42

Physical Science: Properties of Matter
S7-8:12 Students demonstrate their understanding of the Properties of Matter by:
• **Modeling (plays, models, diagrams) molecular motion of the three states of matter and explaining how that motion defines each state.**
c. The atoms in liquids loosely slide past one another.
Physical Science Lab, Level A: Cards 5, 6, 42 **Physical Science Lab, Level B:** Cards 5, 6, 42

Physical Science: Properties of Matter
S7-8:12 Students demonstrate their understanding of the Properties of Matter by:
• **Modeling (plays, models, diagrams) molecular motion of the three states of matter and explaining how that motion defines each state.**
d. The atoms in gases move freely apart from one another and collide with one another.
Physical Science Lab, Level A: Cards 5, 6, 7, 42 **Physical Science Lab, Level B:** Cards 5, 6, 7, 42

Physical Science: Properties of Matter
S7-8:13 Students demonstrate their understanding of the Properties of a Gas by:
• **Using real world examples (tires, balloons, soda) predict and explain the effect that a change in one variable (pressure, temperature or volume) will have on the other(s).**
a. There exists a predictable relationship among the volume, temperature, and amount of gas and the pressure the gas exerts.
Physical Science Lab, Level A: Cards 2, 7, 42 **Physical Science Lab, Level B:** Cards 2, 7, 42

Physical Science: Properties of Matter
S7-8:13 Students demonstrate their understanding of the Properties of a Gas by:
• **Using real world examples (tires, balloons, soda) predict and explain the effect that a change in one variable (pressure, temperature or volume) will have on the other(s).**
b. For any specified amount of a gas, the pressure that the gas exerts will increase as the temperature increases of the volume of the gas decreases. The pressure that the gas exerts will decrease as the temperature decreases or the volume of the gas increases.
Physical Science Lab, Level A: Cards 2, 7, 42 **Physical Science Lab, Level B:** Cards 2, 7, 42

Physical Science: Properties of Matter
S7-8:13 Students demonstrate their understanding of the Properties of a Gas by:
• **Using real world examples (tires, balloons, soda) predict and explain the effect that a change in one variable (pressure, temperature or volume) will have on the other(s).**
c. Gases exert pressure in all directions.
Physical Science Lab, Level A: Card 7 **Physical Science Lab, Level B:** Card 7

Physical Science: Properties of Matter
S7-8:14 Students demonstrate their understanding of Physical Change by:
• **Constructing their own models, representing the states of matter at the molecular level and explaining the effect of increased and decreased heat energy on the motion and arrangement of molecules.** • **Observing the physical processes of evaporation and condensation, and accounting for the disappearance and appearance of liquid water in terms of molecular motion and conservation of matter.**
a. Increased temperature of substances causes increased motion of the atoms and molecules in the substance.
Physical Science Lab, Level A: Cards 5, 6, 7, 42 **Physical Science Lab, Level B:** Cards 5, 6, 7, 42

Physical Science: Properties of Matter
S7-8:14 Students demonstrate their understanding of Physical Change by:
• **Constructing their own models, representing the states of matter at the molecular level and explaining the effect of increased and decreased heat energy on the motion and arrangement of molecules.** • **Observing the physical processes of evaporation and condensation, and accounting for the disappearance and appearance of liquid water in terms of molecular motion and conservation of matter.**
b. As the temperature and motion of molecules in a substance increase, the space between molecules in the substance increases possibly causing a change in state.
Physical Science Lab, Level A: Cards 5, 6, 7, 42 **Physical Science Lab, Level B:** Cards 5, 6, 7, 42

Physical Science: Chemical Change
S7-8:15 Students demonstrate their understanding of Chemical Change by:
• **Observing evidence of chemical change, and offering qualitative explanations for the observed changes in substances in terms of interaction and rearrangement of the atoms, and the production of new substances with different characteristics but the same mass as the original substances.**
a. Chemical change is a transformation of matter that results from the interaction of the molecules in a substance and a new substance results (e.g., electrophoresis of water). Chemical change is not reversible.
Physical Science Lab, Level A: Cards 9, 27, 28, 29, 30 **Physical Science Lab, Level B:** Cards 9, 27, 28, 29, 30 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83

Physical Science: Chemical Change
S7-8:15 Students demonstrate their understanding of Chemical Change by:
• **Observing evidence of chemical change, and offering qualitative explanations for the observed changes in substances in terms of interaction and rearrangement of the atoms, and the production of new substances with different characteristics but the same mass as the original substances.**
b. During chemical change, the atoms in the substances are rearranged and because the mass of the product of a chemical reaction is the same as the mass of the reactants in that reaction, we know that the total number of atoms in the substances stays the same.
Physical Science Lab, Level A: Cards 9, 27, 28, 29, 30 **Physical Science Lab, Level B:** Cards 9, 27, 28, 29, 30 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 2, *Chemical Reaction Rates*, pages 81-83

Physical Science: Motion
S7-8:19 Students demonstrate their understanding of Motion by:
• **Designing investigations that illustrate the effects of a change in mass or velocity on an object's momentum.** • **Describing that acceleration of an object is proportional to the force on the object and inversely proportional to the mass of the object.**
a. Velocity indicates the speed and the direction of a moving object.
Physical Science Lab, Level A: Cards 50, 51, 52 **Physical Science Lab, Level B:** Cards 50, 51, 52

Physical Science: Motion
S7-8:19 Students demonstrate their understanding of Motion by:
• **Designing investigations that illustrate the effects of a change in mass or velocity on an object's momentum.** • **Describing that acceleration of an object is proportional to the force on the object and inversely proportional to the mass of the object.**
b. Momentum is the characteristic of an object in motion that depends on the object's mass and velocity. Momentum provides the ability for a moving object to stay in motion without an additional force.
Physical Science Lab, Level A: Cards 53, 55 **Physical Science Lab, Level B:** Cards 53, 55

Physical Science: Motion
S7-8:19 Students demonstrate their understanding of Motion by:
• **Designing investigations that illustrate the effects of a change in mass or velocity on an object's momentum.** • **Describing that acceleration of an object is proportional to the force on the object and inversely proportional to the mass of the object.**
c. Acceleration is a relationship between the force applied to a moving object and the mass of the object (Newton's Second Law).
Physical Science Lab, Level A: Cards 52, 55 **Physical Science Lab, Level B:** Cards 52, 55

Physical Science: Force
S7-8:21 Students demonstrate their understanding of Force by:
• **Diagramming or describing, after observing a scenario with a moving object, the forces acting on the object before and after it is put in motion. (Students include in their diagram or description, the effect of these forces on the motion of the object.)**
a. If there is no change in the speed or direction of a moving object or stationary object, the forces acting on the object are balanced.
Physical Science Lab, Level A: Cards 54, 55, 56 **Physical Science Lab, Level B:** Cards 54, 55, 56

Physical Science: Force
S7-8:21 Students demonstrate their understanding of Force by:
• **Diagramming or describing, after observing a scenario with a moving object, the forces acting on the object before and after it is put in motion. (Students include in their diagram or description, the effect of these forces on the motion of the object.)**
b. If there is a change in the speed or direction of an object, an outside force needs to be applied and the forces acting on the object are unbalanced (Newton's First Law).
Physical Science Lab, Level A: Cards 54, 55, 56 **Physical Science Lab, Level B:** Cards 54, 55, 56

Physical Science: Force
S7-8:22 Students demonstrate their understanding of Gravitational Force by:
• **Describing the effects of gravitational force on objects in the Solar System and identifying evidence that the force of gravity is relative to the mass of objects and their distance apart.**
a. The force of gravity depends on the amount of mass objects have and how far apart they may be.
Physical Science Lab, Level A: Cards 57, 59 **Physical Science Lab, Level B:** Cards 57, 59

Physical Science: Force
S7-8:22 Students demonstrate their understanding of Gravitational Force by:
• **Describing the effects of gravitational force on objects in the Solar System and identifying evidence that the force of gravity is relative to the mass of objects and their distance apart.**
b. The force of gravity is hard to detect unless at least one of the objects has considerable mass.
Physical Science Lab, Level A: Cards 57, 59 **Physical Science Lab, Level B:** Cards 57, 59

Physical Science: Energy and Energy Transformation
S7-8:23 Students demonstrate their understanding of Heat Energy by:
• **Creating a diagram, model, or analogy for a material in a warmer and cooler state showing or describing the motion of the molecules.** • **Creating a diagram, model, or analogy to explain the difference between conduction, convection, and radiation, and using their visual to explain how heat energy travels in different directions and through different materials by each method of energy transfer.**
a. Heat energy is the motion of molecules.
Physical Science Lab, Level A: Cards 42, 43, 44 **Physical Science Lab, Level B:** Cards 42, 43, 44

Physical Science: Energy and Energy Transformation
S7-8:23 Students demonstrate their understanding of Heat Energy by:
• **Creating a diagram, model, or analogy for a material in a warmer and cooler state showing or describing the motion of the molecules.** • **Creating a diagram, model, or analogy to explain the difference between conduction, convection, and radiation, and using their visual to explain how heat energy travels in different directions and through different materials by each method of energy transfer.**
b. Increased motion of the molecules in a system increases the heat energy of the system.
Physical Science Lab, Level A: Cards 42, 43 **Physical Science Lab, Level B:** Cards 42, 43

Physical Science: Energy and Energy Transformation
S7-8:23 Students demonstrate their understanding of Heat Energy by:
• **Creating a diagram, model, or analogy for a material in a warmer and cooler state showing or describing the motion of the molecules.** • **Creating a diagram, model, or analogy to explain the difference between conduction, convection, and radiation, and using their visual to explain how heat energy travels in different directions and through different materials by each method of energy transfer.**
c. Heat energy is transferred by: • **Conduction—Collusion of molecules in solids.** • **Convection—Organized flow of heat currents through a fluid.** • **Radiation—Transfer by waves that can travel through a vacuum.**
Physical Science Lab, Level A: Cards 43, 44, 46 **Physical Science Lab, Level B:** Cards 43, 44, 46

Physical Science: Energy and Energy Transformation
S7-8:24 Students demonstrate their understanding of Electrical Energy by: • **Building an electric circuit and explaining the transfer of electrical energy into heat, light, and sound, leaving the system but not destroyed.** • **Describing the effect of a change in voltage in the circuit system.**
a. Electric circuits provide a means of transferring electrical energy when heat, light, and sound are produced. The electrical energy is spread out yet still conserved.
Physical Science Lab, Level A: Cards 66, 67, 68, 69, 70, 71, 72, 73 **Physical Science Lab, Level B:** Cards 66, 67, 68, 69, 70, 71, 72, 73 **Physical Science Lab Teacher's Handbook:** Hands-On Activity 5, *Making a Potato Battery*, pages 93-95

Physical Science: Energy and Energy Transformation
S7-8:24 Students demonstrate their understanding of Electrical Energy by: • **Building an electric circuit and explaining the transfer of electrical energy into heat, light, and sound, leaving the system but not destroyed.** • **Describing the effect of a change in voltage in the circuit system.**
b. Electric charges can have "Potential" energy (voltage). The higher the potential energy of the charges, the higher the voltage.
Physical Science Lab, Level A: Card 69 **Physical Science Lab, Level B:** Card 69

Physical Science: Energy and Energy Transformation
S7-8:28 Students demonstrate their understanding of Light Energy by: • **Designing demonstrations that represent the characteristics of light energy transfer.** • **Explaining that visible light is made up of the colored light waves.**
a. Light is a form of radiant energy.
Physical Science Lab, Level A: Cards 82, 83, 84, 85 **Physical Science Lab, Level B:** Cards 82, 83, 84, 85

Physical Science: Energy and Energy Transformation
S7-8:28 Students demonstrate their understanding of Light Energy by: • **Designing demonstrations that represent the characteristics of light energy transfer.** • **Explaining that visible light is made up of the colored light waves.**
b. Transmitted light can be refracted (change in direction of the light) when it passes from one media into another.
Physical Science Lab, Level A: Cards 85, 87 **Physical Science Lab, Level B:** Cards 85, 87

Physical Science: Energy and Energy Transformation
S7-8:28 Students demonstrate their understanding of Light Energy by: • **Designing demonstrations that represent the characteristics of light energy transfer.** • **Explaining that visible light is made up of the colored light waves.**
c. Visible light is part of the electromagnetic spectrum. Visible (white) light is made up of the colored light waves of the visible spectrum.
Physical Science Lab, Level A: Cards 82, 83, 85 **Physical Science Lab, Level B:** Cards 82, 83, 85

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
a. Cells contain structures that carry out survival functions.
Life Science Lab, Level A: Cards 6, 7, 8, 9, 10 **Life Science Lab, Level B:** Cards 6, 7, 8, 9, 10 **Life Science Lab Teacher's Handbook:** Hands-On Activity 1, *Examining Cells*, pages 77-79

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
b. The nucleus of a cell contains the genes. Every cell contains a complete set of genes for that organism.
Life Science Lab, Level A: Cards 10. 62 **Life Science Lab, Level B:** Cards 10, 62

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
c. Genes provide the instructions that direct the functions of the cell.
Life Science Lab, Level A: Cards 62, 63 **Life Science Lab, Level B:** Cards 62, 63

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
d. Plant cells have a cell wall in addition to a cell membrane. The cell wall has openings that allow materials to pass through to the cell and the cell wall provides structural support for the cell.
Life Science Lab, Level A: Card 7 **Life Science Lab, Level B:** Card 7

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
e. Most plant cells contain chloroplasts where green pigment traps the energy from sunlight and transforms it from light energy into chemical energy.
Life Science Lab, Level A: Cards 7, 9, 16, 17 **Life Science Lab, Level B:** Cards 7, 9, 16, 17

Life Science: Survival of Organisms and Cells
S7-8: 30 Students demonstrate their understanding of Structure and Function-Survival Requirements by:
• **Conducting experiments that investigate how different concentrations of materials (inside vs. outside a cell) will cause water to flow into or out of cells.** • **Examining cells under a microscope and identifying cell wall and chloroplasts and by comparing the function of a common cell structure such as membrane in all cells with the function of a unique structure such as chloroplast in plant cells.** • **Examining cells under a microscope, identifying the nucleus and explaining the relationship between genes (located in the nucleus) and traits.**
f. Some materials can pass into and out of cells as concentrations move toward equilibrium (diffusion).
Life Science Lab, Level A: Card 8 **Life Science Lab, Level B:** Card 8

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
a. Cells only come from other cells.
Life Science Lab, Level A: Cards 5, 10 **Life Science Lab, Level B:** Cards 5, 10

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
b. Cells repeatedly divide to make more cells for growth and repair.
Life Science Lab, Level A: Cards 5, 10 **Life Science Lab, Level B:** Cards 5, 10

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
c. During cell reproduction, genes duplicate so that each new cell will have an identical set of genes.
Life Science Lab, Level A: Cards 10, 61, 62 **Life Science Lab, Level B:** Cards 10, 61, 62

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
d. When cells divide, they are reproducing asexually.
Life Science Lab, Level A: Cards 10, 60 **Life Science Lab, Level B:** Cards 10, 60

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
e. Some complete organisms can reproduce asexually (e.g., budding).
Life Science Lab, Level A: Card 60 **Life Science Lab, Level B:** Card 60

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
f. In asexual reproduction, the new cell (organism) is identical to the parent.
Life Science Lab, Level A: Cards 11, 12, 60 **Life Science Lab, Level B:** Cards 11, 12, 60

Life Science: Life Cycles and Reproduction
S7-8: 31 Students demonstrate their understanding of Reproduction by…
• **Explaining that cells come only from other living cells and that genes duplicate in the process of cell division producing an identical copy of the original cell.** • **Describing the relationship between human growth and cell division.**
g. Half of an individual's traits come from one parent—half from the other.
Life Science Lab, Level A: Cards 58, 61, 62, 63 **Life Science Lab, Level B:** Cards 58, 61, 62, 63

Life Science: Chemical Reactions within Cells
S7-8: 33 Students demonstrate their understanding of how Energy Flow within Cells Supports an Organism's Survival by…
• **Recognizing that energy from the sun is transferred and utilized in plant and animal cells through chemical changes and then transferred into other forms such as heat (e.g., using word equations).**
a. Plant cells take in carbon dioxide and water and use the energy from sunlight to chemically change them to food (sugar) and oxygen
Life Science Lab, Level A: Cards 7, 9, 16, 17 **Life Science Lab, Level B:** Cards 7, 9, 16, 17

Life Science: Chemical Reactions within Cells
S7-8: 33 Students demonstrate their understanding of how Energy Flow within Cells Supports an Organism's Survival by…
• **Recognizing that energy from the sun is transferred and utilized in plant and animal cells through chemical changes and then transferred into other forms such as heat (e.g., using word equations).**
b. All cells chemically change sugar (food) and oxygen into energy required to survive.
Life Science Lab, Level A: Cards 7, 9, 16, 17 **Life Science Lab, Level B:** Cards 7, 9, 16, 17

Life Science: Chemical Reactions within Cells
S7-8: 33 Students demonstrate their understanding of how Energy Flow within Cells Supports an Organism's Survival by…
• **Recognizing that energy from the sun is transferred and utilized in plant and animal cells through chemical changes and then transferred into other forms such as heat (e.g., using word equations).**
c. Energy is used by all cells to carry out functions for survival and some energy s transferred to the environment as heat.
Life Science Lab, Level A: Cards 1, 5, 9 **Life Science Lab, Level B:** Cards 1, 5, 9

Life Science: Interdependence within Ecosystems
S7-8: 34 Students demonstrate their understanding of Energy Flow in an Ecosystem by:
• **Describing how light is transformed into chemical energy by producers and how this chemical energy is used by all organisms to sustain life (e.g., using a word equation).**
a. Plants transfer energy from the sun into stored chemical energy by changing carbon dioxide and water into sugar (food). Plants use or store the sugar they produce to satisfy their energy needs.
Life Science Lab, Level A: Cards 7, 9, 16, 17 **Life Science Lab, Level B:** Cards 7, 9, 16, 17

Life Science: Interdependence within Ecosystems
S7-8: 34 Students demonstrate their understanding of Energy Flow in an Ecosystem by:
• **Describing how light is transformed into chemical energy by producers and how this chemical energy is used by all organisms to sustain life (e.g., using a word equation).**
b. All organisms release energy stored in sugar (food) through a chemical change that requires oxygen and produces carbon dioxide and water in addition to energy. Some consumers eat plants directly (herbivores). Some consumers eat other animals (carnivores) and use the energy from the plant's sugar food that was stored in the animal's cells. Some consumers eat both plant and animal material (omnivore).
Life Science Lab, Level A: Cards 1, 16, 17, 46, 76, 77 **Life Science Lab, Level B:** Cards 1, 16, 17, 46, 76, 77

Life Science: Interdependence within Ecosystems
S7-8: 36 Students demonstrate their understanding of Equilibrium in an Ecosystem by:
• **Identifying an abiotic or biotic change in local ecosystems and predicting the short and long-term effects of this change (e.g., local river study).**
a. Given adequate biotic and abiotic resources, an ecosystem will maintain equilibrium and continue indefinitely.
Life Science Lab, Level A: Cards 70, 71, 72, 80 **Life Science Lab, Level B:** Cards 70, 71, 72, 80

Life Science: Interdependence within Ecosystems
S7-8: 36 Students demonstrate their understanding of Equilibrium in an Ecosystem by:
• **Identifying an abiotic or biotic change in local ecosystems and predicting the short and long-term effects of this change (e.g., local river study).**
b. Factors that affect biotic or abiotic resources such as disease, predation, climate and pollution can change the dynamics of an ecosystem and the interdependent relationships among populations of organisms, until a new equilibrium is reached (e.g., Members of a species that occur together at a given time are referred to as a population).
Life Science Lab, Level A: Cards 70, 71, 72, 73, 74, 75, 80, 86 **Life Science Lab, Level B:** Cards 70, 71, 72, 73, 74, 75, 80, 86

Life Science: Interdependence within Ecosystems
S7-8: 37 Students demonstrate their understanding of Recycling in an Ecosystem by:
• **Explaining how products of decomposition are utilized by the ecosystem to sustain life while conserving mass (e.g., worm farm, compost).**
a. When decomposers break down matter contained in plants and animals, the molecules of matter can be recycled through the ecosystem and used by plants to produce food or as a building material for all organisms.
Life Science Lab, Level A: Cards 13, 76, 77 **Life Science Lab, Level B:** Cards 13, 76, 77

Life Science: Interdependence within Ecosystems
S7-8: 37 Students demonstrate their understanding of Recycling in an Ecosystem by:
• **Explaining how products of decomposition are utilized by the ecosystem to sustain life while conserving mass (e.g., worm farm, compost).**
b. As matter is transferred from one organisms to another in an ecosystem, the total amount (mass) remains the same.
Life Science Lab, Level A: Cards 76, 77 **Life Science Lab, Level B:** Cards 76, 77 **Life Science Lab Teacher's Handbook:** Hands-On Activity 6, *How Much Does Energy Cost?,* pages 97-99

Life Science: Classification of Living Things
S7-8: 38 Students demonstrate their understanding of Classification or Organisms by…
• **Comparing and sorting organisms with similar characteristics into groups based on internal and external structures recognized by scientists.** • **Recognizing that individuals that can reproduce with one another and produce fertile offspring are classified as a species.**
a. Scientists organize the vast diversity of organisms by describing similarities and differences among living things. Details of internal and external structures of organisms are more important for scientific classification than behavior and general appearance.
Life Science Lab, Level A: Cards 2, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 **Life Science Lab, Level B:** Cards 2, 3, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40 **Life Science Lab Teacher's Handbook:** Hands-On Activity 2, *Culturing Bacteria,* pages 81-83; Hands-On Activity 3, *Investigating Arthropods,* pages 85-87

Life Science: Classification of Living Things
S7-8: 38 Students demonstrate their understanding of Classification or Organisms by…
• **Comparing and sorting organisms with similar characteristics into groups based on internal and external structures recognized by scientists.** • **Recognizing that individuals that can reproduce with one another and produce fertile offspring are classified as a species.**
b. Individuals that can reproduce with one another and produce fertile offspring are classified as a species.
Life Science Lab, Level A: Card 1 **Life Science Lab, Level B:** Card 1

Life Science: Natural Selection/Evolution
S7-8: 39 Students demonstrate their understanding of Evolution/Natural Selection by:
• **Explaining that advantageous traits of organisms are passed on through reproduction.** • **Identifying that traits occur randomly.**
a. Differences in physical characteristics (traits) occur randomly (by chance) in a population or species.
Life Science Lab, Level A: Cards 64, 65 **Life Science Lab, Level B:** Cards 64, 65

Life Science: Natural Selection/Evolution
S7-8: 39 Students demonstrate their understanding of Evolution/Natural Selection by:
• **Explaining that advantageous traits of organisms are passed on through reproduction.** • **Identifying that traits occur randomly.**
b. As environments change, organisms that possess advantageous traits (those that enable them to survive) pass those traits to offspring through reproduction.
Life Science Lab, Level A: Cards 64, 65, 66 **Life Science Lab, Level B:** Cards 64, 65, 66

Human Body: Heredity
S7-8:40 Students demonstrate their understanding of Human Heredity by:
• **Identifying that traits are produced from the instructions of one or more genes that are inherited from the parents.**
a. Every organism requires a set of instructions (genes) for specifying its traits. Heredity is the passage of these instructions from one generation to another.
Life Science Lab, Level A: Cards 58, 61, 62, 63 **Life Science Lab, Level B:** Cards 58, 61, 62, 63

Human Body: Heredity
S7-8:40 Students demonstrate their understanding of Human Heredity by:
• **Identifying that traits are produced from the instructions of one or more genes that are inherited from the parents.**
b. An inherited traits of an individual can be determined by one or more genes, and a single gene can influence more than one trait.
Life Science Lab, Level A: Cards 62, 63, 64 **Life Science Lab, Level B:** Cards 62, 63, 64

Human Body: Body Systems
S7-8:41 Students demonstrate their understanding of Human Body Systems by:
• **Identifying ways that the human body responds to changes to maintain equilibrium.** • **Explaining the function of the lungs in respiration.** • **Developing models that illustrate the human reproductive system.**
a. The lungs take in the oxygen that the body cells need for the chemical change that releases energy from food and the lungs eliminate carbon dioxide that produced during the chemical change.
Life Science Lab, Level A: Cards 47, 50, 51 **Life Science Lab, Level B:** Cards 47, 50, 51

Human Body: Body Systems
S7-8:41 Students demonstrate their understanding of Human Body Systems by:
• **Identifying ways that the human body responds to changes to maintain equilibrium.** • **Explaining the function of the lungs in respiration.** • **Developing models that illustrate the human reproductive system.**
b. The reproductive system enables the whole organism (human) to reproduce.
Life Science Lab, Level A: Cards 58, 61 **Life Science Lab, Level B:** Cards 58, 61

Human Body: Body Systems
S7-8:41 Students demonstrate their understanding of Human Body Systems by:
• **Identifying ways that the human body responds to changes to maintain equilibrium.** • **Explaining the function of the lungs in respiration.** • **Developing models that illustrate the human reproductive system.**
c. In order to maintain equilibrium, internal body systems react to environmental changes through the nervous system (e.g., sweating, increased respiration during exercise, response to environmental stimuli, etc.).
Life Science Lab, Level A: Cards 44, 47, 54 **Life Science Lab, Level B:** Cards 44, 47, 54

Human Body: Human Disease
S7-8:42 Students demonstrate their understanding of the Patterns of Human Health/Disease by:
• **Identifying a variety of microbes (e.g., virus, bacteria, fungi) and toxic materials that can interfere with the body systems and cause harm.**
a. Viruses, bacteria, fungi, and parasites may infect the human body and interfere with normal body functions.
Life Science Lab, Level A: Cards 11, 12, 14, 15, 49 **Life Science Lab, Level B:** Cards 11, 12, 14, 15, 49

Human Body: Human Disease
S7-8:42 Students demonstrate their understanding of the Patterns of Human Health/Disease by:
• **Identifying a variety of microbes (e.g., virus, bacteria, fungi) and toxic materials that can interfere with the body systems and cause harm.**
b. The environment may contain dangerous levels of substances that are harmful to human beings.
Life Science Lab, Level A: Cards 11, 12, 13, 14, 15, 49, 51, 56, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 11, 12, 13, 14, 15, 49, 51, 56, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 37, 42, 86 **Earth Science Lab, Level B:** Cards 37, 42, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?,* pages 89-91

Universe, Earth, Environment: Scale, Distances, Star Formation, Theories, Instrumentation
S7-8:45 Students demonstrate their understanding of Processes and Change over Time within Systems of the Universe by:
• **Identifying and labeling the location of the sun in our solar system and its relationship to the galaxy.**
a. The sun is many thousands of times closer to the earth than any other star. The sun is located near the edge of a disc-shaped galaxy of stars.
Earth Science Lab, Level A: Cards 67, 75, 76, 77 **Earth Science Lab, Level B:** Cards 67, 75, 76, 77

Universe, Earth, Environment: Atmosphere, Water Cycle, Weather, Seasons
S7-8:48 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Diagramming, labeling, and explaining the process of the water cycle (precipitation, evaporation, condensation, run-off, ground water, transpiration).**
a. The cycling of water in and out of the atmosphere plays an important role in determining climatic patterns. Water evaporates from the surface of the earth, rises and cools, condenses into rain or snow, and falls again to the surface. Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the ocean holds a large amount of heat.
Earth Science Lab, Level A: Cards 43, 44, 47, 48, 49, 54, 55, 56, 57, 58, 60, 87 **Earth Science Lab, Level B:** Cards 43, 44, 47, 48, 49, 54, 55, 56, 57, 58, 60, 87

Universe, Earth, Environment: Atmosphere, Water Cycle, Weather, Seasons
S7-8:48 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Diagramming, labeling, and explaining the process of the water cycle (precipitation, evaporation, condensation, run-off, ground water, transpiration).**
b. The entire planet is surrounded by a relatively thin blanket of air composed of nitrogen, oxygen, and small amounts of other gases, including water vapor.
Earth Science Lab, Level A: Cards 36, 37 **Earth Science Lab, Level B:** Cards 36, 37

Universe, Earth, Environment: Atmosphere, Water Cycle, Weather, Seasons
S7-8:48 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Diagramming, labeling, and explaining the process of the water cycle (precipitation, evaporation, condensation, run-off, ground water, transpiration).**
c. Heat from the sun is the primary source of energy for changes on the earth's surface. The differences in heating of the earth's surface produces the planet's weather patterns.
Earth Science Lab, Level A: Cards 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 52, 53, 54 **Earth Science Lab, Level B:** Cards 37, 38, 39, 40, 41, 43, 44, 45, 46, 47, 48, 49, 52, 53, 54 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 6, *Modeling a Tornado*, pages 93-95 **Physical Science Lab, Level A:** Card 44 **Physical Science Lab, Level B:** Card 44

Universe, Earth, Environment: Atmosphere, Water Cycle, Weather, Seasons
S7-8:48 Students demonstrate their understanding of Processes and Change over Time within Earth Systems by:
• **Diagramming, labeling, and explaining the process of the water cycle (precipitation, evaporation, condensation, run-off, ground water, transpiration).**
d. Seasons result from variations in the amount of sun's energy hitting the earth's surface. This happens because of the tilt of the earth's axis and the orbit of the earth around the sun.
Earth Science Lab, Level A: Cards 55, 62 **Earth Science Lab, Level B:** Cards 55, 62

Universe, Earth, Environment: Natural Resources
S7-8:49 Students demonstrate their understanding of Processes and Change within Natural Resources by:
• **Investigating natural resources in the community and monitoring/managing them for responsible use.** • **Identifying a human activity—in a local environment—and determining the impact of that activity on a specific (local) natural resource.** • **Researching the impact of different human activities on the earth's land, waterways and atmosphere and describing possible effects on the living organisms in those environments.**
a. Human activities have impacts on natural resources, such as increasing wildlife habits, reducing/managing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere and intensive farming. Some of these changes have decreased the capacity of the environment to support life forms. Others have enhanced the environment to support greater availability of resources.
Life Science Lab, Level A: Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab, Level B:** Cards 84, 85, 86, 87, 88, 89, 90 **Life Science Lab Teacher's Handbook:** Hands-On Activity 7, *The Effects of Acid Rain,* pages 101-103 **Earth Science Lab, Level A:** Cards 29, 35, 37, 42, 59, 60, 61, 85, 86 **Earth Science Lab, Level B:** Cards 29, 35, 37, 42, 59, 60, 61, 85, 86 **Earth Science Lab Teacher's Handbook:** Hands-On Activity 5, *What is in the Air?,* pages 89-91

Universe, Earth, Environment: Natural Resources
S7-8:49 Students demonstrate their understanding of Processes and Change within Natural Resources by:
• **Investigating natural resources in the community and monitoring/managing them for responsible use.** • **Identifying a human activity—in a local environment—and determining the impact of that activity on a specific (local) natural resource.** • **Researching the impact of different human activities on the earth's land, waterways and atmosphere and describing possible effects on the living organisms in those environments.**
b. Fresh water, limited in supply, is essential for life and also for most industrial processes. Rivers, lakes, and groundwater can be depleted or polluted, becoming unavailable or unsuitable for life.
Life Science Lab, Level A: Cards 82, 90 **Life Science Lab, Level B:** Cards 82, 90 **Earth Science Lab, Level A:** Cards 82, 83, 84, 85, 86 **Earth Science Lab, Level B:** Cards 82, 83, 84, 85, 86