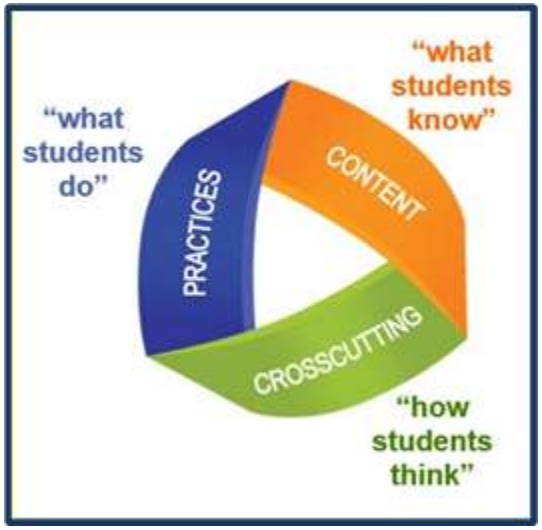
Ledyard Public Schools
Second Grade NGSS Curriculum



District Science Curriculum Committee	
Kim Pelletier	**District Math and Science Consultant**
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Katherine McKelvey, Kathy Colosi, Janice Masse	**First Grade**
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District Philosophy

Ledyard's vision for K-12 inquiry based science is to engage students in scientific and engineering practices as they apply crosscutting concepts to deepen their understanding of the core ideas in these fields.

A New Vision for Science Education

Implications of the Vision of the Framework for K-12 Science Education and the Next Generation Science Standards

SCIENCE EDUCATION WILL INVOLVE LESS:	SCIENCE EDUCATION WILL INVOLVE MORE:
Rote memorization of facts and terminology.	Facts and terminology learned as needed while developing explanations and designing solutions supported by evidence-based arguments and reasoning.
Learning of ideas disconnected from questions about phenomena.	Systems thinking and modeling to explain phenomena and to give a context for the ideas to be learned.
Teachers providing information to the whole class.	Students conducting investigations, solving problems, and engaging in discussions with teachers' guidance.
Teachers posing questions with only one right answer.	Students discussing open-ended questions that focus on the strength of the evidence used to generate claims.
Students reading textbooks and answering questions at the end of the chapter.	Students reading multiple sources, including science-related magazine and journal articles and web-based resources; students developing summaries of information.
Pre-planned outcome for "cookbook" laboratories or hands-on activities.	Multiple investigations driven by students' questions with a range of possible outcomes that collectively lead to a deep understanding of established core scientific ideas.
Worksheets.	Student writing of journals, reports, posters, and media presentations that explain and argue.
Oversimplification of activities for students who are perceived to be less able to do science and engineering	Provision of supports so that all students can engage in sophisticated science and engineering practices

Source: National Research Council. (2015). *Guide to Implementing the Next Generation Science Standards* (pp. 8-9). Washington, DC: National Academies Press. http://www.nap.edu/catalog/18802/guide-to-implementing-the-next-generation-science-standards

Three Dimensions of the *Next Generation Science Standards*:

SEP (appendix F), DCI (appendix E), CCC (appendix G)

Scientific and Engineering Practices Matrix

Asking Questions and Defining Problems

A practice of science is to ask and refine questions that lead to descriptions and explanations of how the natural and designed world works and which can be empirically tested.

Engineering questions clarify problems to determine criteria for successful solutions and identify constraints to solve problems about the designed world. Both scientists and engineers also ask questions to clarify the ideas of others.

Planning and Carrying Out Investigations

Scientists and engineers plan and carry out investigations in the field or laboratory, working collaboratively as well as individually. Their investigations are systematic and require clarifying what counts as data and identifying variables or parameters. Engineering investigations identify the effectiveness, efficiency, and durability of designs under different conditions.

Analyzing and Interpreting Data

Scientific investigations produce data that must be analyzed in order to derive meaning. Because data patterns and trends are not always obvious, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Scientists identify sources of error in the investigations and calculate the degree of certainty in the results. Modern technology makes the collection of large data sets much easier, providing secondary sources for analysis.

Engineering investigations include analysis of data collected in the tests of designs. This allows comparison of different solutions and determines how well each meets specific design criteria—that is, which design best solves the problem within given constraints. Like scientists, engineers require a range of tools to identify patterns within data and interpret the results. Advances in science make analysis of proposed solutions more efficient and effective.

Developing and Using Models

A practice of both science and engineering is to use and construct models as helpful tools for representing ideas and explanations. These tools include diagrams, drawings, physical replicas, mathematical representations, analogies, and computer simulations. Modeling tools are used to develop questions, predictions and explanations; analyze and identify flaws in systems; and communicate ideas. Models are used to build and revise scientific explanations and proposed engineered systems. Measurements and observations are used to revise models and designs.

Constructing Explanations and Designing Solutions

The products of science are explanations and the products of engineering are solutions. The goal of science is the construction of theories that provide explanatory accounts of the world. A theory becomes accepted when it has multiple lines of empirical evidence and greater explanatory power of phenomena than previous theories. The goal of engineering design is to find a systematic solution to problems that is based on scientific knowledge and models of the material world. Each proposed solution results from a process of balancing competing criteria of desired functions, technical feasibility, cost, safety, aesthetics, and compliance with legal requirements. The optimal choice depends on how well the proposed solutions meet criteria and constraints.

Engaging in Argument from Evidence

Argumentation is the process by which explanations and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits. Scientists and engineers engage in argumentation when investigating a phenomenon, testing a design solution, resolving questions about measurements, building data models, and using evidence to identify strengths and weaknesses of claims.

Using Mathematics and Computational Thinking

In both science and engineering, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks such as constructing simulations; statistically analyzing data; and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable scientists and engineers to predict the behavior of systems and test the validity of such predictions. Statistical methods are frequently used to identify significant patterns and establish correlational relationships.

Obtaining, Evaluating, and Communicating Information

Scientists and engineers must be able to communicate clearly and persuasively the ideas and methods they generate. Critiquing and communicating ideas individually and in groups is a critical professional activity. Communicating information and ideas can be done in multiple ways: using tables, diagrams, graphs, models, and equations as well as orally, in writing, and through extended discussions. Scientists and engineers employ multiple sources to acquire information that is used to evaluate the merit and validity of claims, methods, and designs.

NGSS@NSTA STEM STARTS HERE

www.nsta.org/ngss

Developed by NSTA based on content from the *Framework for K-12 Science Education* and supporting documents for the *May 2012 Public Draft of the NGSS*

Disciplinary Core Ideas Matrix			
Physical Science	**Life Science**	**Earth and Space Science**	**Engineering, Technology, and the Application of Science**
PS1: Matter and Its Interactions PS1.A: Structure and Properties of Matter PS1.B: Chemical Reactions PS1.C: Nuclear Processes **PS2: Motion and Stability: Forces and Interactions** PS2.A: Forces and Motion PS2.B: Types of Interactions **PS3: Energy** PS3.A: Definitions of Energy PS3.B: Conservation of Energy and Energy Transfer PS3.C: Relationship Between Energy and Forces PS3.D: Energy in Chemical Processes and Everyday Life **PS4: Waves and Their Applications in Technologies for Information Transfer** PS4.A: Wave Properties PS4.B: Electromagnetic Radiation PS4.C: Information Technologies and Instrumentation	**LS1: From Molecules to Organisms: Structures and Processes** LS1.A: Structure and Function LS1.B: Growth and Development of Organisms LS1.C: Organization for Matter and Energy Flow in Organisms LS1.D: Information Processing **LS2: Ecosystems: Interactions, Energy, and Dynamics** LS2.A: Interdependent Relationships in Ecosystems LS2.B: Cycles of Matter and Energy Transfer in Ecosystems LS2.C: Ecosystem Dynamics, Functioning, and Resilience LS2.D: Social Interactions and Group Behavior **LS3: Heredity: Inheritance and Variation of Traits** LS3.A: Inheritance of Traits LS3.B: Variation of Traits **LS4: Biological Evolution: Unity and Diversity** LS4.A: Evidence of Common Ancestry and Diversity LS4.B: Natural Selection LS4.C: Adaptation LS4.D: Biodiversity and Humans	**ESS1: Earth's Place in the Universe** ESS1.A: The Universe and Its Stars ESS1.B: Earth and the Solar System ESS1.C: The History of Planet Earth **ESS2: Earth's Systems** ESS2.A: Earth Materials and Systems ESS2.B: Plate Tectonics and Large-Scale Systems ESS2.C: The Role of Water in Earth's Surface Processes ESS2.D: Weather and Climate ESS2.E: Biogeology **ESS3: Earth and Human Activity** ESS3.A: Natural Resources ESS3.B: Natural Hazards ESS3.C: Human Impacts on Earth Systems ESS3.D: Global Climate Change	**ETS1: Engineering Design** ETS1.A: Defining and Delimiting an Engineering Problem ETS1.B: Developing Possible Solutions ETS1.C: Optimizing the Design Solution

Developed by NSTA based on content from the *Framework for K-12 Science Education* and supporting documents for the *May 2012 Public Draft of the NGSS*

Crosscutting Concepts Matrix		
Patterns Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them. **Cause and Effect: Mechanism and Explanation** Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.	**Scale, Proportion, and Quantity** In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance. **Systems and System Models** Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.	**Energy and Matter: Flows, Cycles, and Conservation** Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations. **Structure and Function** The way in which an object or living thing is shaped and its substructure determine many of its properties and functions. **Stability and Change** For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

Developed by NSTA based on content from the *Framework for K-12 Science Education* and supporting documents for the *May 2012 Public Draft of the NGSS*

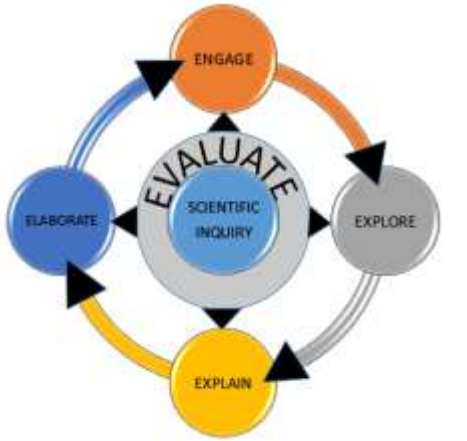
Connections to the Nature of Science

Nature of Science Practices	Nature of Science Crosscutting Concepts
These understandings about the nature of science are closely associated with the science and engineering practices, and are found in that section of the foundation box on a standards page. More information about the Connections to Engineering, Technology and Applications of Science can be found in Appendix H.	These understandings about the nature of science are closely associated with the crosscutting concepts, and are found in that section of the foundation box on a standards page. More information about the Connections to Engineering, Technology and Applications of Science can be found in Appendix H.
Scientific Investigations Use a Variety of Methods	**Science is a Way of Knowing**
Science Knowledge is Based on Empirical Evidence	**Scientific Knowledge Assumes and Order and Consistency in Natural Systems**
Scientific Knowledge is Open to Revision in Light of New Evidence	**Science is a Human Endeavor**
Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena.	**Science Addresses Questions About the Natural and Material World**

How does Ledyard Define Inquiry?

Inquiry is defined as a way of seeking information, knowledge, or truth through questioning. Inquiry is a way for a learner to acquire new information and data and turn it into useful knowledge. Inquiry involves asking good questions and developing robust investigations from them. Inquiry also involves considering possible solutions and consequences. A third component of inquiry is separating evidence based claims from common opinion, and communicating claims with others, and acting upon these claims when appropriate. Questions lead to gathering information through research, study, experimentation, observation, or interviews. During this time, the original question may be revised, a line of research refined, or an entirely new path may be pursued. As more information is gathered, it becomes possible to make connections and allows individuals to construct their own understanding to form new knowledge. Sharing this knowledge with others develops the relevance of the learning for both the student and a greater community. Sharing is followed by reflection and potentially more questions, bringing the inquiry process full circle.

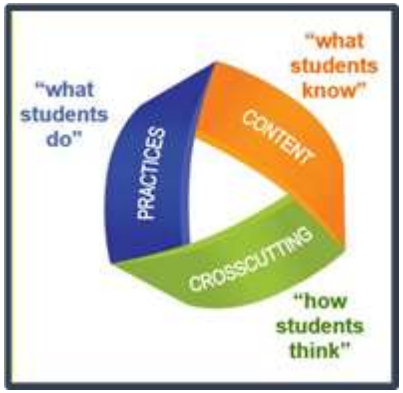
Inquiry 5 Science Teaching Model



Engagement	Object, event or question used to engage students. Connections facilitated between what students know and can do.
Exploration	Objects and phenomena are explored. Hands-on activities, with guidance.
Explanation	Students explain their understanding of concepts and processes. New concepts and skills are introduced as conceptual clarity and cohesion are sought.
Elaboration	Activities allow students to apply concepts in contexts, and build on or extend understanding and skill.
Evaluation	Students assess their knowledge, skills and abilities. Activities permit evaluation of student development and lesson effectiveness.

Ledyard Next Generation Science Standards

Second Grade



Second Grade NGSS Storyline

The performance expectations in second grade help students formulate answers to questions such as: "How does land change and what are some things that cause it to change? What are the different kinds of land and bodies of water? How are materials similar and different from one another, and how do the properties of the materials relate to their use? What do plants need to grow? How many types of living things live in a place?" Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. Students are expected to develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students are also expected to compare the diversity of life in different habitats. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. Students are able to apply their understanding of the idea that wind and water can change the shape of the land to compare design solutions to slow or prevent such change. Students are able to use information and models to identify and represent the shapes and kinds of land and bodies of water in an area and where water is found on Earth. The crosscutting concepts of patterns; cause and effect; energy and matter; structure and function; stability and change; and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for these disciplinary core ideas. In the second grade performance expectations, students are expected to demonstrate grade appropriate proficiency in developing and using models, planning and carrying out investigations, analyzing and interpreting data, constructing explanations and designing solutions, engaging in argument from evidence, and obtaining, evaluating, and communicating information. Students are expected to use these practices to demonstrate understanding of the core ideas.

Ledyard Next Generation Science Standards

Grade 2

Unit 1: MATTER

August-November

Anchoring Phenomenon	
Mixing Jell-O Popsicle on a hot day	
Essential Questions	**Compelling Questions**
How do we design better products to use (thinking about their properties) to make changes?	• *What is matter?* • *What are the properties of matter?* • *How can some materials be used for a specific purpose based on their properties?* • *How can properties of matter be changed?* • *Can the changes of matter be reversed?* • *How can an object be disassembled and made into a new object?*

Unit 1: Matter
Summary

Performance Expectations	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-PS1-1 • 2-PS1-2 • 2-PS1-3 • 2-PS1-4 • K-2 ETS1-3 *Teacher Note: All Science and Engineering Practices and Crosscutting Concepts in bold are written in the Performance Expectations above. The italicized practices and crosscutting concepts, although not mentioned specifically, may be incorporated additionally in any science lesson at any time.*	• *1: Asking Questions and Defining Problems* • *2: Developing and Using Models* • **3: Planning and Carrying Out Investigations** • ***4: Analyzing and Interpreting Data*** • *5: Using Mathematical Computational Thinking* • **6: Constructing Explanations and Designing Solutions** • ***7: Engaging in Argument from Evidence*** • *8: Obtaining, Evaluating, and Communicating Information*	**ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE** • **ETS1 Engineering Design** -ETS1.C: Optimizing the Design Solution **PHYSICAL SCIENCE** • **PS1 MATTER AND ITS INTERACTIONS** -PS1.A: Structure and Properties of Matter -PS1.B: Chemical Reactions	• **1: Patterns** • **2: Cause and Effect** • *3: Scale, Proportion and Quantity* • *4: Systems and System Models* • ***5: Energy and Matter*** • *6: Structure and Function* • *7: Stability and Change*

Unit 1: Matter
DCI Vocabulary

Disciplinary Core Ideas	Vocabulary
ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE • **ETS1 Engineering Design** -ETS1.C: Optimizing the Design Solution **PHYSICAL SCIENCE** • **PS1 MATTER AND ITS INTERACTIONS** -PS1.A: Structure and Properties of Matter -PS1.B: Chemical Reactions	***This is a recommendation for domain specific terms taught to Second Grade students.*** **Domains are bold:** • **Engineering→Optimizing the Design Solution (ETS1.C)** *balance, best, calculator, characteristic, engineering, environment, flow, ruler, safety* • **Matter and Its Interactions→Structure and Properties of Matter (PS1.A), Chemical Reactions (PS1.B)** *environment, exist, flexibility, flexible, flow, gas, hardness, human-made, liquid, magnetic, medicine, mixture, nature, powder, release, solid, space, sugar, temperature, texture, thermometer, unit, weight*

Performance Expectation
2-PS1-1 Matter and Its Interactions

Students who demonstrate understanding can:

Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties.

Clarification Statement: Observations could include color, texture, hardness, and flexibility. Patterns could include the similar properties that different materials share.

Assessment Boundary: N/A

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. ***Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.***	**PS1.A: Structure and Properties of Matter** • Different kinds of matter exist and many of them can be either solid, or liquid, depending on temperature. Matter can be described and classified by its observable properties.	**Patterns** • Patterns in the natural and human designed world can be observed.

Performance Expectation
2-PS1-1 Matter and Its Interactions

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
5.PS1.A

Common Core State Standards Connections:

ELA/Literacy

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-1)

Mathematics

MP.4 Model with mathematics. *(2-PS1-1)*

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(2-PS1-1)*

2-PS1-1 Suggested Activities	2-PS1-1 Recommended Formative Assessments
What is Everything Made Of? *(TCI: Unit 2, lesson 1, pg.72*) Students learn objects are made of materials and that scientists describe and classify materials by their properties by asking questions and looking for patterns to make sense of the world. Students will investigate different materials; describing and classifying the materials by their properties. **How are Liquids and Solids Different?** *(TCI: Unit 2, lesson 2, pg.80*) Students learn about the differences between liquids and solids, the appropriate ways to measure them (you can measure a solid with a ruler and a liquid with cups). Students investigate the sizes of different containers, comparing the container sizes by measuring how much water each container holds. (Make *Oobleck*)	• Students will use the inquiry method (in small groups or as individuals) to generate their own scientific experiment. ***(SEE 2-PS1-4)*** • Identify a secret material by playing a game of **Twenty Questions** about its properties.

2-PS1-1 Suggested Activities	2-PS1-1 Recommended Formative Assessments
What Happens When Materials are Mixed? *(TCI: Unit 2, lesson 5, pg.104*) Students will mix different materials and then try to separate them. They will list the properties of the materials before and after they mix the materials, observing any changes in the properties. **"The Science of Art"** (*Science and Children February 2016*) Students will think about all of the ways crayons can be changed. Students will explore the properties of crayons and learn that by adding heat, crayons can be changed from solid to liquid. **"Eating the Alphabet"** *(Science and Children Summer 2015)* Students compare and contrast their investigation of the decomposition of various fruits and vegetables. Students will also cook various foods and freeze/unfreeze various liquids we taste and use these experiences to explain reversible versus irreversible changes.	• Describe the properties of *Oobleck.* • Construct and analyze a data table after investigating how items have changed.

Performance Expectation
2-PS1-2 Matter and Its Interactions

Students who demonstrate understanding can:

Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.

Clarification Statement: Examples of properties could include strength, flexibility, hardness, texture, and absorbency.

Assessment Boundary: Assessment of quantitative measurements is limited to length.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Analyzing and Interpreting Data • Analyze data from tests of an object or tool to determine if it works as intended. ***Analyzing and interpreting data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.***	**PS1.A: Structure and Properties of Matter** • Different properties are suited to different purposes.	**Cause and Effect** • Simple tests can be designed to gather evidence to support or refute student ideas about causes. --- **Connections to Engineering, Technology, and Applications of Science** **Influence of Engineering, Technology, and Science, on Society and the Natural World** • Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.

Performance Expectation
2-PS1-2 Matter and Its Interactions

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
5.PS1.A

Common Core State Standards Connections:

ELA/Literacy

RI.2.8 Describe how reasons support specific points the author makes in a text. *(2-PS1-2)*
W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-2)
W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-2)

Mathematics

MP.2 Reason abstractly and quantitatively. *(2-PS1-2)*
MP.4 Model with mathematics. *(2-PS1-2)*
MP.5 Use appropriate tools strategically. *(2-PS1-2)*
2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(2-PS1-2)*

2-PS1-2 Suggested Activities	2-PS1-2 Recommended Formative Assessments
How Are Materials Used for Different Purposes? *(TCI: Unit 2, lesson 3, pg.86)* Students will learn that different properties of materials are suited for different purposes. Sometimes more than one kind of material has the right properties for a purpose, and engineers test designs to determine what material(s) work best for the purpose(s). "A House for Chase the Dog" (*Science and Children January 2016*) Students will brainstorm, design a model, and construct the best roof for a dog house.	• CER (Claims Evidence Response) • Design/model engineering for a purpose.

Performance Expectation
2-PS1-3 Matter and Its Interactions

Students who demonstrate understanding can:

Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new project.

Clarification Statement: Examples of pieces could include blocks, building bricks, or other assorted small objects.

Assessment Boundary: *N/A*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions • Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ***Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions***	**PS1.A Structure and Properties of Matter** • Different properties are suited to different purposes. • A great variety of objects can be built up from a small set of pieces.	**Energy and Matter** • Objects may break into smaller pieces and be put together into larger pieces, or change shapes.

Performance Expectation
2-PS1-3 Matter and Its Interactions

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
4.ESS2.A ; 5.PS1.A ; 5.LS2.A

Common Core State Standards Connections:

ELA /Literacy -

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-3)

Mathematics –

N/A

2-PS1-3 Suggested Activities	2-PS1-3 Recommended Formative Assessments
How Can Materials Be Reused? *(TCI: Unit 2, lesson 4, pg.98*) Students learn about how people reuse materials to make different objects, that you can break apart some objects into smaller pieces and you can mold some materials to change their shape. Read Aloud Suggestions: ***The Wonderful Tower of Watts (Reading Rainbow)*** by Patricia Zelver Work as partners or small groups to use math manipulatives (e.g. Pattern Blocks) of student choice to build unique structures/walls using the same materials.	• Teacher observation/monitoring of classroom discussion using ***Talk Moves*.** • Recreate a structure with various materials given.

Performance Expectation
2-PS1-4 Matter and Its Interactions

Students who demonstrate understanding can:

Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot.

Clarification Statement: Examples of reversible changes could include materials such as water and butter at different temperatures. Examples of irreversible changes could include cooking an egg, freezing a plant leaf, and heating paper.

Assessment Boundary: *N/A*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Engaging in Argument from Evidence • Construct an argument with evidence to support a claim. ***Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.*** - **Connections to Nature of Science** **Scientific Investigations Use a Variety of Methods** • Scientists use different ways to study the world.	**ESS1.B Earth and the Solar System** • Seasonal patterns of sunrise and sunset can be observed, described, and predicted.	**Patterns** • Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Performance Expectation
2-PS1-4 Matter and Its Interactions

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
4.ESS2.A ; 5.PS1.A ; 5.LS2.A

Common Core State Standards Connections:

ELA /Literacy -

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-3)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-PS1-3)

Mathematics –

N/A

2-PS1-4 Suggested Activities	2-PS1-4 Recommended Formative Assessments
What Happens When Materials Are Heated or Cooled? *(TCI: Unit 2, lesson 6, pg. 110)* Students learn that changes occur after heating or cooling materials; some changes can be reversed, but not others; and that scientists look closely for patterns and clues to figure out the causes of changes. **"Why Are So Many Toys Made of Plastic?"** *Mystery Science Second Grade Material Magic Mystery 3: Material and Changes & Phases in Matter* Students will learn about melting and the solid & liquid states of matter, then discover why plastic was invented. In the activity, students test the (melt) property of candy.	• Students will use the inquiry method (in small groups or as individuals) to generate their own scientific experiment. • **Camp Way-Too-Hot Candy Melt Activity**

2-PS1-4 Suggested Activities	2-PS1-4 Recommended Formative Assessments
"Eating the Alphabet" *(Science and Children Summer 2015)* Students compare and contrast their investigation of the decomposition of various fruits and vegetables. Students will also cook various foods and freeze/unfreeze various liquids we taste and use these experiences to explain reversible versus irreversible changes. Read Aloud Suggestions: ***Readworks Readings***: (linked in Mystery Science above) *"Colorful Crayons", "Breakfast Time", "A Camping Trip"* Investigate freezing properties- not everything freezes at the same temperature.	• Explain what happens to a Popsicle on a hot summer day. Is there a way to get that Popsicle back?

Performance Expectation K-2 ETS1-3 Engineering Design		
Students who demonstrate understanding can: **Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.** **Clarification Statement:** N/A **Assessment Boundary:** N/A		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Analyzing and Interpreting Data • Analyze data from tests of an object or tool to determine if it works as intended. ***Analyzing data in K-2 builds on prior experiences and progresses to collecting, recording, and sharing observations.***	**ETS1.C Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	**N/A**

Performance Expectation
K-ETS1-3 Engineering Design

Connections to K-2-ETS1.C: Optimizing the Design Solution include:
Second Grade: 2-ESS2-1

Articulation of DCIs across grade-levels:
3-5.ETS1.A ; **3-5.ETS1.C**

Common Core State Standards Connections:

ELA/Literacy –

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(K-2-ETS1-3)*

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. *(K-2-ETS1-3)*

Mathematics -

MP.2 Reason abstractly and quantitatively. *(K-2-ETS1-3)*

MP.4 Model with mathematics. *(K-2-ETS1-3)*

MP.5 Use appropriate tools strategically. *(K-2-ETS1-3)*

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-3)

K-ETS1-3 Suggested Activities	K-ETS1-3 Recommended Formative Assessments
What Do Engineers Do? Students will describe what they think an engineer is since there are many misconceptions. The students will view two videos and come to their own conclusions and communicate their thoughts.	• CER (about what engineers do).

Ledyard Next Generation Science Standards

Grade 2

Unit 2: CHANGES TO THE LAND

December-March

Anchoring Phenomenon	
Canyons have rivers at the bottom **Different oceans have different shapes on the map**	
Essential Questions	**Compelling Questions**
How do we prevent wind or water from changing the land?	• *Where does sand at Ocean Beach come from?* • *Where does the Thames River originate?*

Unit 2: Changes to the Land
Summary

Performance Expectations	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-ESS1-1 • 2-ESS2-1 • 2-ESS2-2 • 2-ESS2-3 • K-2 ETS1-1 *Teacher Note: All Science and Engineering Practices and Crosscutting Concepts in bold are written in the Performance Expectations above. The italicized practices and crosscutting concepts, although not mentioned specifically, may be incorporated additionally in any science lesson at any time.*	• **1: Asking Questions and Defining Problems** • **2: Developing and Using Models** • *3: Planning and Carrying Out Investigations* • *4: Analyzing and Interpreting Data* • *5: Using Mathematical Computational Thinking* • **6: Constructing Explanations and Designing Solutions** • *7: Engaging in Argument from Evidence* • **8: Obtaining, Evaluating, and Communicating Information**	**EARTH AND SPACE SCIENCE** • **ESS1 Earth's Place in the Universe** -ESS1.C: The History of Planet Earth • **ESS2 Earth's Systems** -ESS2.A: Earth Materials and Systems -ESS2.B: Plate Tectonics and Large-Scale System Interactions -ESS2.C: The Roles of Water in Earth's Surface Processes **ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE** • **ETS1 Engineering Design** -ETS1.A :Defining and Delimiting Engineering Problems	• **1: Patterns** • **2: Cause and Effect** • *3: Scale, Proportion and Quantity* • *4: Systems and System Models* • *5: Energy and Matter* • *6: Structure and Function* • **7: Stability and Change**

Unit 2: Changes to the Land
DCI Vocabulary

Disciplinary Core Ideas	Vocabulary
EARTH AND SPACE SCIENCE • **ESS1 Earth's Place in the Universe** -ESS1.C: The History of Planet Earth • **ESS2 Earth's Systems** -ESS2.A: Earth Materials and Systems -ESS2.B: Plate Tectonics and Large-Scale System Interactions -ESS2.C: The Roles of Water in Earth's Surface Processes **ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE** • **ETS1 Engineering Design** -ETS1.A :Defining and Delimiting Engineering Problems	***This is a recommendation for domain specific terms taught to Second Grade students.*** **Domains are bold:** • **Earth's Place in the Universe→The History of Planet Earth (ESS1)** *age, Earth, earthquake, erosion, form, history, lifetime, mammoth, planet, prehistoric animals, river, shell, space, surface, time period, volcanic eruption,* • **Earth's Systems→Earth Materials and Systems; Plate Tectonics and Large-Scale System Interactions; The Roles of Water in Earth's Surface Processes** *age, area, body of water, boulder, Earth, Earth materials, earthquake, ecosystem, environment, erosion, exist, flow, form, freeze, frost, glacier, gravity, heat, history, human, lake, lifetime, liquid, liquid water, living, living thing, melt, mountain, nature, ocean, pebble, period(time), planet, pond, precipitation, reflection, river, river, rock characteristics, salt water, solid, solid rock, space, state, stream, surface, temperature, underground, unit, valley, volcano, weather, weight* • **Engineering (ETS1)** *best, design, environment, human, machine, teamwork*

Performance Expectation
2-ESS1-1 Earth's Place in the Universe

Students who demonstrate understanding can:

Use information from several sources to provide evidence that Earth events can occur quickly or slowly.

Clarification Statement: Examples of events and timescales could include volcanic explosions and earthquakes, which happen quickly and erosion of rocks, which occurs slowly.

Assessment Boundary: Assessment does not include quantitative measurements of timescales.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions • Make observations from several sources to construct an evidence-based account for natural phenomena. ***Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.***	**ESS1.C: The History of Planet Earth** • Some events can happen very quickly; other occur very slowly, over a time period much longer than one can observe.	**Stability and Change** • Things may change rapidly or slowly.

Performance Expectation
2-ESS1-1 Earth's Place in the Universe

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
3.LS2.C ; 4.ESS1.C ; 4.ESS2.A

Common Core State Standards Connections:

ELA/Literacy -

RI.2.1	Ask and answer such questions as who, what, where, when, why, and how to demonstrate understanding of key details in a text. (2-ESS1-1)
RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-ESS1-1)
W.2.6	With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. (2-ESS1-1)
W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-ESS1-1)
W.2.8	Recall information from experiences or gather information from provided sources to answer a question. (2-ESS1-1)
SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

Mathematics -

MP.2	Reason abstractly and quantitatively. *(2-ESS1-1)*
MP.4	Model with mathematics. *(2-ESS1-1)*
2.NBT.A	Understand place value. (2-ESS1-1)

2-ESS1-1 Suggested Activities	2-ESS1-1 Recommended Formative Assessments
How Does Earth's Surface Change? *(TCI: Unit 3, lesson 4, pg.160)* Students will investigate Earth materials and how they move/change shape; learn Earth's surface is constantly changing; Earth changes can occur quickly or slowly. **How Do Wind and Water Change the Land?** *(TCI: Unit 3, lesson 6, pg.168)* Students learn land changes due to wind and/or water.	• **What Earth Materials Do You See?** (Evidence-based explanations of changes.)

Performance Expectation
2-ESS2-1 Earth's Systems

Students who demonstrate understanding can:
Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land.

Clarification Statement: Examples of solutions could include different designs of dikes and windbreaks to hold back wind and water, and different designs for using shrubs, grass, and trees to hold back the land.

Assessment Boundary: *N/A*

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions • Compare multiple solutions to a problem. ***Constructing explanations and designing solutions in K-2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions.***	**ESS2.A: Earth Materials and Systems** • Wind and water can change the shape of the land. **ETS1.C: Optimizing the Design Solution** • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary)	**Stability and Change** • Things may change rapidly or slowly. --- **Connections to Engineering, Technology, and Applications of Science** **Influence of Engineering, Technology, and Science, on Society and the Natural World** • Developing and using technology has impacts on the natural world. --- **Connections to Nature of Science** **Science Addresses Questions About the Natural and Material World** • Scientists study the natural and material world.

Performance Expectation
2-ESS2-1 Earth's Systems

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
K.ETS1.A ; 4.ESS2.A ; 4.ETS1.A ; 4.ETS1.B ; 4.ETS1.C ; 5.ESS2.A

Common Core State Standards Connections:

ELA/Literacy –

RI.2.3 Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. *2-ESS2-1)*
RI.2.9 Compare and contrast the most important points presented by two texts on the same topic. (2-ESS2-1)

Mathematics -

MP.2 Reason abstractly and quantitatively. *(2-ESS2-1)*
MP.4 Model with mathematics. *(2-ESS2-1)*
MP.5 Use appropriate tools strategically. *(2-ESS2-1)*
2.MD.B.5 Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem. *(2-ESS2-1)*

2-ESS2-1 Suggested Activities	2-ESS2-1 Recommended Formative Assessments
"Rocking the River" (*Mystery Science Second Grade Work of Water Mystery 2: Why is There Sand at the Beach?)* Students will learn about the effects of rocks tumbling from a river and construct an explanation for why there is sand at the beach. "Cornmeal Canyons" (*Mystery Science Second Grade Work of Water Mystery 3: What's Strong Enough to Make a Canyon?)* Students will learn about melting and the solid & liquid states of matter, then discover why plastic was invented. In the activity, students test the (melt) property of candy.	• CER Chart • Writing Prompt: Thunderstorm • Why is There Sand at the Beach?

Performance Expectation 2-ESS2-2 Earth's Systems		
Students who demonstrate understanding can: **Develop a model to represent the shapes and kinds of land and bodies in an area.** **Clarification Statement:** N/A **Assessment Boundary**: *Assessment does not include quantitative scaling in models*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models • Develop a model to represent patterns in the natural world. ***Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.***	**ESS2.B: Plate Tectonics and Large-Scale System Interactions** • Maps show where things are located. One can map the shapes and kids of land and water in any area.	**Patterns** • Patterns in the natural world can be observed.

Performance Expectation
2-ESS2-2 Earth's Systems

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
4.ESS2.B ; 5.ESS2.C

Common Core State Standards Connections:

ELA/Literacy -

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(2-ESS2-2)*

Mathematics -

MP.2 Reason abstractly and quantitatively. *(2-ESS2-2)*
MP.4 Model with mathematics. *(2-ESS2-2)*
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form. *(2-ESS2-2)*

2-ESS2-2 Suggested Activities	2-ESS2-2 Recommended Formative Assessments
What is on Earth's Surface? *(TCI: Unit 3, lesson 1, pg.126*) Students will design and make a model representing land and water areas on Earth's surface. **How Do Maps Show Land and Water?** *(TCI: Unit 2, lesson 3, pg.144*) Students read and interpret maps to identify areas of land and water.	• Identify land and Earth surface using a map/globe.

Performance Expectation 2-ESS2-3 Earth's Systems		
Students who demonstrate understanding can: **Obtain information to identify where water is found on Earth and that it can be a solid or a liquid.** **Clarification Statement:** N/A **Assessment Boundary**: *N/A*		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Obtaining, Evaluating, and Communicating Information • Obtain information, using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other medial that will be useful in answering a scientific questions. ***Obtaining, evaluating, and communicating information in K-2 builds on prior experiences and uses observations and texts to communicate new information.***	**ESS2.C: The Roles of Water in Earth's Surface Processes** • Water is found in oceans, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.	**Patterns** • Patterns in the natural world can be observed.

Performance Expectation
2-ESS2-3 Earth's Systems

Connections to other DCIs in Second Grade:
2.PS1.A

Articulation of DCIs across grade-levels:
5.ESS2.C

Common Core State Standards Connections:

ELA/Literacy -

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(2-ESS2-3)*

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-ESS2-3)

Mathematics -

N/A

2-ESS2-3 Suggested Activities	2-ESS2-3 Recommended Formative Assessments
What is on Earth's Surface? *(TCI: Unit 3, lesson 1, pg.126*) Students will design and make a model representing land and water areas on Earth's surface. **What Kinds of Land and Water Are Found on Earth?** *(TCI: Unit 3, lesson 2, pg.134*) Students learn about where water is found on Earth's surface; water exists in different forms (liquid or solid, and salty or fresh). **All the Water in the World** (Science and Children Summer 2015) Students will learn about where water is found on Earth's surface; water exists in different forms (liquid or solid, and salty or fresh).	• Identify land and Earth surface using a map/globe. • Write a letter as if you were an astronaut returning to Earth. Identify where you have landed by describing the Earth's surface in your letter. • **What Kinds of Water Do You See?**

Performance Expectation K-2-ETS1-1 Engineering Design		
Students who demonstrate understanding can: **Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.** **Clarification Statement:** N/A **Assessment Boundary**: N/A		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Asking Questions and Defining Problems • Ask questions based on observations to find more information about the natural and/or designed world(s). • Define a simple problem that can be solved through the development of a new or improved object or tool. ***Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions that can be tested.***	**ETS1.A Defining and Delimiting Engineering Problems** • A situation that people want to change or create can be approached as a problem to be solved though engineering. • Asking questions, making observations, and gathering information are helpful in thinking about problems. • Before beginning to design a solution, it is important to clearly understand the problem.	**N/A**

Performance Expectation
K-2-ETS1-1 Engineering Design

Connections to other DCIs in Second Grade:
Kindergarten: K-PS2-2, K-ESS3-2

Articulation of DCIs across grade-levels:
3-5.ETS1.A ; 3-5.ETS1.C

Common Core State Standards Connections:

ELA/Literacy -

RI.2.1 Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text. (K-2-ETS1-1)

W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(K-2-ETS1-1)*

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (K-2-ETS1-1)

Mathematics -

MP.2 Reason abstractly and quantitatively. *(K-2-ETS1-1)*

MP.4 Model with mathematics. *(K-2-ETS1-1)*

MP.5 Use appropriate tools strategically. *(K-2-ETS1-1)*

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (K-2-ETS1-1)

K-2-ETS1-1 Suggested Activities	K-2-ETS1-1 Recommended Formative Assessments
"Rocking the River" (*Mystery Science Second Grade Work of Water Mystery 2: Why is There Sand at the Beach?)* Students will learn about the effects of rocks tumbling from a river and construct an explanation for why there is sand at the beach. **"Cornmeal Canyons"** (*Mystery Science Second Grade Work of Water Mystery 3: What's Strong Enough to Make a Canyon?)* Students will be able to explain what causes a canyon to form using a model of rain and land.	• CER Chart • **Writing Prompt: Thunderstorm** • **Why is There Sand at the Beach?**

Ledyard Next Generation Science Standards

Grade 2

Unit 3: Needs of Plants and Animals

May-June

Anchoring Phenomenon	
Plants need liquid water in order to survive; they cannot live with only solid water (constant ice). Different plants can live in different places (e.g., a cactus lives in a desert, a cattail lives in a pond.	
Essential Questions	**Compelling Questions**
What do plants and animals need to survive?	• *How does a plant grow outdoors?* • *Why do some plants only grow in certain places?* • *What are some habitats here in Ledyard?* • *Where can we investigate plant and animal life in Ledyard?*

Unit 3: Needs of Plants and Animals Summary

Performance Expectations	Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
• 2-LS2-1 • 2-LS2-2 • 2-LS4-1 • K-2-ETS1-2 *Teacher Note: All Science and Engineering Practices and Crosscutting Concepts in bold are written in the Performance Expectations above. The italicized practices and crosscutting concepts, although not mentioned specifically, may be incorporated additionally in any science lesson at any time.*	• *1: Asking Questions and Defining Problems* • **2: Developing and Using Models** • **3: Planning and Carrying Out Investigations** • *4: Analyzing and Interpreting Data* • *5: Using Mathematical Computational Thinking* • *6: Constructing Explanations and Designing Solutions* • *7: Engaging in Argument from Evidence* • *8: Obtaining, Evaluating, and Communicating Information*	**ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE** • **ETS1 Engineering Design** -ETS1.B Developing Possible Solutions **LIFE SCIENCE** • **LS2 Ecosystems: Interactions, Energy, and Dynamics** -LS2.A: Interdependent Relationships in Ecosystems • **LS4 Biological Evolution: Unity and Diversity** -LS4.D: Biodiversity in Humans	• *1: Patterns* • **2: Cause and Effect** • *3: Scale, Proportion and Quantity* • *4: Systems and System Models* • *5: Energy and Matter* • **6: Structure and Function** • *7: Stability and Change*

Unit 3: Plant and Animal Structures and Behaviors
DCI Vocabulary

Disciplinary Core Ideas	Vocabulary
ENGINEERING, TECHNOLOGY AND THE APPLICATION OF SCIENCE • **ETS1 Engineering Design** -ETS1.B Developing Possible Solutions **LIFE SCIENCE** • **LS2 Ecosystems: Interactions, Energy, and Dynamics** -LS2.A: Interdependent Relationships in Ecosystems • **LS4 Biological Evolution: Unity and Diversity** -LS4.D: Biodiversity in Humans	***This is a recommendation for domain specific terms taught to Kindergarten students.*** **Domains are bold:** • **Engineering (ETS1)** *best, design, environment, human, machine, teamwork* • **Ecosystems: Interactions, Energy, and Dynamics→Interdependent Relationships in Ecosystems (LS2)** *behavior, ecosystem, environment, flock, group behavior, herd, living, membership, migrate, mimic, nonliving, pollinate, pollination, predatory, seed, species, survival, survive, swarm* • **Biological Evolution: Unity and Diversity→Biodiversity in Humans (LS4)** *Earth, ecosystem, environment, environmental, erosion, habitat, health, human, living, material, medicine, pollution, recycle, recycling, safety, species, survival*

Performance Expectation
2-LS2-1 Ecosystems: Interactions, Energy, and Dynamics

Students who demonstrate understanding can:
Plan and conduct an investigation to determine if plants need sunlight and water to grow.

Clarification Statement: N/A

Assessment Boundary: Assessment is limited to testing one variable at a time.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Plan and conduct and investigation collaboratively to produce data to serve as the basis for evidence to answer a question. ***Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.***	**LS2.A: Structure and Function** • Plants depend on water and light to grow.	**Cause and Effect** • Events have causes that generate observable patterns.

Performance Expectation

2-LS2-1 Ecosystems: Interactions, Energy and Dynamics

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
K.LS1.C ; K.ESS3.A ; 5.LS1.C

Common Core State Standards Connections:

ELA/Literacy –

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS2-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1)

Mathematics -

MP.2 Reason abstractly and quantitatively. *(2-LS2-1)*

MP.4 Model with mathematics. *(2-LS2-1)*

MP.5 Use appropriate tools strategically. *(2-LS2-1)*

2-LS2-1 Suggested Activities	2-LS2-1 Recommended Formative Assessments
What Do Plants and Animals Need to Survive? *(TCI: Unit 1, lesson 2, pg.16*) Students will learn about what plants and animals need to survive, and that plants depend upon their environment to survive.	• Complete a data chart displaying investigation examining the requirements of sunlight and water for plants to live and grow.

Performance Expectation
2-LS2-2 Ecosystems: Interactions, Energy and Dynamics

Students who demonstrate understanding can:

Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants.

Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).

Assessment Boundary: N/A.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models • Develop a simple model based on evidence to represent a proposed object or tool. ***Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.***	**LS2.A: Interdependent Relationships in Ecosystems** • Plants depend on animals for pollination or to move their seeds around. **ETS1.B: Interdependent Relationships in Ecosystems** • Designs can be conveyed through sketches, drawings or physical models. These representations are useful in communicating ideas for a problem's solutions to other people. *(secondary)*	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s).

Performance Expectation
2-LS2-2 Ecosystems: Interactions, Energy, and Dynamics

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
K.ETS1.A ; 5.LS2.A

Common Core State Standards Connections:

ELA/Literacy -

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(2-LS2-2)*

Mathematics –

MP.4 Model with mathematics. *(2-LS2-2)*

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(2-LS2-2)*

2-LS2-2 Suggested Activities	2-LS2-2 Recommended Formative Assessments
How Do Plants and Animals Depend on Each Other? *(TCI: Unit 1, lesson 3, pg.24*) Students will learn about how plants and animals depend on each other for survival, and that plants depend on animals for pollination or for moving their seeds around. **"Fly Your Own Seed"** (*Mystery Science Second Grade Plant Adventures Mystery 3: How Did a Tree Travel Halfway Around the World?)* Students will be able to explain what causes a canyon to form using a model of rain and land.	• Construct a model showing the function of an animal in pollinating plants. • **Plants Adventures**

Performance Expectation
2-LS4-1 Biological Evolution: Unity and Diversity

Students who demonstrate understanding can:
Make observations of plants and animals to compare the diversity of life in different habitats.

Clarification Statement: Emphasis is on the diversity of living things in each of a variety of different habitats.

Assessment Boundary: Assessment does not include specific animal and plant names in specific habitats.

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations • Plan and conduct and investigation collaboratively to produce data to serve as the basis for evidence to answer a question. ***Planning and carrying out investigations to answer questions or test solutions to problems in K-2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions*** - **Connections to Nature of Science** **Scientific Knowledge is Based on Empirical Evidence** • Scientists look for patterns and order when making observations about the world.	**LS4.D: Biodiversity and Humans** • There are many different kinds of living things in any area, and they exist in different places on land and in water.	**N/A**

Performance Expectation
2-LS4-1 Heredity: Evolution: Unity and Diversity

Connections to other DCIs in Second Grade:
N/A

Articulation of DCIs across grade-levels:
3.LS4.C ; 3.LS4.D ; 5.LS2.A

Common Core State Standards Connections:

ELA/Literacy -

W.2.7 Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-LS4-1)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS4-1)

Mathematics -

MP.2 Reason abstractly and quantitatively. *(2-LS4-1)*

MP.4 Model with mathematics. *(2-LS4-1)*

2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. *(2-LS4-1)*

2-LS4-1 Suggested Activities	2-LS4-1 Recommended Formative Assessments
What Kinds of Living Things Are There? *(TCI: Unit 1, lesson 1, pg.4)* Students will learn that all plants and animals are living things, also that there are many different kinds of plants and animals. Plants and animals can look different from each other, behave different from each other, and live in different areas, on land or in water. **Why Do Plants and Animals Live in Some Places and Not in Others?** *(TCI: Unit 1, lesson 4, pg.32)* Students will learn that a habitat is the place where plants and animals live and get what they need to survive, that there are many different types of habitats on Earth, and that scientists use measurements to make observations about habitats and to compare them.	• Complete a Venn diagram comparing and contrasting the needs of plants and animals. • Draw a diagram of ocean life you might observe at the shore or in deep water.

2-LS4-1 Suggested Activities	2-LS4-1 Recommended Formative Assessments
How do Plants and Animals Survive in a Pond? *(TCI: Unit 1, lesson 7, pg.54*) Students learn the characteristics of a pond habitat and about the living things that survive there. **How do Plants and Animals Survive in the Ocean?** *(TCI: Unit 1, lesson 8, pg.60*) Students learn the characteristics of an ocean habitat and about the living things that survive there. **Extension Activities:** **How do Plants and Animals Survive and a Rain Forest?** *(TCI: Unit 1, lesson 5, pg.42*) Students learn the characteristics of a rainforest habitat and about the living things that survive there. **How do Plants and Animals Survive in a Desert?** *(TCI: Unit 1, lesson 6, pg.48*) Students learn the characteristics of a desert habitat and about the living things that survive there. **"Root Viewer"** (*Mystery Science Second Grade Plant Adventures Mystery 2: Do Plants Eat Dirt?)* Students will build a 'root viewer' to investigate the importance of water and dirt for a plant.	• **Building Blocks: Pond** • **Lab Investigation Challenge: Ocean**

Performance Expectation K-2 ETS1-2 Engineering Design		
Students who demonstrate understanding can: **Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.**		
Science and Engineering Practices	**Disciplinary Core Ideas**	**Crosscutting Concepts**
Developing and Using Models • Develop a simple model based on evidence to represent a proposed object or tool. ***Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions.***	**ETS1.B Developing Possible Solutions** • Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem's solutions to other people.	**Structure and Function** • The shape and stability of structures of natural and designed objects are related to their function(s).

Performance Expectation
K-2-ETS1-2 Engineering Design

Connections to other DCIs in Second Grade:
Kindergarten: K-ESS3-3, First Grade: 1-PS4-4, Second Grade: 2-LS2-2

Articulation of DCIs across grade-levels:
3-5.ETS1.A ; 3-5.ETS1.B ; 3-5.ETS1.C

Common Core State Standards Connections:

ELA/Literacy -

SL.2.5 Create audio recordings of stories or poems; add drawings or other visual displays to stories or recounts of experiences when appropriate to clarify ideas, thoughts, and feelings. *(K-2-ETS1-2)*

Mathematics -

N/A

K-2-ETS1-2 Suggested Activities	K-2-ETS1-2 Recommended Formative Assessments
"Root Viewer" (*Mystery Science Second Grade Plant Adventures Mystery 2: Do Plants Eat Dirt?)* Students will build a 'root viewer' to investigate the importance of water and dirt for a plant. **"Grow Your Name"** (*Mystery Science Second Grade Plant Adventures Mystery 2: Do Plants Eat Dirt?)* Students will grow their plants from seeds in a simple hydroponic garden in the absence of dirt.	• Draw a diagram showing the structure and function of the roots on a plant.