

Estell Manor School District Science Curriculum



Grade 2

Philosophy

The performance expectations in second grade help students formulate answers to questions such as: How are materials similar and different from one another, and how do the properties of the materials relate to their use? How can materials be assembled or disassembled to change their purpose? 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 many types of living things live in a place? Students will be able to construct an argument with evidence some change caused by heating and cooling can be reversed and some cannot. Second grade performance expectations include PS1, LS2, LS4, ESS1, ESS2, and ETS1 Disciplinary Core Ideas from the NRC Framework. An understanding of observable properties of materials is developed by students at this level through analysis and classification of different materials. 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.

Pacing Guide

Unit	Time Frame
Unit 1: Engineering Design Process	20-25 Days
Unit 2: Properties of Matter and Changes to Matter	40-50 Days
Unit 3: Environments for Living Things and Relationships in Habitats	30-40 Days
Unit 4: Earth's Land and Water	30-40 Days
Unit 5: Changes to Earth's Surface	30-40 Days

Core Materials: NJSLS – Science Model Curriculum Grade 2

Unit 1 will address the following 21st Century Life and Careers skills:

21st Century Themes		Career Ready Practices	
9.1	Personal Financial Literacy		CRP1. Act as a responsible and contributing citizen and employee.
	Income and Careers		CRP2. Apply appropriate academic and technical skills.
	Money Management		CRP3. Attend to personal health and financial well-being.
	Credit and Debt Management		CRP4. Communicate clearly and effectively and with reason.
	Planning, Saving, and Investing		CRP5. Consider the environmental, social and economic impacts of decisions.
	Becoming a Critical Consumer	√	CRP6. Demonstrate creativity and innovation.
	Civic Financial Responsibility		CRP7. Employ valid and reliable research strategies.

	Insuring and Protecting		√	CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
9.2	Career Awareness, Exploration, and Preparation		√	CRP9. Model integrity, ethical leadership and effective management.
X	Career Awareness			CRP10. Plan education and career paths aligned to personal goals.
X	Career Exploration		√	CRP11. Use technology to enhance productivity.
X	Career Preparation		√	CRP12. Work productively in teams while using cultural global competence.

Technology

	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
	A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
	C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 1 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Asking Questions and Defining Problems Asking questions and defining problems in K–2 builds on prior experiences and progresses to simple descriptive questions. Ask questions based on observations to find more information about the natural and/or designed world(s). (K2-ETS1-1) Define a simple problem that can be solved through the development of a new or improved object or tool. (K-2- ETS1-1) Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2) Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Analyze data from tests of an object or tool to determine if it works as intended. (K-2-ETS1-3)	ETS1.A: Defining and Delimiting Engineering Problems A situation that people want to change or create can be approached as a problem to be solved through engineering. (K-2-ETS1-1) Asking questions, making observations, and gathering information are helpful in thinking about problems. (K-2-ETS1-1) Before beginning to design a solution, it is important to clearly understand the problem. (K-2-ETS1-1) ETS1.B: Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. (K-2-ETS1-2) ETS1.C: Optimizing the Design Solution Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (K-2-ETS1-3)	Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2)

Unit 1: Science / 2nd Grade Engineering and Technology	Duration: 20-25 Days
Standards: K-2-ETS-1-1: 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. K-2-ETS1-2: 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. K-2-ETS1-3: Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.	
Unit Summary: Students will be exposed to engineering and technology. This unit has two lessons attached to it and should be completed in 20-25 Days. They will be able to ask questions, make observations, and gather information to define a problem, use a design process to solve a problem, and compare and contrast.	
NJ Student Learning Standards: Interdisciplinary Skills Primary Interdisciplinary Connections: Infused within the unit are connections to the NJSL for Mathematics, Language Arts NJSLA.SL2. Integrate and evaluate information presented in diverse media and formats, including visually, quantitatively, and orally. NJSLA.W10. Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of tasks, purposes, and audiences. SL.2.1. Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 2 topics and texts, building on others' ideas and expressing their own clearly	

Technology

8.1.8.A.1 - Demonstrate knowledge of a real world problem using digital tools.

21st Century Life and Career

- CRP6. Demonstrate creativity and innovation.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP11. Use technology to enhance productivity.
- CRP12. Work productively in teams while using cultural global competence.

Essential Understanding	Essential Questions
<i>Students will understand that...</i> ● Engineers use a design process ● Engineers compare design solutions	● What is a design process? ● How can we compare design solutions?
Evidence of Student Learning	
Performance Tasks: <i>Activities to provide evidence for student learning of content and cognitive skills.</i>	Other Assessments

● Runaway Wagon - best way to keep a wagon from rolling away when you let go of its handle	Formative Assessments ● Teacher Observations ● Interactive Notebook ● Graphic Organizers Summative Assessments ● Tests ● Quizzes ● Hands-On Activities Benchmark Assessment ● Beginning of the Year Benchmark ● Mid-Year Benchmark ● End of the Year Benchmark Alternative Assessments ● Teacher Observations ● Group Work/Class Work
Vocabulary engineer/design process/solution/strength/weakness	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i>	<i>Students will be able to...</i>

• What a design process is • How they can compare design solutions	• Ask questions, make observations, and gather information to define a problem • Use a design process to solve a problem • Compare the strengths and weaknesses of multiple design solutions
Instructional Plan	
Suggested Activities	Resources
- Build a better lunchbox - Marshmallow design solution	- www.brainpopjr.com - www.mysteryscience.com - https://www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com
Literature	
- Leveled texts (Readworks.org), literature from ELA program	
Websites	
	- www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/

	- www.readworks.org (leveled texts) - www.generationgenius.com
Modifications Special Education Students / 504 (<i>These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan</i>) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge. English Language learners: <i>use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.</i> Students at Risk of Failure: <i>Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.</i> Gifted Students: <i>provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.</i> <i>*For additional modifications and accommodations, see below</i>	
English Language Learners ● Provide pictures and well labeled models ● Speak slowly and gesture when necessary ● Pre-teach vocabulary words ● Extended Time ● Less questions on a page for tests	
Gifted and Talented ● Higher level questioning ● Students design questions ● Higher level texts	

- Choice of activity to extend learning
- Expose to sophisticated vocabulary
- Open ended questions to activate higher level thinking
- Enrichment opportunities to push assessment boundaries

Basic Skills/Economically Disadvantaged/Students at Risk

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Communication logs

Special Education/504

- Follow all IEP modifications/504 plan
- Provide student with specific graphic organizers to help them note take about the different levels of government
- Provide opportunity to draw solution strategies
- Provide students with notes from the lesson and discussions
- Labeled pictures related to concepts
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus

Unit 2 will address the following 21st Century Life and Careers skills:

21st Century Themes		Career Ready Practices	
9.1	Personal Financial Literacy		CRP1. Act as a responsible and contributing citizen and employee.
	Income and Careers		CRP2. Apply appropriate academic and technical skills.
	Money Management		CRP3. Attend to personal health and financial well-being.
	Credit and Debt Management	√	CRP4. Communicate clearly and effectively and with reason.
	Planning, Saving, and Investing		CRP5. Consider the environmental, social and economic impacts of decisions.
	Becoming a Critical Consumer	√	CRP6. Demonstrate creativity and innovation.
	Civic Financial Responsibility	√	CRP7. Employ valid and reliable research strategies.

	Insuring and Protecting		√	CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
9.2	Career Awareness, Exploration, and Preparation			CRP9. Model integrity, ethical leadership and effective management.
X	Career Awareness			CRP10. Plan education and career paths aligned to personal goals.
X	Career Exploration			CRP11. Use technology to enhance productivity.
X	Career Preparation			CRP12. Work productively in teams while using cultural global competence.

Technology

	TECHNOLOGY STANDARDS 8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
	A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations

	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
	C. Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 2 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-PS1-1) Analyzing and Interpreting Data Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations. Analyze data from tests of an object or tool to determine if it works as intended. (2-PS1-2) Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations (firsthand or from	PS1.A: Structure and Properties of Matter Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1) Different properties are suited to different purposes. (2- PS1-2),(2-PS1-3) A great variety of objects can be built up from a small set of pieces. (2-PS1-3) PS1.B: Chemical Reactions Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)	Patterns Patterns in the natural and human designed world can be observed. (2-PS1-1) Cause and Effect Events have causes that generate observable patterns. (2-PS1-4) Simple tests can be designed to gather evidence to support or refute student ideas about causes. (2-PS1-2) Energy and Matter Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3) ----- ----- 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. (2-PS1-2)

media) to construct an evidence-based account for natural phenomena. (2-PS1-3) Engaging in Argument from Evidence Engaging in argument from evidence in K–2 builds on prior experiences and progresses to comparing ideas and representations about the natural and designed world(s). Construct an argument with evidence to support a claim. (2- PS1-4) ----- ---Connections to Nature of Science Science Models, Laws, Mechanisms, and Theories Explain Natural Phenomena Scientists search for cause and effect relationships to explain natural events. (2- PS1-4)		
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Unit 2: Science/2nd Grade	Duration: 40-50 Days
Properties of Matter and Changes to Matter	
Standards: 2-PS1-1 Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties 2-PS1-2 Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose 2-PS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs. Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object	

2-PS1-4 Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot

K-2-ETS1-3 Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Unit Summary: Students will be exposed to matter. This unit has four lessons attached to it and should be completed in about 40-50 Days. They will be able to describe and classify, select and use materials, use evidence to describe, and explore.

NJ Student Learning Standards

Interdisciplinary Skills

SL.2.1.A - Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1.B - Build on others' talk in conversations by linking their explicit comments to the remarks of others.

SL.2.1.C - Ask for clarification and further explanation as needed about the topics and texts under discussion.

Technology

8.8.2. A.4 - Create a document with text using a word processing program.

8.1.2. E.1 - Explore a problem / issue affecting children using digital tools and online resources and discuss possible solutions.

8.2.8. B.1 - Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.

8.2.8. B.2 - Identify the design constraints and tradeoffs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.

8.2.8. B.3 - Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.

9.1.4. B.1 - Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

21st Century Life and Careers Skills ● CRP4. Communicate clearly and effectively and with reason. ● CRP6. Demonstrate creativity and innovation. ● CRP7. Employ valid and reliable research strategies. ● CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.	
Essential Understandings	Essential Questions
<i>Students will understand that...</i> ● There are different properties of matter ● Objects can be put together in different ways ● Heating and cooling can change matter ● Matter can change	● What are properties of matter? ● How are objects put together? ● How do heating and cooling change matter? ● How does matter change?
Evidence of Student Learning	
Performance Tasks: <i>Activities to provide evidence for student learning of content and cognitive skills.</i>	Other Assessments
● Explore melting by identifying the fastest way to cause ice to change to water	Formative Assessments ● Performance Assessments - explore melting ● Exit Slips ● Response Cards ● Graphic Organizers Summative Assessments ● Summary

	• Labs • Hands-On Activities Benchmark Assessment • Beginning of the Year Benchmark • Mid-Year Benchmark • End of the Year Benchmark Alternative Assessments • Teacher Observations • Participation Rubric • Group Work/Class Work
Vocabulary matter/property/solid/liquid/melt/freeze/reversible/irreversible	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i> • Different properties of matter • How objects are put together • How heating and cooling change matter • How matter changes	<i>Students will be able to ...</i> • Describe and classify materials by their observable properties • Select and use materials based on these properties • Use evidence to describe how heating and cooling cause changes to matter

	● Use evidence to describe reversible and irreversible changes to matter ● Explore how an object can be taken apart and its pieces used to make another object
Instructional Plan	
Suggested Activities	Resources
- Separate objects based on observable properties. - Work together to brainstorm a list of possible structures that could be built with different materials - Boil water in a kettle. Discuss how matter changes from liquid to gas. - Put a popsicle in the sun. Make predictions. Watch the solid become a liquid. Think/Pair/Share whether the liquid can become a solid again. - Place water on the counter. Predict what will happen if left there over long periods of time. Discuss where the heat came from that caused it to become a gas. - Create boats out of different materials. Talk about which worked, which did not, and why.	- www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com
Literature	
- Leveled texts (readworks.org), literature from ELA program	
Websites	

- www.brainpopjr.com
- www.mysteryscience.com
- www.teachengineering.org/
- www.readworks.org (leveled texts)
- www.generationgenius.com

Modifications

Special Education Students / 504 (*These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan*) reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.

Students at Risk of Failure: Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.

Gifted Students: provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.

Suggested Options for Differentiation

English Language Learners

- Preview lessons
- Labeled pictures
- Use visuals

Gifted and Talented

- Higher level questioning
- Students design questions
- Differentiated Assignments
- Choice board to extend learning

Basic Skills/Economically Disadvantaged/Students at Risk ● Highlight key words ● Preview lessons ● Graphic organizers
Special Education/504 ● Provide differentiated instruction as needed ● Follow all IEP modifications/504 plan ● Pre-teach and model strategies to learn and practice new vocabulary words pertaining to the unit ● Modified assignments

Unit 3 will address the following 21st Century Life and Careers skills:

21st Century Themes		Career Ready Practices	
9.1	Personal Financial Literacy		CRP1. Act as a responsible and contributing citizen and employee.
	Income and Careers	√	CRP2. Apply appropriate academic and technical skills.
	Money Management		CRP3. Attend to personal health and financial well-being.
	Credit and Debt Management		CRP4. Communicate clearly and effectively and with reason.
	Planning, Saving, and Investing	√	CRP5. Consider the environmental, social and economic impacts of decisions.
	Becoming a Critical Consumer		CRP6. Demonstrate creativity and innovation.
	Civic Financial Responsibility		CRP7. Employ valid and reliable research strategies.

	Insuring and Protecting		√	CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
9.2	Career Awareness, Exploration, and Preparation			CRP9. Model integrity, ethical leadership and effective management.
X	Career Awareness			CRP10. Plan education and career paths aligned to personal goals.
X	Career Exploration		√	CRP11. Use technology to enhance productivity.
X	Career Preparation			CRP12. Work productively in teams while using cultural global competence.

Technology

	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 3 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a simple model based on evidence to represent a proposed object or tool. (2-LS2-2) Planning and Carrying Out Investigations Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions. Plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. (2-LS2-1)	LS2.A: Interdependent Relationships in Ecosystems Plants depend on water and light to grow. (2-LS2-1) Plants depend on animals for pollination or to move their seeds around. (2-LS2-2) ETS1.B: Developing Possible Solutions Designs can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a	Cause and Effect Events have causes that generate observable patterns. (2-LS2-1) Structure and Function The shape and stability of structures of natural and designed objects are related to their function(s). (2-LS2-2)

Unit 3: Science/2nd Grade	Duration: 30-40 Days
Environments for Living Things and Relationships in Habitats	
Standards: 2-LS2-1- Plan and conduct an investigation to determine if plants need sunlight and water to grow	

2-LS2-2- Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants

2-LS4-1- Make observations of plants and animals to compare the diversity of life in different habitats

K-2 ETS1-1 Ask questions, make observations, and gather information about a situation people want to change (e.g. climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

Unit Summary: Students will be exposed to environments for living things. This unit has four lessons attached to it and should be completed in about 30-40 Days. They will be able to investigate, develop models, explore, and observe.

NJ Student Learning Standards

Interdisciplinary Skills

SL.2.1.A - Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1.B - Build on others' talk in conversations by linking their explicit comments to the remarks of others.

SL.2.1.C - Ask for clarification and further explanation as needed about the topics and texts under discussion.

Technology

8.8.2. A.4 - Create a document with text using a word processing program.

8.1.2. B.1 - Illustrate and communicate original ideas and stories using digital tools and media-rich resources.

8.1.2. E.1 - Explore a problem / issue affecting children using digital tools and online resources and discuss possible solutions.

8.2.8. B.1 - Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.

8.2.8. B.2 - Identify the design constraints and tradeoffs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.

8.2.8. B.3 - Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.

9.1.4.B.1 - Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

21st Century Life and Career

- CRP2. Apply appropriate academic and technical skills.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
- CRP11. Use technology to enhance productivity.

Essential Understandings	Essential Questions
<i>Students will understand that...</i> ● Plants need a number of things in order to survive ● Plants depend on animals ● A number of plants and animals live in water habitats ● A number of plants and animals live in land habitats	● What do plants need? ● How do plants depend on animals? ● What plants and animals live in water habitats? ● What plants and animals live in land habitats
Evidence of Student Learning	
Performance Tasks: Activities to provide evidence for student learning of content and cognitive skills.	Other Assessments Formative Assessments ● Teacher Observations ● Interactive Notebook

Explore habitats by planning and conducting an investigation to find out how plants and animals get what they need in their habitat	- Performance Assessments - explore habitats - Exit Slips Summative Assessments - Tests - Hands-On Activities Benchmark Assessment - Beginning of the Year Benchmark - Mid-Year Benchmark - End of the Year Benchmark Alternative Assessments - Teacher Observations - Group Work/Class Work
Vocabulary nutrient/pollen/habitat	
Knowledge and Skills	
Content	Skills
<i>Students will know...</i> - What plants need in order to survive - How plants depend on animals - What plants and animals live in water habitats	<i>Students will be able to ...</i> Investigate what plants and animals need to live and grow

• What plants and animals live in land habitats	• Develop models to show how plants depend on animals • Explore environments to identify observable patterns • Observable plants and animals to compare diversity of life in water habitats • Observe plants and animals to compare diversity of life in land habitats
Instructional Plan	
Suggested Activities	Resources
- Explore what a plant needs and what happens when it is placed in colored water - Make a model tool to pick up and move seeds - Make a tide pool model - Make a savanna habitat	- www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com
Literature	
- Leveled texts(Readworks.org), literature from ELA program	
Websites	
- www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts)	

- www.generationgenius.com

Modifications

Special Education Students / 504 *(These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan)* reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended Time
- Less questions on a page for tests

Gifted and Talented

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Differentiate Assignments
- Complete different homework assignments than peers

- Open ended questions to activate higher level thinking
- Higher level texts

Basic Skills/Economically Disadvantaged/Students at Risk

- Pre-teach vocabulary using visuals and gestures
- Chunk texts
- Highlight key words
- Frequent breaks
- Strategic grouping
- Pre-teach concepts
- Communication logs

Modifications/Accommodations

Special Education/504

- Provide differentiated instruction as needed
- Follow all IEP modifications/504 plan
- Review concepts and important vocabulary from previous lessons before teaching new information
- Check for student understanding often with formal, informal, verbal, and nonverbal measures
- Progress Monitoring
- Strategic grouping
- Pre-teach concepts
- Check in's during experiments to help refocus

Unit 4 will address the following 21st Century Life and Careers skills:

21st Century Themes		Career Ready Practices	
9.1	Personal Financial Literacy	√	CRP1. Act as a responsible and contributing citizen and employee.
	Income and Careers		CRP2. Apply appropriate academic and technical skills.
	Money Management		CRP3. Attend to personal health and financial well-being.
	Credit and Debt Management		CRP4. Communicate clearly and effectively and with reason.
	Planning, Saving, and Investing	√	CRP5. Consider the environmental, social and economic impacts of decisions.
	Becoming a Critical Consumer	√	CRP6. Demonstrate creativity and innovation.

	Civic Financial Responsibility			CRP7. Employ valid and reliable research strategies.
	Insuring and Protecting			CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
9.2	Career Awareness, Exploration, and Preparation		√	CRP9. Model integrity, ethical leadership and effective management.
X	Career Awareness			CRP10. Plan education and career paths aligned to personal goals.
X	Career Exploration			CRP11. Use technology to enhance productivity.
X	Career Preparation		√	CRP12. Work productively in teams while using cultural global competence.

Technology

	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
	D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 4 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Developing and Using Models Modeling in K–2 builds on prior experiences and progresses to include using and developing models (i.e., diagram, drawing, physical replica, diorama, dramatization, or storyboard) that represent concrete events or design solutions. Develop a model to represent patterns in the natural world. (2-ESS2-2) Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Compare multiple solutions to a problem. (2-ESS2-1) Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information. Obtain information using various texts,	ESS2.A: Earth Materials and Systems Wind and water can change the shape of the land. (2- ESS2-1) ESS2.B: Plate Tectonics and Large-Scale System Interactions Maps show where things are located. One can map the shapes and kinds of land and water in any area. (2-ESS2- 2) ESS2.C: The Roles of Water in Earth’s Surface Processes Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. (2-ESS2-3) ETS1.C: Optimizing the Design Solution Because there is always more than one possible solution to a problem, it is useful to compare and test designs. (secondary to 2-ESS2-1)	Patterns Patterns in the natural world can be observed. (2-ESS2-2),(2-ESS2-3) Stability and Change Things may change slowly or rapidly. (2- ESS2-1) ----- Connections to Engineering, Technology, and Applications of Science Influence of Engineering, Technology, and Science on Society and the Natural World Developing and using technology has impacts on the natural world. (2-ESS2-1) ----- ----- Connections to Nature of Science Science Addresses Questions About the Natural and Material World Scientists study the natural and material world. (2-ESS2-1)

text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. (2-ESS2-3)		
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Unit 4: Science/2nd Grade	Duration: 30-40 Days
Earth's Land and Water	
Unit Summary: Students will be exposed to earth's surfaces. This unit has two lessons attached to it and should be completed in about 30-40 Days. They will be able to gather information and develop maps.	
Standards:	
2-ESS2-2 - Develop a model to represent the shapes and kinds of land and bodies of water in an area.	
2-ESS2-3 - Obtain information to identify where water is found on Earth and that it can be solid or liquid.	
NJ Student Learning Standards	
Interdisciplinary Skills SL.2.1.A - Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion). SL.2.1.B - Build on others' talk in conversations by linking their explicit comments to the remarks of others. SL.2.1.C - Ask for clarification and further explanation as needed about the topics and texts under discussion. Technology 8.8.2.A.4 - Create a document with text using a word processing program.	

8.1.2.E.1 - Explore a problem / issue affecting children using digital tools and online resources and discuss possible solutions.

8.2.8.B.1 - Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.

8.2.8.B.2 - Identify the design constraints and tradeoffs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.

8.2.8.B.3 - Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.

9.1.4.B.1 - Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

21st Century Life and Career

- CRP1. Act as a responsible and contributing citizen and employee.
- CRP5. Consider the environmental, social and economic impacts of decisions.
- CRP6. Demonstrate creativity and innovation.
- CRP9. Model integrity, ethical leadership and effective management.
- CRP12. Work productively in teams while using cultural global competence.

Essential Understandings	Essential Questions
<i>Students will understand that...</i> ● There are different places on earth where water is found ● Land and water can be mapped	● Where is water found on earth? ● How can we map land and water?
Evidence of Student Learning	

Performance Tasks: <i>Activities to provide evidence for student learning of content and cognitive skills.</i> ● Explore ocean water	Other Assessments Formative Assessments ● Teacher Observations ● Interactive Notebook ● Graphic Organizers Summative Assessments ● Tests ● Quizzes ● Hands-On Activities Benchmark Assessment ● Beginning of the Year Benchmark ● Mid-Year Benchmark ● End of the Year Benchmark Alternative Assessments ● Teacher Observations ● Group Work/Class Work
Vocabulary map/map title/map key/compass rose	
Knowledge and Skills	
Content	Skills
<i>Students will know....</i>	<i>Students will be able to ...</i>

• Where water is found on earth • How to map land and water	• Gather information to identify where water is located on earth • Develop maps to represent locations of land and water on earth
Instructional Plan	
Suggested Activities • Locate bodies of water by using a variety of resources to obtain information about bodies of water near where they live and make posters to share this information with their classmates • Make a map of the classroom using a map title, map key, and compass rose	Resources - www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com
Literature	
- Leveled texts (Readworks.org), literature from ELA series	
Websites	
- www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com	
Modifications	

Special Education Students / 504 *(These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan)* reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge.

English Language learners: *use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.*

Students at Risk of Failure: *Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.*

Gifted Students: *provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.*

Suggested Options for Differentiation

English Language Learners

- Provide pictures and well labeled models
- Speak slowly and gesture when necessary
- Pre-teach vocabulary words
- Extended time on assessments
- Small group for assessment

Gifted and Talented

- Organize and offer flexible small group learning activities
- Teach cognitive and methodological skills
- Use centers

Basic Skills/Economically Disadvantaged/Students at Risk

- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus
- Communication logs

Special Education/504

- Follow all IEP modifications/504 plan
- Provide visual aids to support concepts being taught

- Use graphic organizers to help students organize important information from a lesson
- Reword Directions
- Strategic grouping
- Pre-teach concepts
- Small group for assessments
- Check in's during experiments to help refocus

Unit 5 will address the following 21st Century Life and Careers skills:

21st Century Themes		Career Ready Practices	
9.1	Personal Financial Literacy	√	CRP1. Act as a responsible and contributing citizen and employee.
	Income and Careers		CRP2. Apply appropriate academic and technical skills.
	Money Management		CRP3. Attend to personal health and financial well-being.
	Credit and Debt Management		CRP4. Communicate clearly and effectively and with reason.
	Planning, Saving, and Investing	√	CRP5. Consider the environmental, social and economic impacts of decisions.

	Becoming a Critical Consumer		√	CRP6. Demonstrate creativity and innovation.
	Civic Financial Responsibility			CRP7. Employ valid and reliable research strategies.
	Insuring and Protecting			CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
9.2	Career Awareness, Exploration, and Preparation		√	CRP9. Model integrity, ethical leadership and effective management.
X	Career Awareness			CRP10. Plan education and career paths aligned to personal goals.
X	Career Exploration			CRP11. Use technology to enhance productivity.
X	Career Preparation		√	CRP12. Work productively in teams while using cultural global competence.

Technology

	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
	A. Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations
	B. Creativity and Innovation: Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.
	D. Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
	E: Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
	F: Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.

Unit 5 Disciplinary Core Ideas Chart

Science and Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
Constructing Explanations and Designing Solutions Constructing explanations and designing solutions in K–2 builds on prior experiences and progresses to the use of evidence and ideas in constructing evidence-based accounts of natural phenomena and designing solutions. Make observations from several sources to construct an evidence-based account for natural phenomena. (2-ESS1-1)	ESS1.C: The History of Planet Earth Some events happen very quickly; others occur very slowly, over a time period much longer than one can observe. (2-ESS1-1)	Stability and Change Things may change slowly or rapidly. (2-ESS1-1)

Unit 5: Science/2nd Grade Changes to Earth’s Surface	Duration: 30-40 Days
Unit Summary: Students will be exposed to changes to earth’s surface. This unit has three lessons attached to it and should be completed in about 30-40 Days. They will be able to use evidence to explain and find solutions.	
Standards: 2-ESS1-1: Use information from several sources to provide evidence that Earth events can occur quickly or slowly 2-ESS2-1: Compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land	

K-2-ETS1-1: Ask questions, make observations, and gather information about a situation people want to change (e.g. climate change) to define a simple problem that can be solved through the development of a new or improved object or tool.

K-2-ETS1-2: 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.

NJ Student Learning Standards

Interdisciplinary Skills

SL.2.1.A - Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).

SL.2.1.B - Build on others' talk in conversations by linking their explicit comments to the remarks of others.

SL.2.1.C - Ask for clarification and further explanation as needed about the topics and texts under discussion.

Technology

8.8.2.A.4 - Create a document with text using a word processing program.

8.1.2.E.1 - Explore a problem / issue affecting children using digital tools and online resources and discuss possible solutions.

8.2.8.B.1 - Design and create a product using the design process that addresses a real world problem with specific criteria and constraints.

8.2.8.B.2 - Identify the design constraints and tradeoffs involved in designing a prototype, (how the prototype might fail, and how it might be improved) by completing a design problem and reporting results in a multimedia presentation.

8.2.8.B.3 - Solve a science-based design challenge and build a prototype using science and math principles throughout the design process.

9.1.4.B.1 - Participate in brainstorming sessions to seek information, ideas, and strategies that foster creative thinking.

21st Century Life and Career ● CRP1. Act as a responsible and contributing citizen and employee. ● CRP5. Consider the environmental, social and economic impacts of decisions. ● CRP6. Demonstrate creativity and innovation. ● CRP9. Model integrity, ethical leadership and effective management. ● CRP12. Work productively in teams while using cultural global competence.	
Essential Understandings	Essential Questions
<i>Students will understand that...</i> ● There are changes on earth that happen slowly ● There are changes on earth that happen quickly ● There are ways to prevent wind and water from changing the land	● What changes on earth happen slowly? ● What changes on earth happen quickly ● How can we prevent wind and water from changing land?
Evidence of Student Learning	
Performance Tasks: <i>Activities to provide evidence for student learning of content and cognitive skills.</i> ● Make a windbreak that will stop wind from changing the land	Other Assessments Formative Assessments ● Performance Assessments ● Exit Slips ● Graphic Organizers Summative Assessments ● Quizzes ● Summary ● Hands-On Activities Benchmark Assessment

	● Beginning of the Year Benchmark ● Mid-Year Benchmark ● End of the Year Benchmark Alternative Assessments ● Participation Rubric ● Teacher Observations ● Group Work/Class Work
Vocabulary weathering/erosion/earthquake/volcano/landslide/hurricane/flood/windbreak/dike	
Knowledge and Skills	
Content	Skills
<i>Students will know....</i> ● That there are changes on earth that happen slowly ● That there are changes on earth that happen quickly ● That there are ways to prevent wind and water from changing the land	<i>Students will be able to ...</i> ● Use evidence to explain that some changes to earth happen slowly ● Use evidence to explain that some changes to earth happen quickly ● Find solutions to prevent wind from changing the land ● Find solutions to prevent water from changing the land
Instructional Plan	
Suggested Activities	Resources
● How Can Water Change the Shape of Land? Students will make a sand tower and use water and a dropper to create and record	- www.brainpopjr.com - www.mysteryscience.com

changes. • Wind Can Change the Shape of Land The class will make a sand tower and then the students will take turns blowing through straws and observe the changes. • Preventing Wind Erosion Students will create a structure of blocks to prevent the wind from hitting a house. • Model erosion by water • Model quick changes on earth (floods) • Prevent water from changing land	- www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com
Literature - Leveled texts (Readworks.org), literature from ELA program	
Websites - www.brainpopjr.com - www.mysteryscience.com - www.teachengineering.org/ - www.readworks.org (leveled texts) - www.generationgenius.com	
Modifications Special Education Students / 504 <i>(These are just suggested ideas to modify instruction. All modifications and accommodations should be specific to each student's IEP or 504 plan)</i> reduce/revise assignments & assignments as per IEP; provide individual and small group assistance; notes, and study guides; provide background knowledge. English Language learners: <i>use consistent, simplified language; provide bilingual when appropriate; provide cooperative learning opportunities, use modeling, visual aids, and manipulatives.</i> Students at Risk of Failure: <i>Provide less distracting seating if possible, frequent check-in by teacher, study guides, notes, etc.</i>	

Gifted Students: <i>provide additional enrichment activity involving demonstrating knowledge, deeper research to answer a higher level questions, or complimentary assignment.</i>
Suggested Options for Differentiation
English Language Learners ● Provide pictures and well labeled models ● Speak slowly and gesture when necessary ● Extended time on assessments ● Small group for assessment
Gifted and Talented ● Differentiate Assignments ● Differentiate Texts ● Complete Different Homework than peers
Basic Skills/Economically Disadvantaged/Students at Risk ● Graphic organizers ● Build background knowledge ● Increased parent communication ● Strategic grouping ● Pre-teach concepts ● Small group for assessments
Special Education/504 ● Follow all IEP modifications/504 plan ● Provide manipulatives or the opportunity to draw solution strategies ● Pre-Teach concepts ● Extended Time ● Strategic grouping ● Small group for assessments ● Check in's during experiments to help refocus