BURCH CHARTER SCHOOL OF EXCELLENCE

2020-2021

2nd Grade Science

Approved by the Burch Charter School of Excellence Board of Trustees

August 2020

MISSION STATEMENT OF BURCH CHARTER SCHOOL OF EXCELLENCE:

Burch Charter School of Excellence (BCSE) was founded in September, 2008. Our primal mission is to enable students to reach their intellectual and personal potential. We strive to instill integrity and respect in our students' in partnership with families and the community. We maintain a blended learning environment that enhances positive character traits that ensures our students become productive 21st century world citizens. The Burch Charter School of Excellence, a public school, is committed to providing best practices for educating our students in an environment that enables them to develop into critical thinkers that evolve into digital, life-long learners. Our curriculum emphasizes literacy and mathematics infused with technology.

We believe:

- Our students will be effective communicators, quality producers, self-directed lifelong learners, community contributors, collaborative workers and complex thinkers;
- All students are entitled to opportunities to maximize their talents and abilities;
- Our ethnic and cultural diversity is our strength and prepares students for success in a global society;
- Setting high expectations for students, teachers and administrators ensures that our students successfully meet or exceed the New Jersey Student Learning Standards.
- Parents are essential partners in the education of their children;
- Maintaining a strong partnership with the Irvington community is integral to student success;
- Understanding, implementing and responding to current trends in technology is intrinsic to success in a 21st century world; In ensuring that the district has a well-trained, highly qualified and competent staff; In maintaining a safe and secure learning environment.

The underlying values and principles that drive our mission and vision are our personal responsibility, a strong work ethic, cooperation, respect for others, honesty, integrity and the firm belief that every child can learn.

Burch Charter School of Excellence

2nd Grade Science Model Curriculum Overview

Unit 1: Relationships in Habitats **Instructional Days: 15**

In this unit of study, students develop an understanding of what plants need to grow and how plants depend on animals for seed dispersal and pollination. Students also compare the diversity of life in different habitats. The crosscutting concepts of *cause and effect* and *structure and function* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *developing and using models*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 2-LS4-1, 2-LS2-1, 2-LS2-2, and K-2-ETS1-1.

Instructional Days: 20

Unit 2: Properties of Matter

In this unit of study, students demonstrate an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of *patterns, cause and effect,* and *the influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *planning and carrying out investigations* and *analyzing and interpreting data*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 2-PS1-1, 2-PS1-2, and K-2-ETS1-3.

Unit 3: Changes to Matter **Instructional Days:15**

In this unit of study, students continue to develop an understanding of observable properties of materials through analysis and classification of different materials. The crosscutting concepts of *cause and effect* and *energy and matter* are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in *constructing explanations*, *designing solutions*, and *engaging in argument from evidence*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 2-PS1-3 and 2-PS1-4.

Unit 4: The Earth's Land and Water **Instructional Days:20**

In this unit of study, students 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 concept of *patterns* is called out as an organizing concept for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *developing and using models* and *obtaining, evaluating, and communicating information*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 2-ESS2-3 and 2-ESS2-2.

Unit 5: Changes to Earth's Land **Instructional Days: 20**

In this unit of study, students apply their understanding of the idea that wind and water can change the shape of land to compare design solutions to slow or prevent such change. The crosscutting concepts of *stability and change*; *structure and function*; and *the influence of engineering, technology, and science on society and the natural world* are called out as organizing concepts for these disciplinary core ideas. Students demonstrate grade-appropriate proficiency in *asking questions and defining problems*, *developing and using models*, and *constructing explanations and designing solutions*. Students are also expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 2-ESS1-1, 2-ESS2-1, K-2-ETS1-1, and K-2-ETS1-2.

Note: *The number of instructional days is an estimate based on the information available at this time. 1 day equals approximately 42 minutes of seat time. Teachers are strongly encouraged to review the entire unit of study carefully and collaboratively to determine whether adjustments to this estimate need to be made.*

Grade: 2		**Content: Science**
Unit 1: Relationships in Habitats		**Time Frame: 15 Days**
Next Generation Science Standards	**Skills**	I Can Statements
2-LS4-1: Make observations of plants and animals to compare the diversity of life in different habitats. **Essential Question:** ❖ *How does the diversity of plants and animals compare among different habitats?*	❖ People look for patterns and order when making observations about the world. ❖ There are many different kinds of living things in any area, and they exist in different places on land and in water.	❖ I can look for patterns and order when making observations about the world. ❖ I can make observations (firsthand or from media) to collect data that can be used to make comparisons. ❖ I can make observations of plants and animals to compare the diversity of life in different habitats
2-LS2-1: Plan and conduct an investigation to determine if plants need sunlight and water to grow. **Essential Question:** ❖ *What do plants need to live and grow?*	❖ Events have causes that generate observable patterns. ❖ Plants depend on water and light to grow.	❖ I can observe patterns in events generated by cause-and-effect relationships. ❖ I can plan and conduct an investigation collaboratively to produce data to serve as a basis for evidence to answer a question. ❖ I can plan and conduct an investigation to determine whether 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. **Essential Question:** ❖ *Why do some plants rely on animals for reproduction?*	❖ The shape and stability of structures of natural and designed objects are related to their function. ❖ Plants depend on animals for pollination or to move their seeds around. ❖ 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.	❖ I can describe how the shape and stability of structures are related to their function. ❖ I can develop a simple model based on evidence to represent a proposed object or tool. ❖ I can develop a simple model that mimics the function of an animal in dispersing

		seeds or pollinating plants. ❖ I 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.
K-2-ETS1-1: 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. **Essential Question:** ❖ *How can I define a simple problem that can be solved through the development of a new or improved object or tool?*	❖ People encounter questions about the natural world every day. ❖ People depend on various technologies in their lives; human life would be very different without technology. ❖ Before beginning to design a solution, it is important to clearly understand the problem. ❖ Asking questions, making observations, and gathering information are helpful in thinking about problems. ❖ A situation that people want to change or create can be approached as a problem to be solved through engineering.	❖ I can read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. ❖ I can ask questions based on observations to find more information about the designed world. ❖ I can ask questions to obtain information about the purpose of weather forecasting to prepare for and respond to severe weather. ❖ I can define a simple problem that can be solved through the development of a new or improved object or tool. ❖ I can ask questions, make observations, and gather information about a situation people want to change in order to define a simple problem that can be solved through the development of a new or improved object.
Resources		

Do Plants Need Sunlight? Students will explore the importance sunlight for a plant's survival by conducting an investigation. Each group of students will cover parts of plants' leaves with black construction paper and make observations of the plant's leaves over several days. This lesson serves to model the process of investigation. The investigation will take 7 days to complete. Then students can remove the black paper, place the plants back in the sunlight, and view the leaves in a second investigation.

Who Needs What? Students identify the physical needs of animals. Through classroom discussion, students speculate on the needs of plants. With teacher guidance, students then design an experiment that can take place in the classroom to test whether or not plants need light and water in order to grow. Students conduct the associated activity in which sunflower seeds are planted in plastic cups, and once germinated, are exposed to different conditions. In the classroom setting, students test for the effects of light versus darkness, and watered versus non-watered conditions. During exposure of the plants to these different conditions, students measure growth of the seedlings every few days using non-standard measurement. After a few weeks, students compare the growth of plants exposed to the different conditions, and make pictorial bar graphs that demonstrate these comparisons.

.I Scream, You Scream, We All Scream for Vanilla Ice Cream! In this lesson students design a vanilla plant pollinator. This is an end-of-the-unit task, taking about 3 days to complete. The students will view an amazing video that tells about the problems with pollinating vanilla by hand. The students pretend to be employees of Ben and Jerry's ice cream company and help to plan and design a pollinator for the vanilla plant so that the great vanilla flavored ice cream can continue to be produced. (This is the first of several lessons created by Jeri Faber on plant pollination at: betterlessons.com/)

Building and Testing Our Vanilla Plant Pollinator: In previous lessons designed by Jeri Faber, students have learned about how animals help pollinate flowers. The students have also planned and designed their own vanilla plant pollinator. In this lesson, students use the engineering design process to build and test the plant pollinator they planned the day before in class.

Two Scoops Are Better Than One: This lesson is the second day of an end of the unit task to address the Performance Expectation: Develop a simple model that mimics the function of an animal in dispersing seeds or pollinating plants. This end of unit task is expected to take 3-4 days to complete. In the previous lesson (http://betterlesson.com/lesson/628130/i-scream-you-scream-we-all-scream-for-vanilla-ice-cream), the students were challenged to brainstorm their version of a vanilla flower pollinator. For this lesson, students work with a partner to choose and develop their engineering plans by drawing a diagram for a vanilla plant pollinator. They also create a list of materials needed for the task.

Improving Our Vanilla Bean Pollinators: This lesson is part of a series of lessons created by Jeri Faber on using the engineering design process to solve a problem. In the Ice Scream, You Scream We All Scream for Vanilla Ice Cream, the students were challenged to design a vanilla flower plant pollinator. For day 2, Two Scoops Are Better Than One, students worked with a partner to determine which design to build for their vanilla plant pollinator. For day 3, Building and Testing Our Vanilla Pollinators, the students constructed and tested the effectiveness of their pollinators based on the design plans. In this lesson, students improve their plant pollinator models and retest the pollinator's effectiveness.

The Bug Chicks-Mission: Pollination (Episode 5): The Bug Chicks' five minute video provides a fun, animated way of learning about the fascinating world of pollination and insects. In this video, the students observe interesting museums and habitats to look at lesser known insect pollinators. The student challenge at the end leads students into their environment to look for other pollinators and encourages them to bring their observations back to the classroom to discuss.

Pearson Realize: **https://www.savvasrealize.com/index.html#/**

Connections to NJSLS – English Language Arts

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).

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

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.

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.

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.

Connections to NJSLS – Math

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.

MP.5: Use appropriate tools strategically.

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.

Grade: 2		**Content: Science**
Unit 2: Properties of Matter		**Time Frame: 20 Days**
Next Generation Science Standards	**Skills**	I Can Statements
2-PS1-1: Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **Essential Question:** ❖ *How can we sort objects into groups that have similar patterns?* ❖ *Can some materials be a solid or a liquid?*	❖ Patterns in the natural and human-designed world can be observed. ❖ 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	❖ I can observe patterns in the natural and human-designed world. ❖ I can plan and conduct an investigation collaboratively to produce data to serve as the basis for evidence to answer a question. ❖ I can plan and conduct an investigation to describe and classify different kinds of material by their observable properties. ✓ Observations could include color, texture, hardness, and flexibility. ✓ Patterns could include the similar properties that different materials share.
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. **Essential Question:** ❖ *What should the three little pigs have used to build their houses?*	❖ Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world. ❖ Simple tests can be designed to gather evidence to support or refute student ideas about causes. ❖ Different properties are suited to different purposes. ❖ Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	❖ I can design simple tests to gather evidence to support or refute student ideas about causes. ❖ I can analyze data from tests of an object or tool to determine if it works as intended. ❖ I can analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose.
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. **Essential Question:** *How can a situation that people want to change or create be approached as a problem to be solved through engineering with many acceptable solutions?*	❖ There's always more than one possible solution to a problem, it is useful to compare and test designs.	❖ I can analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.

Resources

Exploring Reversible Changes of State and Exploring Irreversible Changes of State: These two lessons work together to explore reversible and irreversible changes of state through guided investigations. The PDF is a set of activities focusing on materials followed by some optional post-activity lessons.

Discovering Science: classifying and categorizing (matter, grades 2-3): This resource is a day, or longer, lab activity aimed for second and third grade students. The lesson starts with a guided discussion and an activity identifying and classifying materials, then it guides students through a series of observations of mixing and changing different materials of different states and observing the resulting effects. Overall, the lesson targets the states of matter, and forces and motion. Some of the ideas (i.e., gas and energy) are aimed at the third grader and beyond. Please note that the link above goes to a larger set of activities and you need to click on the link Discovering science: Classifying and categorizing matter grades 2-3.

Materials and Their Properties, lessons Comparing the Properties of Different Materials (pp. 22); and Exploring Thermal Insulators and Conductors (pp. 23): Students participate in an open-ended sort using various materials. Based on their self-selected categories, students explain their reasoning. Next, through a fair test trial, students use new information to decide, using evidence, which material is best suited for maintaining cold the longest.

The Properties of Materials and their Everyday Uses: This wonderful set of lessons engage students in testing materials to understand their properties and discuss appropriate uses for the materials based on those properties. For example, one activity has the students examining the materials that a number of balls are made out of (plastic, rubber, aluminum, etc.) and describing the properties of the materials (light, stretchy, rigid). Next, the students test balls made of those materials for bouncing height and record their data. The students discuss which materials are best for bouncing and why. The teacher could choose to do all of the activities and have a robust alignment with the three dimensions of the NGSS PS1-2, an engineering physical science Performance Expectation.

Matter song a music video by untamed Science: This is an engaging music video that defines and gives examples of matter. The video is fun, colorful and explores many different kinds of matter as part of the music video sequence. Young students will love the song and the interactive dance sequences.

Science Games For Kids: Properties of Materials: This resource is an interactive simulation designed to have students test various materials for different properties including flexibility, strength, waterproof, and transparency. The simulation includes a workshop where students can select different materials to see if the selected property matches the intended use.

Pearson Realize: **https://www.savvasrealize.com/index.html#/**

Connections to NJSLS – English Language Arts

RI.2.8: Describe how reasons support specific points the author makes in a text.

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.

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).

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

Connections to NJSLS – Math

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.

MP.5: Use appropriate tools strategically.

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.

Grade: 2		Content: Science
Unit 3: Changes to Matter		**Time Frame: 15 Days**
Next Generation Science Standards	**Skills**	I Can Statements
2-PS1-3: 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**.** **Essential Question:** ❖ *In what ways can an object made of a small set of pieces be disassembled and made into a new object?*	❖ Objects may break into smaller pieces and be put together into larger pieces or change shapes. ❖ Different properties are suited to different purposes. ❖ A great variety of objects can be built up from a small set of pieces.	❖ I can break objects into smaller pieces and put them together into larger pieces or change shapes. ❖ I can make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. ❖ I 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 object.
2-PS1-4: Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. **Essential Question:** ❖ *Can all changes caused by heating or cooling be reversed?*	❖ People search for cause-and-effect relationships to explain natural events. ❖ Events have causes that generate observable patterns. ❖ Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not.	❖ I can observe patterns in events generated due to cause-and-effect relationships. ❖ I can construct an argument with evidence to support a claim. ❖ I can construct an argument with evidence that some changes caused by heating or cooling can be reversed, and some cannot. ✓ 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 ❖ Heating paper
Resources		

STEM in a BOX - Shakin' Up the Classroom: K-3EarthScienceSTEMintheboxprint.docx: In this engaging lesson, the students examine and describe materials and their properties in order to assemble these materials into a strong building that could withstand the earth shaking. The physical science core ideas in the Performance Expectation are met through a larger earth science/earthquake unit that is part of the unit level resource.

Go to the resource listed under K-3: k-3EarthScienceSTEMintheboxprint.docx

Thousands of tiny pieces can create something big: In this resource which is based on enactment in a second grade classroom and includes videos and examples of student work, the teacher introduces students to Watt's tower, a tower made of many pieces of junk in the neighborhood. Students make their own objects out of many pieces or materials that the teacher provides and the students think about and discuss whether they could use the same set of materials to make something different.

Take it apart, put it together: This is a wonderfully supported and creative lesson that involves students taking apart an old appliance and making a new object using the appliance parts. The teacher guides students using a variety of teacher prompts and individual journaling to track their idea development, questions, changing plans, and evidence-based explanations.

Exploring Reversible Changes of State and Exploring Irreversible Changes of State

These two lessons work together to explore reversible and irreversible changes of state through guided investigations. The PDF is a set of activities focusing on materials followed by some optional post-activity lessons. Two of these post activity lessons deal with reversible and irreversible changes to materials. The first lesson involves teachers showing students phenomena and then asking the students to generate questions about their observations of the phenomena. The second lesson involves students engaging in investigating, explaining and asking questions about two irreversible changes and using observations to identify what about the changes make them irreversible.

The Magic School Bus Bakes in a Cake lesson and video, "Ready Set Dough" !: This is a lesson plan that accompanies the reading or watching of The Magic School Bus Bakes a Cake, or Ready Set Dough. The lesson is a short activity with guided questions that accompany making pretzel dough. In the book and video, which are not included in the resource, The Magic School Bus shrinks down to molecule size to observe and discuss chemical and physical changes while baking. The resource contains a link to purchase the book. The video can be found at https://www.youtube.com/watch?v=dTw-ok3KkuU.

The Science of Macaroni Salad (and 2. Dig Deeper): This three minute video is great for teachers who need a short and deeper understanding of what is entailed in the Performance Expectations for Properties of Matter and what is involved when a physical and chemical change occurs. It would be over the heads of younger children, but perfect for elementary teachers who can either view the video themselves and translate the most pertinent ideas in it, or watch the video with the students and narrate in kid language. If the teacher watched the video first, they would be ensured that they had the understanding necessary for tough questions.

Pearson Realize: **https://www.savvasrealize.com/index.html#/**

Connections to NJSLS – English Language Arts

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.

RI.2.3: Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

RI.2.8: Describe how reasons support specific points the author makes in a text.

W.2.1: Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., because, and, also) to connect opinion and reasons, and provide a concluding statement or section.

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).

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

Grade: 2		Content: Science
Unit 4: The Earth's Land and Water		**Time Frame: 20 Days**
Next Generation Science Standards	**Skills**	I Can Statements
2-ESS2-3: Obtain information to identify where water is found on Earth and that it can be solid or liquid. **Essential Question:** ❖ *How can we identify where water is found on Earth and if it is solid or liquid?*	❖ Patterns in the natural world can be observed. ❖ Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.	❖ I can observe patterns in the natural world. ❖ I can obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons) and other media that will be useful in answering a scientific question. ❖ I can obtain information to identify where water is found on Earth and to communicate that it can be a solid or liquid.
2-ESS2-2: Develop a model to represent the shapes and kinds of land and bodies of water in an area. **Essential Question:** ❖ *In what ways can you represent the shapes and kinds of land and bodies of water in an area?*	❖ Patterns in the natural world can be observed. ❖ Maps show where things are located. One can map the shapes and kinds of land and water in any area.	❖ I can observe patterns in the natural world. ❖ I can develop a model to represent patterns in the natural world. ❖ I can develop a model to represent the shapes and kinds of land and bodies of water in an area
Resources		

Teaching *NGSS* in K-5: Making Meaning through Discourse

Presenters were Carla Zembal-Saul, (Penn State University), Mary Starr, (Michigan Mathematics and Science Centers Network), and Kathy Renfrew (Vermont Agency of Education).

After a brief introduction by NSTA's Ted Willard about the Next Generation Science Standards (NGSS), Zembal-Saul, Starr, and Renfrew gave context to the NGSS specifically for K-5 teachers, discussing three-dimensional learning, performance expectations, and background information on the NGSS framework for K-5. The presenters also gave a number of examples and tips on how to approach NGSS with students, and took participants' questions. The web seminar ended with the presentation of a number of recommended NSTA resources for participants to explore.

View the resource collection.

Continue discussing this topic in the community forums.

https://learningcenter.nsta.org/products/symposia_seminars/NGSS/webseminar50.aspx
http://learningcenter.nsta.org/my_learning_center/my_library.aspx?cid=4uluvkApV08_E

http://learningcenter.nsta.org/discuss/

Pearson Realize: **https://www.savvasrealize.com/index.html#/**

Connections to NJSLS – English Language Arts

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.

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

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.

Connections to NJSLS – Math

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.

2.NBT.A.3: Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

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.

Grade: 2		Content: Science
Unit 5: Changes to Earth's Land		**Time Frame: 20 Days**
Next Generation Science Standards	**Skills**	I Can Statements
2-ESS1-1 Use information from several sources to provide evidence that Earth events can occur quickly or slowly. **Essential Question:** ❖ *What evidence can we find to prove that Earth events can occur quickly or slowly?*	❖ Some events happen very quickly; others occur very slowly over a time period much longer than one can observe. ❖ Things may change slowly or rapidly.	❖ I can make observations from several sources to construct an evidence-based account for natural phenomena. ❖ I can 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 **Essential Question:** ❖ *In what ways do humans slow or prevent wind or water from changing the shape of the land?*	❖ Things may change slowly or rapidly. ❖ Developing and using technology has impacts on the natural world. ❖ Scientists study the natural and material world. ❖ The shape and stability of structures of natural and designed objects are related to their function(s). ❖ Wind and water can change the shape of the land.	❖ I can compare multiple solutions to a problem. ❖ I can compare multiple solutions designed to slow or prevent wind or water from changing the shape of the land. Examples of solutions could include: ✓ Different designs of dikes and windbreaks to hold back wind and water ✓ Different designs for using shrubs, grass, and trees to hold back the land.
K-2-ETS1-1: 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. **Essential Question:** ❖ *How can I define a simple problem that can be solved through the development of a new or*	❖ People encounter questions about the natural world every day. ❖ People depend on various technologies in their lives; human life would be very different without technology. ❖ Before beginning to design a solution, it is important to clearly understand the problem.	❖ I can read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world. ❖ I can ask questions based on observations to find more information about the designed world. ❖ I can ask questions to obtain information

improved object or tool?	❖ Asking questions, making observations, and gathering information are helpful in thinking about problems. ❖ A situation that people want to change or create can be approached as a problem to be solved through engineering.	about the purpose of weather forecasting to prepare for and respond to severe weather. ❖ I can define a simple problem that can be solved through the development of a new or improved object or tool. ❖ I can ask questions, make observations, and gather information about a situation people want to change in order 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. **Essential Question:** ❖ *How can I draw and label a simple diagram?*	❖ 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. ❖ Because there is always more than one possible solution to a problem, it is useful to compare and test designs.	❖ I can develop a simple model based on evidence to represent a proposed object or tool. ❖ I 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. ❖ I can analyze data from tests of an object or tool to determine if it works as intended. I can analyze data from tests of two objects designed to solve the same problem to compare the strengths.

Resources

How Can Water Change the Shape of the Land?: In this lesson plan children investigate water erosion. Students make a sand tower and observe the erosion as they drop water on it. Students observe, illustrate, and record notes about the process. Short videos and a read aloud also further support understanding of the Performance Expectation.

How Can Wind Change the Shape of the Land?This lesson builds on another lesson created by Jeri Faber in which students discovered how water changes the earth. For this lesson, students take part in a teacher-led investigation to show how wind changes the land. The children use straws to blow on a small mound or hill of sand. As each child takes a turn, the other students record their detailed observations that will later be used to draw conclusions. Students also watch a short video on wind erosion and discuss the new learning with partners.

Finding Erosion at Our School :In this lesson, students walk around the school grounds, neighborhood, or another area of their community to locate evidence of erosion. Various problems caused by erosion are discussed and a solution is developed for one of the problems. This lesson is one in a series on erosion by Jeri Faber. A follow-up lesson is available where students compare their erosion design solutions.

Pearson Realize: **https://www.savvasrealize.com/index.html#/**

Connections to NJSLS – English Language Arts

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.

RI.2.3: Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

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.

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).

W.2.8: Recall information from experiences or gather information from provided sources to answer a question.

SL.2.2: Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.

RI.2.3: Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.

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.

RI.2.9: Compare and contrast the most important points presented by two texts on the same topic.

Connections to NJSLS – Math

MP.2: Reason abstractly and quantitatively.

MP.4: Model with mathematics.

MP.5: Use appropriate tools strategically.

2. NBT.A: Understand place value.

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.

Differentiated Instruction ***(content, process, product and learning environment)***	
At Risk Students	**English Language Learners**
Modifications for Classroom Pair visual prompts with verbal presentations Use of lab or experiments to give visual representation of concept Ask students to restate information, directions, and assignments.	**Modifications for Classroom** Native Language Translation (peer, online assistive technology, translation device, bilingual dictionary) Preteach vocabulary

Work within group or partners Repetition and practice Model skills / techniques to be mastered. Use metacognitive work Extended time to complete class work Provide copy of class notes Student may request to use a computer to complete assignments. Use manipulatives to examine concepts Assign a peer helper in the class setting Provide oral reminders and check student work during independent work time	Use graphic organizers or other visual models Use of manipulatives to visualize concept Highlight key vocabulary-chart or vocabulary bank Use of nonverbal responses (thumbs up/down) Use sentence frames Design questions for different proficiency levels Utilize partners and partner talk
Special Education	**Gifted and Talented**
<u>Modifications for Classroom</u> Pair visual prompts with verbal presentations Use of lab or experiments to give visual representation of concept Ask students to restate information, directions, and assignments. Preteach vocabulary Repetition and practice Model skills / techniques to be mastered. Use manipulatives and visual representation to examine Breakdown large assignments into smaller tasks	**Extension Activities** Conduct research and provide presentation of cultural topics. Design surveys to generate and analyze data to be used in discussion. Use of Higher Level Questioning Techniques Provide assessments at a higher level of thinking Create alternative assessment which requires writing, research and presentation

Extended time to complete class work Provide copy of class notes Preferential seating to be mutually determined by the student and teacher Use of online component of book Extra textbooks for home. Student may request books on tape / CD / digital media, as available and appropriate. Assign a peer helper in the class setting Provide oral reminders and check student work during independent work time Assist student with long and short term planning of assignments	