Science - Grade 1

Unit Title: **Grade 1 - Unit 1 - Patterns of Change in the Sky**

Can we predict how the sky will change over time?

In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of patterns is called out as an organizing concept for the disciplinary core ideas. Students are expected to 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 1-ESS1-1 and 1-ESS1-2.

Stage 1: Desired Results

Standards & Indicators:

- **NJSLS – Science**
  - **Science and Engineering Practices (SEP)**
    - Planning and Carrying Out Investigations
      - Plan and conduct investigations collaboratively to produce evidence to answer a question. (1PS4-1),(1-PS4-3)
      - Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)
  - **Disciplinary Core Ideas (DCI)**
    - ESS1.A: The Universe and its Stars
      - Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. (1-ESS1-1)
    - ESS1.B: Earth and the Solar System
      - Seasonal patterns of sunrise and sunset can be observed, described, and predicted. (1-ESS1-2)
  - **Crosscutting Concepts (CCC)**
    - Patterns
      - Patterns in the natural world can be observed, used to describe phenomena, and used as evidence. (1-ESS1-1),(1-ESS1-2)
    - Connections to Nature of Science
      - Scientific Knowledge Assumes an Order and Consistency in Natural Systems
        - Science assumes natural events happen today as they happened in the past. (1-ESS1-1)
        - Many events are repeated. (1-ESS1-1)

Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
8.2.2.ETW.1	Classify products as resulting from nature or produced as a result of technology.	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.
8.2.2.ETW.2	Identify the natural resources needed to create a product.	
8.2.2.ETW.3	Describe or model the system used for recycling technology.	
8.2.2.ETW.4	Explain how the disposal of or reusing a product affects the local and global environment.	

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Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)	Brainstorming can create new, innovative ideas.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).	Digital tools can be used to display data in various ways.
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).	A variety of diverse sources, contexts, disciplines, and cultures provide valuable and necessary information that can be used for different purposes.
9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).	Digital tools have a purpose.

Central Idea / Enduring Understanding:

- In this unit of study, students observe, describe, and predict some patterns in the movement of objects in the sky. The crosscutting concept of patterns is called out as an organizing concept for the disciplinary core ideas. Students are expected to 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.

Essential/Guiding Question:

Can we predict how the sky will change over time?

- What patterns of change can be predicted when observing the sun, moon, and stars?
- What is the relationship between the amount of daylight and the time of year?
- What causes day and night?
- Why is the sun important?
- What are the four seasons?

Content:

- Science assumes that natural events happen today as they happened in the past.
- Many events are repeated.
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Patterns in the motion of the sun, moon, and stars in the sky can be observed, described, and predicted.
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Seasonal patterns of sunrise and sunset can be observed, described, and predicted.

Skills (Student Learning Objectives):

- 1-ESS1-1: Use observations of the sun, moon, and stars to describe patterns that can be predicted. [Clarification Statement: Examples of patterns could include that the sun and moon appear to rise in one part of the sky, move across the sky, and set; and stars other than our sun are visible at night but not during the day.] [Assessment Boundary: Assessment of star patterns is limited to stars being seen at night and not during the day.]
- 1-ESS1-2: Make observations at different times of year to relate the amount of daylight to the time of year. [Clarification Statement: Emphasis is on relative comparisons of the amount of daylight in the winter to the amount in the spring or fall.] [Assessment Boundary: Assessment is limited to

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	relative amounts of daylight, not quantifying the hours or time of daylight.]

Interdisciplinary Connection(s):

- **NJSLS – Math**
  - MP.2: Reason abstractly and quantitatively.
  - MP.4: Model with mathematics.
  - MP.5: Use appropriate tools strategically.
  - 1.OA.A.1: Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.
  - 1.LD.A.1: Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.
- **NJSLS – English Language Arts**
  - W.NW.1.2: With prompts and support, write informative/explanatory texts to examine a topic and convey ideas and information.
  - W.NW.1.2.a: Introduce a topic.
  - W.NW.1.2.b: Develop the topic with facts or other information and examples related to the topic.
  - W.NW.1.2.c: Provide a conclusion.
  - W.SE.1.6: With guidance and support from adults, gather and select information from multiple sources to answer a question or write about a topic.

Stage 2: Assessment Evidence

Performance Task(s):

- "Inquiry labs"
- STEM activities
- Formative assessment: "Lesson Check" blackline masters
- Complete graphic organizers
- Performance Expectation Activities
- Performance Based-Assessment
- Unit Assessment

Other Evidence:

- Post-activity discussion questions
- Review Vocabulary Smart Cards
- Students elaborate in "Science Notebooks"
- Students make connections to the "Unlock the Big ?" in each lesson.
- Have students restate or contrast topics in each lesson

Stage 3: Learning Plan

Learning Opportunities/Strategies:

1-ESS1-1 Use observations of the sun, moon, and stars to describe patterns that can be predicted.

Pearson Chapter 3

- **Inquiry Engagement**
  - Students will track changes in shadows as the relative position of the sun changes
  - STEM Activity How Does a Greenhouse Work

Pearson Chapter 3 - Lesson 2: What causes day and night?

- **Engage** Students will identify differences between day and night

Resources:

Pearson Chapter 3

- **Try It!** - How does the sun's movement cause shadows to change? SE/TE p. 102
  - SE/TE pp. 104-113

Pearson Chapter 3 - Lesson 2

- **Envision It!** SE/TE pp. 118-119
- **Explore It!** SE/TE p. 118, TE p. 123a

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• **Explore** How does the shape of the moon appear to change?
• **Explain** Students will read Day Sky, Night Sky, Moon, Sunrise and Sunset, and Day and Night and answer the questions
• **Elaborate** Student Notebook -Explain that the different ways the moon looks are called phases
• **Evaluate** Formative Assessment
 	
Additional learning opportunities/strategies:
• Utilize online resources and web links to support learning.
 	
1-ESS1-2 Make observations at different times of year to relate the amount of daylight to the time of year.
 	
Pearson Chapter 3 - Lesson 3: What are the four seasons?
 	
• **Engage** Students will analyze how weather changes from season to season
• **Explore** My Planet Diary Fact or Fiction
 	
• **Explain** Read Spring, Summer and Fall and Winter and answer the questions
• **Elaborate** Student Notebook - Have children draw a chart describing the current season using their five senses
• **Evaluate** Formative Assessment
 	
• **Unit Cumulative Activities**
  • Performance-Based Assessment
  • Performance Expectation Activity
  • Inquiry Investigate It
 	
  • Inquiry Apply It
 	
Additional learning opportunities/strategies:
• Utilize online resources and web links to support learning.
	• **Explain** SE/TE pp. 119-123
	
	• **Elaborate** Science Notebook TE p. 121
	
	• **Evaluate** TE p. 123b
	
	Additional resources:
	• http://www.bozemanscience.com/
	• http://ngss.nsta.org/
	• https://www.teachingchannel.org/ngss
	
	Pearson Chapter 3 - Lesson 3
	
	• **Envision It!** SE/TE pp. 124-125
	
	• **Explore It!** SE/TE p. 124, blackline master TE p. 127a
	• **Explain** SE/TE pp. 125-127
	
	• **Elaborate** Science Notebook TE p. 127
	
	• **Evaluate** TE p. 127b
	
	• **Unit Cumulative Activities**
	  o SE/TE pp. 138-139
	  o TE pp. 139a -139b
	
	  o SE/TE pp. 128-129 blackline master TE p. 129b
	  o SE/TE pp. 136-137
	
	Additional resources:
	• http://www.bozemanscience.com/
	• http://ngss.nsta.org/
	• https://www.teachingchannel.org/ngss

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Advanced Leveled Content Reader	On-Level Content Reader	Below-Level Content Reader	Below-Level Content Reader Utilize the support flaps in the leveled readers to provide support

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Use project-based science learning to connect science with observable phenomena.	Use project-based science learning to connect science with observable phenomena.	Use project-based science learning to connect science with observable phenomena. Utilize the If/Then strategies in the RTI section of the lesson/chapter Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	before-reading support (KWL charts, word webs), during-reading support (visual vocabulary support, strategies to determine word meanings, questioning while reading), and after-reading support (summative assessment, activity). Utilize the ELL lesson plan to identify content and language objectives. Use project-based science learning to connect science with observable phenomena. When using the write-in student edition, refer to graphic organizers, photographs, illustrations, and models Use Envision it! to frontload the lesson by activating prior knowledge and building background knowledge. Utilize the ELL handbook for best practices and instructional strategies. Follow the specific “ELL Support” for each chapter in the TE. Support is given through scripted text, graphic organizers, etc.

Unit Title: Grade 1 - Unit 2 - Light and Sound

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials.

The crosscutting concept of cause and effect is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Stage 1: Desired Results

Standards & Indicators:

- **NJSLS – Science**
  - **Science and Engineering Practices (SEP)**
    - Planning and Carrying Out Investigations
      - Plan and conduct investigations collaboratively to produce evidence to answer a question. (1PS4-1),(1-PS4-3)
    - Constructing Explanations and Designing Solutions

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- Make observations (firsthand or from media) to construct an evidence-based account for natural phenomena. (1-PS4-2)
- Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)
- Connections to Nature of Science Scientific Investigations Use a Variety of Methods
  - Science investigations begin with a question. (1PS4-1)
  - Scientists use different ways to study the world. (1-PS4-1)

- **Disciplinary Core Ideas (DCI)**
  - PS4.A: Wave Properties
    - Sound can make matter vibrate, and vibrating matter can make sound. (1-PS4-1)
  - PS4.B: Electromagnetic Radiation
    - Objects can be seen if light is available to illuminate them or if they give off their own light. (1-PS4-2)
    - Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.) (1-PS4-3)
  - PS4.C: Information Technologies and Instrumentation
    - People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)
- **Crosscutting Concepts (CCC)**
  - Cause and Effect
    - Simple tests can be designed to gather evidence to support or refute student ideas about causes. (1-PS4-1),(1-PS4-2),(1-PS4-3)
  - Connections to Engineering, Technology, and Applications of Science
    - Influence of Engineering, Technology, and Science, on Society and the Natural World
      - People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).	
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).	
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4)	Individuals should practice safe behaviors when using the Internet.
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.

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9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).	Digital tools can be used to display data in various ways.
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2)	A variety of diverse sources, contexts, disciplines,and cultures provide valuable and necessary information that can be used for different purposes.
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.)	Digital tools have a purpose.

Central Idea / Enduring Understanding:

In this unit of study, students develop an understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. The idea that light travels from place to place can be understood by students at this level by placing objects made with different materials in the path of a beam of light and determining the effect of the different materials. The crosscutting concept of cause and effect is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in planning and carrying out investigations, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Essential/Guiding Question:

- How can you prove that you can only see something when someone shines a light on it or if the object gives off its own light?
- What happens to a beam of light when you put different kinds of things in front of it?
- How would you design an experiment to prove your thinking?
- How do instruments (band) make sound?

Content:

- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Objects can be seen if light is available to illuminate them or if they give off their own light.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.
- Some materials allow light to pass through them, others allow only some light through, and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach.
- Mirrors can be used to redirect a light beam. (Boundary: The idea that light travels from place to place is developed through experiences with light sources, mirrors, and shadows, but no attempt is made to discuss the speed of light.)
- Sound can make matter vibrate, and vibrating matter can make sound.
- Simple tests can be designed to gather evidence to support or refute student ideas about causes.

Skills (Student Learning Objectives):

- Make observations to construct an evidence-based account that objects in darkness can be seen only when illuminated. [Clarification Statement: Examples of observations could include those made in a completely dark room, a pinhole box, and a video of a cave explorer with a flashlight. Illumination could be from an external light source or by an object giving off its own light.] (1-PS4-2)
- Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light. [Clarification Statement: Examples of materials could include those that are transparent (such as clear plastic), translucent (such as wax paper), opaque (such as cardboard), and reflective (such as a mirror).] [Assessment Boundary: Assessment does not include the speed of light.] (1-PS4-3)
- Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate. [Clarification Statement: Examples of vibrating materials that make sound could include tuning forks and plucking a stretched string. Examples of how sound can make matter vibrate could include holding a piece of paper

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	near a speaker making sound and holding an object near a vibrating tuning fork.] (1-PS4-1)

Interdisciplinary Connection(s):

- **NJSLS – Math**
  - MP.5: Use appropriate tools strategically.
  - 1.M.A.1: Order three objects by length; compare the lengths of two objects indirectly by using a third object.
  - 1.M.A.2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
- **NJSLS – Comprehensive Health and Physical Education**
  - 2.5.2.A.2: Demonstrate changes in time, force, and flow while moving in personal and general space at different levels, directions, ranges, and pathways.
- **NJSLS – English Language Arts**
  - W.NW.1.2: With prompts and support, write informative/explanatory texts to examine a topic and convey ideas and information.
  - W.NW.1.2.a: Introduce a topic.
  - W.NW.1.2.b: Develop the topic with facts or other information and examples related to the topic.
  - W.NW.1.2.c: Provide a conclusion.
  - W.WR1.5: With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic.
  - SL.PE1.1: Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups.

Stage 2: Assessment Evidence

Performance Task(s):

- "Inquiry labs"
- STEM activities
- Formative assessment: "Lesson Check" blackline masters
- Complete graphic organizers
- Performance Expectation Activities
- Performance Based-Assessment
- Unit Assessment

Other Evidence:

- Post-activity discussion questions
- Review Vocabulary Smart Cards
- Students elaborate in "Science Notebooks"
- Students make connections to the "Unlock the Big ?" in each lesson.
- Have students restate or contrast topics in each lesson

Stage 3: Learning Plan

Learning Opportunities/Strategies:

1-PS4-3 Some materials allow light to pass through them, others allow only some light through and others block all the light and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam.

Pearson Chapter 1

- **Inquiry** What does light do?
- **Inquiry** How does light move through water?
- **Unit Cumulative Activities**
  - **Performance Expectation Activity**

Resources:

Pearson Chapter 1

- **Inquiry** Try It SE/TE p. 4
- **Inquiry** Apply It SE/TE pp. 40-41
- **Unit Cumulative Activities**
  - TE p. 43c

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1-PS4-2 Objects can be seen if light is available to illuminate them or if they give off their own light **Pearson Chapter 1 - Lesson 1: How do we use energy?** ● **Explain** Students will read Energy and answer the questions **1-PS4-1** Sound can make matter vibrate, and vibrating matter can make sound **Pearson Chapter 1 - Lesson 3: What can energy Do?** ● **Engage** Students will draw one or more objects that make light ● **Explore** Invention! ● **Explain** Students will read What makes Light, Light Shines Through and What Light Can Do and answer the questions ● **Elaborate** Science Notebook - Answer lesson questions ● **Evaluate** Formative Assessment ● **Unit Cumulative Activities** ○ **Performance Expectation Activity** **Pearson Chapter 1 - Lesson 4: What is sound?** ● **Engage** Students will tell about the sounds these instruments make ● **Explore** How can you make sound? ● **Explain** Students will read Sounds, Loud and Soft, and High and Low and answer the questions ● **Elaborate** Science Notebook -Answer lesson questions ● **Evaluate** Formative Assessment ● **Unit Cumulative Activities** ○ **Inquiry** ○ **Inquiry** ○ **Performance Expectation Activity** **Additional learning opportunities/strategies:** ● Utilize online resources and web links to support learning.	**Pearson Chapter 1 - Lesson 1** ● **Explain** SE/TE p. 17 **Pearson Chapter 1 - Lesson 3** ● **Envision It!** SE/TE pp. 24-25 ● **Explore It!** SE/TE p. 24, blackline master TE p. 27a ● **Explain** SE/TE pp. 25-27 ● **Elaborate** Science Notebook TE p. 27 ● **Evaluate** TE p. 27b ● **Unit Cumulative Activities** ○ TE p. 43b **Pearson Chapter 1 - Lesson 4** ● **Envision It!** SE/TE pp. 28-29 ● **Explore It!** SE/TE p. 28, TE p. 31a ● **Explain** SE/TE pp. 29-31 ● **Elaborate** Science Notebook TE p. 31 ● **Evaluate** TE p. 31b ● **Unit Cumulative Activities** ○ Investigate It SE/TE pp. 32-33 ○ Activity Card Support TE p. 33a ○ TE p. 43a **Additional resources:** ● http://www.bozemanscience.com/ ● http://ngss.nsta.org/ ● https://www.teachingchannel.org/ngss
Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation.	

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High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Advanced Leveled Content Reader Use project-based science learning to connect science with observable phenomena.	On-Level Content Reader Use project-based science learning to connect science with observable phenomena.	Below-Level Content Reader Use project-based science learning to connect science with observable phenomena. Utilize the If/Then strategies in the RTI section of the lesson/chapter Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	Below-Level Content Reader Utilize the support flaps in the leveled readers to provide support before-reading support (KWL charts, word webs), during-reading support (visual vocabulary support, strategies to determine word meanings, questioning while reading), and after-reading support (summative assessment, activity). Utilize the ELL lesson plan to identify content and language objectives. Use project-based science learning to connect science with observable phenomena. When using the write-in student edition, refer to graphic organizers, photographs, illustrations, and models Use Envision it! to frontload the lesson by activating prior knowledge and building background knowledge. Utilize the ELL handbook for best practices and instructional strategies. Follow the specific “ELL Support” for each chapter in the TE. Support is given through scripted text, graphic organizers, etc.

Unit Title: Grade 1 - Unit 3 - Communicating with Light and Sound

How would we communicate over a distance without the use of any of the devices that people currently use?

In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound. The crosscutting concepts of structure and function and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations and designing solutions, asking questions and defining problems, 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 1-PS4-4, K-2-ETS1-1, and K-2-ETS1-2.

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Stage 1: Desired Results

Standards & Indicators:

- **NJSLS – Science**
  - **Science and Engineering Practices (SEP)**
    - Planning and Carrying Out Investigations
      - Plan and conduct investigations collaboratively to produce evidence to answer a question. (1PS4-1),(1-PS4-3)
    - Constructing Explanations and Designing Solutions
      - Use tools and materials provided to design a device that solves a specific problem. (1-PS4-4)
    - Asking Questions and Defining Problems
      - Ask questions based on observations to find more information about the natural and/or designed world(s). (K-2-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
      - Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS12)
  - **Disciplinary Core Ideas (DCI)**
    - PS4.C: Information Technologies and Instrumentation
      - People also use a variety of devices to communicate (send and receive information) over long distances. (1-PS4-4)
    - 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-2ETS1-1)
    - 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-2ETS1-2)
  - **Crosscutting Concepts (CCC)**
    - Structure and Function
      - The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)
    - Connections to Engineering, Technology, and Applications of Science
      - Influence of Engineering, Technology, and Science, on Society and the Natural World
        - People depend on various technologies in their lives; human life would be very different without technology. (1-PS4-4)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).	
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm	Critical thinkers must first identify a problem then develop a plan to

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	ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).	address it to effectively solve the problem.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).	
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).	Digital tools can be used to display data in various ways.
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).	A variety of diverse sources, contexts, disciplines, and cultures provide valuable and necessary information that can be used for different purposes.
9.4.2.IML.4	Compare and contrast the way information is shared in a variety of contexts (e.g., social, academic, athletic) (e.g., 2.2.2.MSC.5, RL.2.9).	Information is shared or conveyed in a variety of formats and sources.
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.)	Digital tools have a purpose.
9.4.2.TL.7	Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).	Collaboration can simplify the work an individual has to do and sometimes produce a better product.

Central Idea / Enduring Understanding:

- In this unit of study, students continue to develop their understanding of the relationship between sound and vibrating materials as well as between the availability of light and the ability to see objects. Students apply their knowledge of light and sound to engage in engineering design to solve a simple problem involving communication with light and sound. The crosscutting concepts of structure and function and influence of engineering, technology, and science on society and the natural world are called out as organizing concepts for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations and designing solutions, asking questions and defining problems, and developing and using models. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Essential/Guiding Question:

- How would we communicate over a distance without the use of any of the devices that people currently use?
- How can light or sound be used to communicate over a distance?

Content:

- The shape and stability of structures of natural and designed objects are related to their function(s).
- People depend on various technologies in their lives; human life would be very different without technology.
- People also use a variety of devices to communicate (send and receive information) over long distances.

Skills (Student Learning Objectives):

- Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance.* [Clarification Statement: Examples of devices could include a light source to send signals, paper cup and string “telephones,” and a pattern of drum beats.] [Assessment Boundary: Assessment does not

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- A situation that people want to change or create can be approached as a problem to be solved through engineering.
- Asking questions, making observations, and gathering information are helpful in thinking about problems.
- Before beginning to design a solution, it is important to clearly understand the problem.
- 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.

include technological details for how communication devices work.] (1-PS4-4)

- 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-ETS1-1)
- 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-ETS1-2)

Interdisciplinary Connection(s):

- **NJSLS – Math**
  - MP.2: Reason abstractly and quantitatively.
  - MP.4: Model with mathematics.
  - MP.5: Use appropriate tools strategically.
  - 1.M.A.2: Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.
  - 2.DL.B.4: 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.
- **NJSLS – English Language Arts**
  - W.WR1.5: With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic.
  - RI.CI.1.2: Determine main topic and retell a series of key details in informational texts (e.g., who, what, where, when, why, how).
  - SL.UM.1.5: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Stage 2: Assessment Evidence

Performance Task(s):

- "Inquiry labs"
- STEM activities
- Formative assessment: "Lesson Check" blackline masters
- Complete graphic organizers
- Performance Expectation Activities
- Performance Based-Assessment
- Unit Assessment

Other Evidence:

- Post-activity discussion questions
- Review Vocabulary Smart Cards
- Students elaborate in "Science Notebooks"
- Students make connections to the "Unlock the Big ?" in each lesson.
- Have students restate or contrast topics in each lesson

Stage 3: Learning Plan

Learning Opportunities/Strategies:

1-PS4-4 Use tools and materials to design and build a device that uses light or sound to solve the problem of communicating over a distance

Resources:

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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. 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. **Pearson** ● **STEM QUEST** Keep out the Sun Students will design a curtain ● Stem Quest Kick-Off Keep Out the Sun! ● Check - In 1 Light and Sight ● Check - In 2 Blocking Light ● Check - In 3 How We Use Light ● Stem Quest Findings Design a Curtain **Pearson Chapter 1** ● **Inquiry** STEM Activity ○ Students will design and build a string phone and send a message to a partner who is standing on the other side of the room. ● **Performance-Based Assessment** Students will send a message with sound ● **Performance Expectation Activity** Students will design and build a device that uses light to solve the problem of communicating over a distance. **Unit Cumulative Activities** **Pearson Science, Engineering, and Technology Skills Handbook** ● **Inquiry** Stem Activity What's Over the Wall? **Additional learning opportunities/strategies:** ● Utilize online resources and web links to support learning.	**Pearson** ● TE pp. xliv-xlv and digital activities **Pearson Chapter 1** ● **Let's Talk** SE/TE pp. 6-15 ● **Send A Message with Sound** SE/TE p. 43 ● TE p. 43d **Pearson Science, Engineering, and Technology Skills Handbook** ● SE/TE pp. 144-153 **Additional resources:** ● http://www.bozemanscience.com/ ● http://ngss.nsta.org/ ● https://www.teachingchannel.org/ngss

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation.

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Advanced Leveled Content Reader Use project-based science learning to connect science with observable phenomena.	On-Level Content Reader Use project-based science learning to connect science with observable phenomena.	Below-Level Content Reader Use project-based science learning to connect science with observable phenomena.	Below-Level Content Reader Utilize the support flaps in the leveled readers to provide support before-reading support (KWL charts, word webs), during-reading support (visual vocabulary support, strategies to determine word meanings, questioning while reading), and

		Utilize the If/Then strategies in the RTI section of the lesson/chapter Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	after-reading support (summative assessment, activity). Utilize the ELL lesson plan to identify content and language objectives. Use project-based science learning to connect science with observable phenomena. When using the write-in student edition, refer to graphic organizers, photographs, illustrations, and models Use Envision it! to frontload the lesson by activating prior knowledge and building background knowledge. Utilize the ELL handbook for best practices and instructional strategies. Follow the specific "ELL Support" for each chapter in the TE. Support is given through scripted text, graphic organizers, etc.

Unit Title: Grade 1 - Unit 4 - Characteristics of Living Things

In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of patterns is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in obtaining, evaluating, and communicating information and constructing explanations. Students are also expected to use these practices to demonstrate understanding of the core ideas.
This unit is based on 1-LS3-1 and 1-LS1-2.

Stage 1: Desired Results

Standards & Indicators:

- **NJSLS – Science**
  - **Science and Engineering Practices (SEP)**
    - Analyzing and Interpreting Data
      - Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)
    - Obtaining, Evaluating, and Communicating Information
      - Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)
  - **Disciplinary Core Ideas (DCI)**
    - LS3.A: Inheritance of Traits
      - Many characteristics of organisms are inherited from their parents. (3-LS3-1)
    - LS1.B: Growth and Development of Organisms
      - Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)

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- **Crosscutting Concepts (CCC)**
  - Patterns
    - Similarities and differences in patterns can be used to sort and classify natural phenomena. (3LS3-1)
    - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2)
    - Connections to Nature of Science
      - Scientific Knowledge is Based on Empirical Evidence
        - Scientists look for patterns and order when making observations about the world. (1-LS1-2)

Computer Science and Design Thinking

Standard	Performance Expectations	Core Ideas
8.2.2.ETW.1	Classify products as resulting from nature or produced as a result of technology.	The use of technology developed for the human designed world can affect the environment, including land, water, air, plants, and animals. Technologies that use natural sources can have negative effects on the environment, its quality, and inhabitants. Reusing and recycling materials can save money while preserving natural resources and avoiding damage to the environment.
8.2.2.ETW.2	Identify the natural resources needed to create a product.	
8.2.2.ETW.3	Describe or model the system used for recycling technology.	
8.2.2.ETW.4	Explain how the disposal of or reusing a product affects the local and global environment.	

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.1.2.CAP.1	Make a list of different types of jobs and describe the skills associated with each job.	Different types of jobs require different knowledge and skills.
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).	
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).	Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).	
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.DC.3	Explain how to be safe online and follow safe practices when using the internet (e.g., 8.1.2.NI.3, 8.1.2.NI.4)	Individuals should practice safe behaviors when using the Internet.
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).	Digital tools can be used to display data in various ways.

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9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).	A variety of diverse sources, contexts, disciplines, and cultures provide valuable and necessary information that can be used for different purposes.
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.)	Digital tools have a purpose.

Central Idea / Enduring Understanding:

- In this unit of study, students develop an understanding of how plants and animals use their external parts to help them survive, grow, and meet their needs, as well as how the behaviors of parents and offspring help offspring survive. The understanding that young plants and animals are like, but not exactly the same as, their parents is developed. The crosscutting concept of patterns is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in obtaining, evaluating, and communicating information and constructing explanations. Students are also expected to use these practices to demonstrate understanding of the core ideas.

Essential/Guiding Question:

- How are young plants and animals alike and different from their parents?
- What types (patterns) of behavior can be observed among parents that help offspring survive?

Content:

- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.
- Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents.
- Scientists look for patterns and order when making observations about the world.
- Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.
- Adult plants and animals can have young.
- In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring survive.

Skills (Student Learning Objectives):

- Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.] (1-LS3-1)
- Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive. [Clarification Statement: Examples of patterns of behaviors could include the signals that offspring make (such as crying, cheeping, and other vocalizations) and the responses of the parents (such as feeding, comforting, and protecting the offspring).] (1-LS1-2)

Interdisciplinary Connection(s):

- **NJSLS – Math**
  - MP.2: Reason abstractly and quantitatively.
  - MP.4: Model with mathematics.
  - 3.DL.B.4: Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate units—whole numbers, halves, or quarters.

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- **NJSLS – English Language Arts**
  - W.WR1.5: With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic.
  - RI.CI.1.2: Determine main topic and retell a series of key details in informational texts (e.g., who, what, where, when, why, how).
  - SL.UM.1.5: Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings.

Stage 2: Assessment Evidence

Performance Task(s):

- "Inquiry labs"
- STEM activities
- Formative assessment: "Lesson Check" blackline masters
- Complete graphic organizers
- Performance Expectation Activities
- Performance Based-Assessment
- Unit Assessment

Other Evidence:

- Post-activity discussion questions
- Review Vocabulary Smart Cards
- Students elaborate in "Science Notebooks"
- Students make connections to the "Unlock the Big ?" in each lesson.
- Have students restate or contrast topics in each lesson

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Pearson Chapter 2

- **Read aloud**
  - How is the young orangutan like its mother?
- **Try It!** - How are flowers alike and different?

1-LS1-2 Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.

Pearson Chapter 2 - Lesson 3: How do plants grow?

- **Engage** Students will tell what they know about seeds and plants
- **Explore** How does a seed grow?
- **Explain** Students will read Seeds to Trees and Life Cycle of a Plant and answer questions
- **Elaborate** Students will learn what a seed coat is and why it is important
- **Evaluate** Formative Assessment
- **Unit Cumulative Activities**
  - Performance-Based Assessment
  - Performance Expectation Activity
  - Inquiry Investigate It
  - Inquiry Apply It

1-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms

Resources:

Pearson Chapter 2

- SE/TE pp. 44-45 Read aloud, Talk about the picture, read the Big Question
- SE/TE p. 46

Pearson Chapter 2 - Lesson 3

- **Envision It!** SE/TE p. 68-69
- **Explore** p. 68, blackline master TE p. 71a
- **Explain** SE/TE pp. 69-71
- **Elaborate** TE p. 70
- **Evaluate** TE blackline master p.71b
- **Unit Cumulative Activities**
  - Chapter 2 Performance Expectation Activity TE p. 99b

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Pearson Chapter 2 - Lesson 4: How do some animals grow? ● **Engage** Students will predict how a pig will look when its grown ● **Explain** Students will read Animal Life Cycles, Life of A Sea Turtle, and Life of a Grasshopper and answer the questions ● **Elaborate** Discuss why it is important for young sea turtles to move from the nest to the ocean at night ● **Evaluate** Formative Assessment	**Pearson Chapter 2 - Lesson 4** ● **Envision It!** SE/TE pp. 72-73 ● **Explain** SE/TE pp. 73-77 ● **Elaborate** TE p. 75 ● **Evaluate** TE blackline master p. 77b
Pearson Chapter 2 - Lesson 5: How are living things like their parents? ● **Engage** Students will discuss the similarities and differences between a cow and its calf ● **Explore** How are babies and parents alike and different? ● **Explain** Students will read Plants and Their Parents, How Animals and Their Parents Are Alike, and How Animals and Their Parents are different and answer the questions ● **Elaborate** Students will compare and contrast young animals that have the same parents ● **Evaluate** Formative Assessment ● **Unit Cumulative Activities**	**Pearson Chapter 2 - Lesson 5** ● **Envision It!** SE/TE pp. 78-79 ● **Explore** p. 78, blackline master TE p. 81a ● **Explain** SE/TE pp. 79-81 ● **Elaborate** TE p. 80 ● **Evaluate** TE blackline master p. 81b ● **Unit Cumulative Activities** ○ Chapter 2 Performance Expectation Activity TE p. 99c
Pearson Chapter 2 - Lesson 6 ● **Engage** Students will color a daisy to show that the same kind of plant can have different colored flowers ● **Explore** How are bodies different? ● **Explain** Students will read Kinds of Plants, Kinds of Animals, And Different Animals of One Kind and answer questions ● **Elaborate** Science Notebook - Students will draw two animals of the same kind and describe how they are alike and different ● **Evaluate** Formative Assessment	**Pearson Chapter 2 - Lesson 6** ● **Engage** SE/TE pp. 82-83 ● **Explore** TE p. 82, blackline master TE p. 85a ● **Explain** SE/TE pp. 83-85 ● **Elaborate** TE p. 84 ● **Evaluate** TE blackline master p. 85b
Additional learning opportunities/strategies: ● Utilize online resources and web links to support learning.	**Additional resources:** ● http://www.bozemanscience.com/ ● http://ngss.nsta.org/ ● https://www.teachingchannel.org/ngss
Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation.	

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High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Advanced Leveled Content Reader Use project-based science learning to connect science with observable phenomena.	On-Level Content Reader Use project-based science learning to connect science with observable phenomena.	Below-Level Content Reader Use project-based science learning to connect science with observable phenomena. Utilize the If/Then strategies in the RTI section of the lesson/chapter Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	Below-Level Content Reader Utilize the support flaps in the leveled readers to provide support before-reading support (KWL charts, word webs), during-reading support (visual vocabulary support, strategies to determine word meanings, questioning while reading), and after-reading support (summative assessment, activity). Utilize the ELL lesson plan to identify content and language objectives. Use project-based science learning to connect science with observable phenomena. When using the write-in student edition, refer to graphic organizers, photographs, illustrations, and models Use Envision it! to frontload the lesson by activating prior knowledge and building background knowledge. Utilize the ELL handbook for best practices and instructional strategies. Follow the specific “ELL Support” for each chapter in the TE. Support is given through scripted text, graphic organizers, etc.

Unit Title: Grade 1 - Unit 5 - Mimicking Organisms to Solve Problems

In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to develop possible solutions. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of structure and function is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations, designing solutions, and in developing and using models. Students are expected to use these practices to demonstrate understanding of the core ideas.

This unit is based on 1-LS1-1 and K-2-ETS1-2.

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Stage 1: Desired Results

Standards & Indicators:

- **NJSLS – Science**
  - **Science and Engineering Practices (SEP)**
    - Analyzing and Interpreting Data
      - Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)
    - Constructing Explanations and Designing Solutions
      - Use materials to design a device that solves a specific problem or a solution to a specific problem. (1-LS1-1)
    - Developing and Using Models
      - Develop a simple model based on evidence to represent a proposed object or tool. (K-2-ETS1-2)
  - **Disciplinary Core Ideas (DCI)**
    - LS1.A: Structure and Function
      - All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)
    - LS1.B: Growth and Development of Organisms
      - Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive. (1-LS1-2)
    - LS1.D: Information Processing
      - Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs. (1-LS1-1)
    - 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)
  - **Crosscutting Concepts (CCC)**
    - Patterns
      - Patterns in the natural and human designed world can be observed, used to describe phenomena, and used as evidence. (1-LS1-2)
    - Structure and Function
      - The shape and stability of structures of natural and designed objects are related to their function(s). (1-LS1-1)
      - The shape and stability of structures of natural and designed objects are related to their function(s). (K-2-ETS1-2)
    - Connections to Engineering, Technology, and Applications of Science
      - Influence of Science, Engineering and Technology 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. (1-LS1-1)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2)	Brainstorming can create new, innovative ideas.
9.4.2.CI.2	Demonstrate originality and inventiveness in work (e.g., 1.3A.2CR1a).	
9.4.2.CT.1	Gather information about an issue, such as climate change, and collaboratively brainstorm	Critical thinkers must first identify a problem then develop a plan to

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	ways to solve the problem (e.g., K-2-ETS1-1, 6.3.2.GeoGI.2).	address it to effectively solve the problem.
9.4.2.CT.2	Identify possible approaches and resources to execute a plan (e.g., 1.2.2.CR1b, 8.2.2.ED.3).	
9.4.2.CT.3	Use a variety of types of thinking to solve problems (e.g., inductive, deductive).	
9.4.2.IML.1	Identify a simple search term to find information in a search engine or digital resource.	Digital tools and media resources provide access to vast stores of information that can be searched.
9.4.2.IML.2	Represent data in a visual format to tell a story about the data (e.g., 2.MD.D.10).	Digital tools can be used to display data in various ways.
9.4.2.IML.3	Use a variety of sources including multimedia sources to find information about topics such as climate change, with guidance and support from adults (e.g., 6.3.2.GeoGI.2, 6.1.2.HistorySE.3, W.2.6, 1-LSI-2).	A variety of diverse sources, contexts, disciplines, and cultures provide valuable and necessary information that can be used for different purposes.
9.4.2.IML.4	Compare and contrast the way information is shared in a variety of contexts (e.g., social, academic, athletic) (e.g., 2.2.2.MSC.5, RL.2.9).	Information is shared or conveyed in a variety of formats and sources.
9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.)	Digital tools have a purpose.
9.4.2.TL.7	Describe the benefits of collaborating with others to complete digital tasks or develop digital artifacts (e.g., W.2.6., 8.2.2.ED.2).	Collaboration can simplify the work an individual has to do and sometimes produce a better product.

Central Idea / Enduring Understanding:

- In this unit of study, students develop an understanding of how plants and animals use their parts to help them survive, grow, and meet their needs. Students also need opportunities to develop possible solutions. As students develop possible solutions, one challenge will be to keep them from immediately implementing the first solution they think of and to instead think through the problem carefully before acting. Having students sketch their ideas or make a physical model is a good way to engage them in shaping their ideas to meet the requirements of the problem. The crosscutting concept of structure and function is called out as an organizing concept for the disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in constructing explanations, designing solutions, and in developing and using models. Students are expected to use these practices to demonstrate understanding of the core ideas.

Essential/Guiding Question:

- How can humans mimic how plants and animals use their external parts to help them survive and grow?

Content:

- Every human-made product is designed by applying some knowledge of the natural world and is built using materials derived from the natural world.
- The shape and stability of structures of natural and designed objects are related to their function(s).

Skills (Student Learning Objectives):

- Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.* [Clarification Statement: Examples of human problems that can be solved by mimicking plant or animal solutions could include

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- All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow.
- Animals have body parts that capture and convey different kinds of information needed for growth and survival. Animals respond to these inputs with behaviors that help them survive. Plants also respond to some external inputs.
- 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.

designing clothing or equipment to protect bicyclists by mimicking turtle shells, acorn shells, and animal scales; stabilizing structures by mimicking animal tails and roots on plants; keeping out intruders by mimicking thorns on branches and animal quills; and, detecting intruders by mimicking eyes and ears.] (1-LS1-1)

- 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-ETS1-2)

Interdisciplinary Connection(s):

- **NJSLS – Math**
  - MP.2: Reason abstractly and quantitatively.
  - MP.5: Use appropriate tools strategically.
- **NJSLS – English Language Arts**
  - RI.CR.1.1: Ask and answer questions about key details in an informational text (e.g., who, what, where, when, why, how).
  - RI.CI.1.2: Determine main topic and retell a series of key details in informational texts (e.g., who, what, where, when, why, how).
  - L.RF.1.4: Read with sufficient accuracy and fluency to support comprehension.
  - L.RF.1.4.a: Read grade-level text with purpose and understanding.
  - W.WR.1.5: With prompting and support, generate questions through shared research about a topic and determine possible sources to obtain information on that topic.

Stage 2: Assessment Evidence

Performance Task(s):

- "Inquiry labs"
- STEM activities
- Formative assessment: "Lesson Check" blackline masters
- Complete graphic organizers
- Performance Expectation Activities
- Performance Based-Assessment
- Unit Assessment

Other Evidence:

- Post-activity discussion questions
- Review Vocabulary Smart Cards
- Students elaborate in "Science Notebooks"
- Students make connections to the "Unlock the Big ?" in each lesson.
- Have students restate or contrast topics in each lesson

Stage 3: Learning Plan

Learning Opportunities/Strategies:

LS1.A All organisms have external parts. Different animals use their body parts in different ways to see, hear, grasp objects, protect themselves, move from place to place, and seek, find, and take in food, water and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. (1-LS1-1)

Resources:

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Pearson Chapter 2 - Lesson 1: What are some groups of living things? ● **Explain** Students will read Animal Groups and answer the questions	**Pearson Chapter 2 - Lesson 1** ● **Explain** SE/TE pp. 62-63
Pearson Chapter 2 - Lesson 2: How are living things alike and different? ● **Engage** Students will observe a photograph and then draw the missing parts of a plant ● **Explore** Did you Know? ● **Explain** Students will read Parts of Plants; Roots, Stems, and Leaves; Flowers and Fruit and answer the questions ● **Elaborate** Students will draw a picture of a plant, label its parts, and write sentences to describe the functions of roots, stems, and leave ● **Inquiry** How are flowers alike and different? ● **Evaluate** Formative Assessment	**Pearson Chapter 2 - Lesson 2** ● **Envision It!** SE/TE pp. 64-65 ● **Explore** p. 64, blackline master TE p. 67a ● **Explain** SE/TE pp. 65-67 ● **Elaborate** Science Notebook TE p. 66 ● **Try It** SE/TE p. 46 ● **Evaluate** TE p. 67b blackline master
1-LS1-1 Use materials to design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs 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.	
Pearson Chapter 2 ● **Inquiry** How can a mouse's color keep it safe from hawks? ● **Performance-Based Assessment** - Draw a Picture ● **Performance-Based Assessment** - Use materials to design a solution to a human problem by mimicking how plants and/ or animals use their external parts to help them survive, grow, and meet their needs ● **Performance Expectation Activity** Use materials to design a solution to a human problem by mimicking how plants and/ or animals use their external parts to help them survive, grow, and meet their needs	**Pearson Chapter 2** ● **Apply It** SE/TE pp. 96-97 ● SE/TE p. 98 ● SE/TE p. 99 Design a Helmet using pictures of plants and animals with hard coverings to design a bicycle helmet. Students will draw a picture of their helmet along with a description. ● TE p. 99a Use observations of plant and animals parts to design a solution to a problem. Show students a picture of a burr from a plant and relate this to the invention of fasteners. Observing the burrs helped people design a solution to a problem. Provide images of plant and animals structures. Examples: cactus needles, armadillo plates, porcupine quills. Design a solution to a human problem by mimicking a plant and animals structure.
Additional learning opportunities/strategies: ● Utilize online resources and web links to support learning.	**Additional resources:** ● http://www.bozemanscience.com/ ● http://ngss.nsta.org/ ● https://www.teachingchannel.org/ngss

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Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation.			
High-Achieving Students	**On Grade Level Students**	**Struggling Students**	**Special Needs/ELL**
Advanced Leveled Content Reader Use project-based science learning to connect science with observable phenomena.	On-Level Content Reader Use project-based science learning to connect science with observable phenomena.	Below-Level Content Reader Use project-based science learning to connect science with observable phenomena. Utilize the If/Then strategies in the RTI section of the lesson/chapter Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling).	Below-Level Content Reader Utilize the support flaps in the leveled readers to provide support before-reading support (KWL charts, word webs), during-reading support (visual vocabulary support, strategies to determine word meanings, questioning while reading), and after-reading support (summative assessment, activity). Utilize the ELL lesson plan to identify content and language objectives. Use project-based science learning to connect science with observable phenomena. When using the write-in student edition, refer to graphic organizers, photographs, illustrations, and models Use Envision it! to frontload the lesson by activating prior knowledge and building background knowledge. Utilize the ELL handbook for best practices and instructional strategies. Follow the specific “ELL Support” for each chapter in the TE. Support is given through scripted text, graphic organizers, etc.

Science Pacing Guide

Grade 1

MP	Units	Unit TOTAL*	Cumulative TOTAL**
MP1	**Unit 1 – Patterns of Change in the Sky** Chapter 3: Try It!, Lesson 2, Lesson 3	15 days	15 days
MP1-2	**Unit 2 – Light and Sound** Chapter 1: Try It!, Investigate It!, Apply It!, Lesson 1, Lesson 3, & Lesson 4	20 days	35 days
MP2	**Unit 3 – Communicating with Light and Sound** Chapter 1: STEM Quest, Chapter 1 Stem Activity, Performance Based Assessment and Performance Expectation Activity	25 days	60 days
MP2-3	**Unit 4 – Characteristics of Living Things** Chapter 2: Try It!, Lesson 3, Lesson 4, Lesson 5, Lesson 6	15 days	75 days
MP3	**Unit 5 – Mimicking Organisms to Solve Problems** Chapter 2: Lesson 1, Lesson 2, Performance Based Assessment, Performance Expectation Activity	25 days	100 days
MP1-3	**FLEX DAYS**	12 days	112 days

* Unit Total is inclusive of introduction, instruction, assessment, labs, projects, etc. for that particular unit.

** Cumulative Total is a running total, inclusive of prior and current units.