Grade 1 Science

Link Community Charter School

UNITS (4/4 SELECTED)	SUGGESTED DURATION
Unit 1: Air and Weather	*30 lessons*
Unit 2: Sound and Light	*34 lessons*
Unit 3: Plants and Animals	*30 lessons*
Unit 4: i STEAM Scientist Challenge (Additional Unit)	*30 lessons*

Unit 1: Air and Weather

Grade 1 Science - *Last Updated on October 28, 2022*

STANDARDS ADDRESSED

New Jersey (NJSLS) - Grades K-2 - Computer Science and Design Thinking (2020)
8.1.2.DA.4:
Make predictions based on data using charts or graphs.
8.2.2.ITH.3:
Identify how technology impacts or improves life.
Next Generation Science (NGSS) - Grade 1
1-ESS1-1.
Use observations of the sun, moon, and stars to describe patterns that can be predicted.
1-ESS1-2.
Make observations at different times of year to relate the amount of daylight to the time of year.

Unit 1: Air and Weather

Grade 1 Science - *Last Updated on October 28, 2022*

DESIRED RESULTS

Established Goals
In this module, young students turn their focus to the sky to make observations that will heighten their awareness, curiosity, and understanding of Earth's dynamic atmosphere and the observable patterns of objects in the sky. Students explore the natural world by using simple instruments and calendars to observe and monitor change. Students build on the science concepts of weather and how the Sun warms Earth's surface, introduced in kindergarten. They use new tools and methods to enrich observations. Students find out about properties of air by exploring how objects interact with air. Students observe daily changes in air temperature and connect them to the daily movement of the Sun in the sky. They monitor changes in hours of daylight over the seasons and connect them to changing weather conditions. And they find the Moon in the day and night skies and monitor its movement over the month. Throughout the Air and Weather Module, students engage in science and engineering practices by collecting data and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of crosscutting concepts of patterns; cause and effect; scale, proportion, and quantity; systems and system models; structure and function; and stability and change.

Transfer
Students will be able to independently use their learning to... explore air and its properties, observe weather patterns and observe changes and stages in the moon and its phases.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • Observable changes and patterns in the sky are caused by motions in the Earth moon system. • The motion of the sun, moon, and earth relates to time (days, months, years). • Patterns of the motion of the sun, moon, and stars in the sky can be observed, described, and predicted. • Seasonal patterns of sunrise and set can be observed, described, and predicted. • Through the use of tools and/or media, objects	Students will keep considering... ◦ What is air? ◦ What are the properties of air? ◦ How does air relate to weather? ◦ How do we gather information about weather? ◦ What are some patterns of seasonal weather? ◦ What changes can we observe in the appearance of the Moon?

Meaning	
can be observed more clearly then with the naked eye	

Acquisition	
Knowledge	**Skills**
Students will know... • That air and other gases are substantial and can be manipulated. • The basic components of weather and changes in weather in a specific area. • That wind is real and tangible and can be measured. • How to identify patterns of objects in the sky • How to observe stars, moon and sun in the day and night sky to describe predictable patterns. • How to predict patterns of daily change with the sun and the moon. • How to use scientific tools such as binoculars and telescopes to enhance observation.	Students will be skilled at.... • Observing and describe patterns of objects in the sky that are cyclic and can be predicted. • Using observations of stars, moon, and sun in the day and night sky to describe patterns that can be predicted. • Using observations to compare the motion of the sun, earth, and moon as it relates to time. • Observing, describing, and predicting patterns of daily change in the appearance and visibility of the moon and sun. • Observing, describing, and predicting patterns of seasonal change in the timing and position of sunrise and sunset. • Using scientific tools such as binoculars or telescopes to enhance observation

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): create a thermometer measure and record temperature create a temperature graph and analyze
	Other Evidence:

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Weeks 1-4

Exploring Air Students explore properties of a common gas mixture, air. Using vials, syringes, and tubes, students experience air as matter, discovering that it takes up space and can be compressed and that compressed air builds up pressure that can push objects around. They construct and compare parachutes and balloon rockets. Students read about air and where it's found.

Observing Weather Students record weather for 4–8 weeks on a class calendar and in weather journals. They measure temperature with a thermometer and rainfall with a rain gauge. They learn to identify three basic cloud types by matching their observations to a cloud chart. Students read about different kinds of weather.

Wind Explorations Students look for evidence of moving air. They observe and describe wind speed using pinwheels, an anemometer, and a wind scale. They observe bubbles and construct wind vanes to find the wind's direction. Flying kites, they feel the strength of the wind and its direction. Students read how meteorologists gather information on the weather.

Looking for Change Students organize monthly weather data, using graphs to describe weather trends. They continue to measure and record weather throughout the year, to compare the seasons. Students read about the seasonal weather patterns.

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide multiple means of representation.
- Give learners various ways to acquire information and knowledge.
- Provide multiple means of action and expression. Offers students alternatives for demonstrating what they know.
- Provide multiple means of engagement. Help learners get interested, be challenged, and stay motivated.

Unit 2: Sound and Light

Grade 1 Science - *Last Updated on October 28, 2022*

STANDARDS ADDRESSED

Next Generation Science (NGSS) - Grade 1
1-PS4-1.
Plan and conduct investigations to provide evidence that vibrating materials can make sound and that sound can make materials vibrate.
1-PS4-2.
Make observations to contruct an evidence-based account that objects in darkness can be seen only when illuminated.
1-PS4-3.
Plan and conduct investigations to determine the effect of placing objects made with different materials in the path of a beam of light.
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.

Unit 2: Sound and Light

Grade 1 Science - *Last Updated on October 28, 2022*

DESIRED RESULTS

Established Goals
This module provides experiences that help students develop an understanding of how to observe and manipulate sound and light. They explore these dimensions of the natural world using simple tools and musical instruments. Students learn that sound comes from vibrating objects. They explore how to change sound volume and pitch, and develop simple models for how sound travels from a source to a receiver. With light, students also work with sources and receivers. They find out what happens when materials with different properties are placed in a beam of light, and explore how to create and change shadows and reflections. Students explore how to use sound and light devices to communicate information and compare the ways that animals use their senses (ears and eyes) to gather information about their environment. Throughout the Sound and Light Module, students engage in science and engineering practices by collecting data and designing and using tools to solve problems and answer questions. Students gain experiences that contribute to their understanding of the crosscutting concepts: patterns; cause and effect; and systems and system models.

Transfer
Students will be able to independently use their learning to... Engage in investigations which demonstrate that sound can make matter vibrate, and vibrating matter can make sound. Investigate shadows and describe how shadows are the entire space blocked by the light. Students will also be able to describe how objects can be seen only when light is available to illuminate them.

Meaning	
Big Ideas & Understandings	• **Essential Questions**
Students will understand that • All sounds come from vibrations (including people's voices) and vibrations cause all sounds - • People use their ears to sense sounds - Light travels in different ways through different materials - Mirrors reflect light • Shadows are created when objects block light - We use our eyes to sense light • Light and sound can be used to send	Students will keep considering... • How do scientists use evidence to understand light and sound? • What makes sound? (people, animals, nonliving things?) • How can you stop or change sound? - How can you make things vibrate? • How can the path of light change? • How are shadows made? What makes shadows change? • What role does sound and light play

Meaning	
messages across a distance • Light and sound travel across distances	in people's lives? • How can we send sound/light over a distance? • Why do people send signals over a distance? - How can we improve our designs?

Acquisition	
Knowledge	**Skills**
Students will know... • Vibrating objects can make sound (sound cannot be created without vibrations) • That light can pass through, be blocked or be redirected by objects • That differences between opaque, translucent, transparent • Shadows are created by dark areas that result from light being blocked • Mirrors reflect light • Sound and light is used to send signals and can travel over a distance • Engineers are people who use the design process to create things or solve problems.	Students will be skilled at... • observe and record vibrating objects and the behavior of light • test how sounds are created by different materials - share and record observations • communicate ideas, using basic evidence to support their ideas • plan, design and improve a device that sends sound or light over a distance • - work together cooperatively, sharing and listening to other's ideas

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s) :students apply what they learned about sound and light to send a signal over a distance Other Evidence -class discussions -completed science notebook entries
	Other Evidence: -class discussions -completed science notebook entries

LEARNING PLAN

Summary of Key Learning Events and Instruction:

Activities Introduction

Week 1- Listening Walk. Teacher leads discussion- how do we use our senses?

How do scientists use their senses?

Class completes sound idea web (optional).

Teacher leads listening walk (connecting to senses) indoors and outdoors.

Students record sounds and share their observations.

Teacher begins anchor chart- How did we use our senses?

Teachers will need to plan this lesson carefully- it works best on a day and when students can go outside. Students will know: vibrating objects can make sound (sound cannot be created without vibrations)

Students will be able to:

- observe and record vibrating objects
- test how sounds are created by different materials

Week 2 - Exploring Sound. Students explore sound with rubber bands, cup, tongue depressors. Students record observations in science notebook.

Students discuss observations and model how they made sound.

Teacher read aloud: Oscar and the Bat

Week 3 - Exploring Sound and Vibrations.

Teacher demonstrates how to use tuning fork.

Students work in pairs to explore ways to stop/start the sound of the tuning fork, recording their observations in the science notebook.

Students use tuning fork to observe its affect on ping pong balls on string and water and noticing vibrations.

Teacher leads science talk to review and solidify idea that sound is caused by vibrating objects.

Week 4- Review with Vibration Stations.

Students review and observe how vibrations make sound and how sound is made by vibrations.

Students move through five stations (2 kalimbas, 2 monochords, spoon gong, rice and speaker, musical instruments (finger cymbals, toy guitar). Teacher reviews using a variety of resources (FOSS Sound and Light big book, FOSS interactive

FOSS video and/or brainpop) and how sound is caused by vibrations.

Teacher can also use optional student assessments to check for understanding after this lesson concludes.

Week 5: Light experiments

Students complete an idea web on light to assess what they know.

Teacher introduces terms transparent/translucent/opaque.

Students work in pairs to make predictions and test how different materials let light pass through using flashlights.

Week 6: Mystery Science:

What if there were no windows? Students watch a short Mystery Science video that asks students to consider the impact of materials that let light through (aka transparent) like glass.

Students observe different types of paper for to see how much light they let pass through.

They then use these materials to create paper stained glass windows.

Week 7: Golf tee shadows

Teacher reads FOSS big book or shows interactive ebook Sound and Light introducing shadows and observing how shadows are made.

Students work in pairs to explore shadows and how to create shadows with a flashlight and a golf tee.

They share their results and observations about how shadows can be made.

Week 8: Sun Shadows.

Students go outside or find indoor sunny area to observe and experiment with shadows. If possible, students draw their shadows at multiple times of the day to see how the sun's apparent change in the sky can alter shadows. They discuss their results and review with FOSS videos or book: Bear's Shadow by Frank Asch.

NOTE: ** Teachers will need to plan this lesson carefully- it works best on sunny day and when students can go outside more than once during the same day. Students will know: - sound and light is used to send signals and can travel over a distance

Week 9: Mirrors. Students work in groups to complete challenges with mirrors and see how mirrors can be used to reflect light. To review, teacher reads about reflections in the FOSS big book or ebook- Sound and Light.

Week 10: - Student assessment- Sending signals with light and sound Students apply what they learned about sound and/or light to complete a design challenge: Use light or sound to send a signal over a distance (by creating cup-string telephones and/or sending a secret message using flashlights and mirrors). *This is the culminating project for the unit. Teachers can choose if they would like students to do one or both of the design challenges and how much time to devote to the project.

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

- Provide multiple means of representation.
- Give learners various ways to acquire information and knowledge.
- Provide multiple means of action and expression. Offers students alternatives for demonstrating what they know.
- Provide multiple means of engagement. Help learners get interested, be challenged, and stay motivated.

Unit 3: Plants and Animals

Grade 1 Science - *Last Updated on October 28, 2022*

STANDARDS ADDRESSED

Next Generation Science (NGSS) - Grade 1
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.
1-LS1-2.
Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
1-LS3-1.
Make observations to construct an evidence-based account that young plants and animals are like, but not exactly like, their parents.
New Jersey (NJSLS) - Grades K-2 - Computer Science and Design Thinking (2020)
8.2.2.ED.3:
Select and use appropriate tools and materials to build a product using the design process.
8.2.2.ED.4:
Identify constraints and their role in the engineering design process.

DESIRED RESULTS

Established Goals
This module provides experiences that heighten students' awareness of the way that plants and animals meet their basic needs. Students observe firsthand the structures of plants and discover ways to propagate new plants from mature plants (from seeds, bulbs, roots, and stem cuttings). They observe and describe changes that occur as plants grow, and compare classroom plants to those in the schoolyard. They design terrariums (habitat systems) and provide for the needs of both plants and animals living together in the classroom. Students explore variation in the same kind of organism, including variation between young and adults. They learn about the behaviors of parents to help their young (offspring) survive. And they explore structure and function relationships as they sort different kinds of animal and plant structures. Throughout the Plants and Animals Module, students engage in science and engineering practices by collecting and interpreting data to build explanations and designing and using tools to answer questions. Students gain experiences that will contribute to the understanding of the crosscutting concepts of patterns; cause and effect; systems and system models; and structure and function.

Transfer
Students will be able to independently use their learning to... begin to make connections, between grains and plants, they will also use their learning to how plants are important to animals for nesting and shelter. Students will also use their learning to observe structures and behaviors in nature.

Meaning	
Big Ideas & Understandings	**Essential Questions**
Students will understand that... • Heredity refers to specific mechanisms by which characteristics or traits are passed from one generation to the next via genes, and explains why offspring resemble, but are not identical to, their parents. • All organisms are made of cells and can be characterized by common aspects of their structure and functioning • Organisms have external structures that help them survive, grow and meet their need	Students will keep considering... • How are the characteristics of one generation passed to the next? • How can individuals of the same species and even siblings have different characteristics? • How do organisms live, grow, respond to their environment, and reproduce? • How do organisms live, grow, respond to their environment, and reproduce

Acquisition	
Knowledge	**Skills**
Students will know... • That organisms have external structures that serve various functions in growth, survival, behavior, and reproduction. • Organisms have external structures that help them survive, grow and meet their needs. • Parents and offspring engage in behaviors that help the offspring to survive. • Every human made product is designed by applying knowledge of the natural world and is built using materials from nature. • Young animals are very much but not exactly like their parents. Plants also are very much, but not exactly, like their parents. • Adult plants and animals have young. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring to survive. • Offspring resemble their parents, but can also vary in many ways. • Plants and animals have a life cycle	Students will be skilled at... • Observing and categorizing living and nonliving things by external characteristics. • Make observations and describe the different parts of organisms that help them survive, grow, and meet their needs. • Designing a model that replicates the function of an organism's structure. Observe and determine patterns in behavior of parents and offspring that help offspring survive. • Classifying plants and animals according to physical characteristics they share. • Using materials to design a solution to a human problem by mimicking how plant or animals use their external parts to help them survive, grow and meet their needs. • Make observations and to construct an evidence-based account that young plants and animals are alike but not exactly like their parents. • Note patterns in characteristics or behaviors that appear in adult and offspring (e.g. hair color, eye color,). • Observe and compare the stages of life cycles of organisms (plants & animals)

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s) :Science Notebook Entries Animal Research Project
	Other Evidence:

Assessments

Evaluation Criteria	Assessment Evidence
Rubrics/Checklists:	Performance Task(s): Animal Research Project
	Other Evidence:

LEARNING PLAN

Summary of Key Learning Events and Instruction:

1. Grass and Grain Seeds Students plant miniature lawns with rye grass and alfalfa. They mow the lawns and observe the response of grass and alfalfa to cutting. They plant individual wheat seeds in clear soda straws and observe how grain seeds germinate and grow. They read about plant needs and view a video on how plants grow

2. Stems Students make new plants from stems of houseplants. They put sections of stems from mints and other plants into water and look for evidence that a new plant is forming. Stem pieces that develop roots are planted to make new plants. Students plant pieces of potatoes (modified stems) and observe them grow. They learn about how plants make food. Students read about seed dispersal.

3. Terrariums Students set up terrariums using seeds and plants from Investigations 1 and 2. They add local animals such as snails, isopods, and worms and provide for the needs of the plants and animals. They learn about other animals and plants through readings and multimedia.

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION

*Scaffolded Notes

*Provide multiple means of action and expression.

*Offer students alternatives for demonstrating what they know.

*Provide multiple means of engagement. Help learners get interested, be challenged, and stay motivated.

*Use new media and technologies to improve instruction.

Unit 4: i STEAM Scientist Challenge (Additional Unit)

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STANDARDS ADDRESSED

DESIRED RESULTS

ASSESSMENT EVIDENCE (DIAGNOSTIC / FORMATIVE / SUMMATIVE)

LEARNING PLAN

SUPPORTING MATERIALS/RESOURCES/STRATEGIES FOR DIFFERENTIATION