Title: Air and Weather **Grade: 1**

Length: 8-10 weeks

Enduring Understandings:

<u>Investigation 1:</u> Air is invisible, but can be compressed to create pressure and movement.

<u>Investigation 2:</u> Weather and sky conditions can be measured and recorded.

<u>Investigation 3</u>: Moving air creates wind. The movement of objects reflects the speed and direction of wind.

<u>Investigation 4:</u> Weather, solar, lunar and atmospheric patterns show daily, monthly and seasonal changes and patterns.

Standards to be addressed: NGSS, CCSS ELA, CCSS Math

Physical Sciences: 2-PS1-1

Earth and Space Sciences: K-ESS2-1, K-ESS3-3, 1-ESS1-1, 1-ESS1-2

Engineering, Technology, and Applications of Science K–2: ET S1-1, K–2 ET S1-2, K–2 ET S1-3

Essential Questions:

What provocative questions will foster inquiry, understanding, and transfer learning? What questions can you use to connect this unit to Cross-Cutting Concepts?

<u>Investigation 1:</u> What can air do? How does a parachute interact with air? What happens when air is pushed into a smaller space? How can water be used to show that air takes up space? How can compressed air be used to make a balloon rocket?

<u>Investigation 2:</u> What is the weather today? What time of day is the air the warmest? What types of clouds are in the sky today? What time of day can we observe the Moon?

<u>Investigation 3</u>: How can bubbles be used to observe the wind? How strong is the wind today? How can pinwheels be used to observe the wind? What does a wind vane tell us about the wind? What weather conditions are good for kite flying?

<u>Investigation 4:</u> How can we describe the weather over a month? What does the Moon look like at different times during a month? How does the amount of daylight change over the year? How does the temperature and weather change over the seasons?

Disciplinary Core Ideas:	**Scientific & Engineering Practices:**	**Crosscutting Concepts:**

Investigation 1: PS1.A: Structure and properties of matter • Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (From grade 2) ETS1.A: Defining and delimiting engineering problems • Before beginning to design a solution, it is important to clearly understand the problem. 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 solution to other people. ETS1.C: Optimizing the design solution • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. **Investigation 2:** 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. ESS1.B: Earth and the solar	**Investigation 1:** ● Asking questions and defining problems. ● Developing and using models. ● Planning and carrying out investigations. ● Analyzing and interpreting data. ● Constructing explanations and designing solutions. ● Obtaining, evaluating, and communicating information. **Investigation 2:** ● Developing and using models. ● Planning and carrying out investigations. ● Analyzing and interpreting data. ● Using mathematics and computational thinking. ● Constructing explanations. ● Obtaining, evaluating, and communicating information. **Investigation 3:** ● Developing and using models. ● Planning and carrying out investigations. ● Analyzing and interpreting data. ● Constructing	**Investigation 1:** ● Cause and Effect ● Systems and System Models ● Structure and Function **Investigation 2:** ● Patterns ● Cause and Effect ● Stability and Change **Investigation 3**: ● Patterns ● Cause and Effect ● Scale, Proportion, and Quantity ● Structure and Function **Investigation 4:** ● Patterns ● Stability and Change

system • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. ESS2.D: Weather and climate • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (Extended from kindergarten) PS3.B: Conservation of energy and energy transfer • Sunlight warms Earth's surface. (Extended from kindergarten) **<u>Investigation 3</u>**: ESS2.D: Weather and climate • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (Extended from kindergarten) ESS3.A: Natural resources • Living things need water,	explanations and designing solutions ● Obtaining, evaluating, and communicating information. **<u>Investigation 4:</u>** ● Asking questions. ● Planning and carrying out investigations. ● Analyzing and interpreting data. ● Using mathematics and computational thinking. ● Constructing explanations. ● Obtaining, evaluating, and communicating information.	

air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (Extended from kindergarten) ETS1.C: Optimizing the design solution • Because there is always more than one possible solution to a problem, it is useful to compare and test designs. **<u>Investigation 4:</u>** 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. ESS1.B: Earth and the solar system • Seasonal patterns of sunrise and sunset can be observed, described, and predicted. ESS2.D: Weather and climate • Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (Extended from		

kindergarten) PS3.B: Conservation of energy and energy transfer • Sunlight warms Earth's surface. (Extended from kindergarten)		

Big Ideas-I want students to understand:

What scientific explanations and/or models are critical for student understanding of the content?
So what? Who cares?
What is the most important for students to understand about this topic?

<u>Investigation 1:</u>
Air is a gas and is all around us. Air is matter and takes up space. Air makes objects move. Air moves from place to place. Moving air is wind. Air resistance affects how things move. Air can be compressed. The pressure from compressed air can move things, including water.

<u>Investigation 2:</u>
Weather describes conditions in the air outside. Temperature describes how hot or cold the air is. Temperature is measured with a thermometer. Clouds are made of liquid water drops that fall to Earth as rain. Wind moves clouds in the sky. The Sun and Moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night.

<u>Investigation 3</u>:
Wind is moving air. Meteorologists use wind scales (models) to describe the strength of the wind. Meteorologists use anemometers to measure the speed of the wind. A wind vane points in the direction the wind is coming from. Wind lifts kites up into the sky.

<u>Investigation 4:</u>
Daily changes in temperature and weather type can be observed, compared, and predicted over a month. The Sun and Moon can be observed moving across the sky; we see them at different locations in the sky, depending on the time of day or night. Each season has a typical weather pattern that can be observed, compared, and predicted. The number of hours of daylight changes predictably through the seasons.

Do-I want students to be able to:

What scientific practices will we explicitly focus on in this unit?
What key knowledge and skills will students develop as a result of this unit?
(Use verb phrases)

<u>Investigation 1:</u> Students explore properties of a common gas mixture—air. Using vials, syringes, and tubing, 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 that use air.

<u>Investigation 2:</u> Students use instruments for 4–8 weeks to observe and record weather on a class calendar and in science notebooks. Students monitor temperature with a thermometer and (optionally) rainfall with a rain gauge. They learn to identify three basic cloud types by matching their observations with a cloud chart. They also monitor times of sunrise and sunset and record the number of daylight hours each day.

<u>Investigation 3:</u> 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. Students fly kites to feel the strength of the wind and the direction it is moving.

<u>Investigation 4:</u> Students organize monthly weather data, using graphs to describe weather trends. They continue to monitor weather throughout the year, comparing the seasons and looking for weather patterns. Students use the observations they have recorded on the calendar to look for monthly patterns of the Moon and annual patterns of daylight hours.

Know-What are the basics?:

What vocabulary formations or other facts do students need to know in order to understand the big ideas?

<u>Investigation 1:</u>
Air, air resistance, barrel, blow, bubble, compress, distance, engineer, gas, matter, move, parachute, plunger, pressure, push, rocket, submerge, syringe, system, tube, wind

<u>Investigation 2:</u>
Change, cirrus, cloud, cold, cool, cumulus, day, degrees Celsius, degrees Fahrenheit, describe, hot, measure, meteorologist, Moon, night, overcast, partly cloudy, Pattern, rain gauge, rainy, record, snowy, star, stratus, Sun, sunny, sunrise, sunset, symbol, temperature, thermometer, warm, water vapor, weather, weather condition, weather instrument

<u>Investigation 3</u>:
Anemometer, calm, direction, east, gentle breeze, kite, moderate breeze, north, pinwheel, south, strong breeze, west, wind speed, wind vane

<u>Investigation 4:</u>

Fall, graph, hibernate, migrate, season, spring, summer, winter

How do I reinforce or build literacy or mathematics skills?

<u>Investigations 1, 2, 3 and 4:</u>
Student Notebook entry
Science Resources Book
Video
Word Wall

<u>Investigation 1:</u>
- Science Resources Book: “What Is All around Us?”
- Video: “Friction and Air Resistance”

<u>Investigation 2:</u>
- Science Resources Book: “What Is the Weather Today?”; “Clouds”; “Water in the Air”; “Changes in the Sky”
- Online Activity: “Cloud Catcher**”**

<u>Investigation 3:</u>
- Science Resources Book: “Understanding the Weather”; “Resources”
- Online Activity: “Wind Speed”

<u>Investigation 4:</u>
- Science Resources Book: “Changes in the Sky”; “Seasons” ;“Getting through the Winter”
- Online Activity: “What’s the Weather?”

Assessment: How will I know what students have learned?

Performance Expectations:
Does the formative or summative assessment require students to show their understanding in an observable way?
Does it make students' thinking visible?
Are there criteria and are the criteria relevant to the big ideas for the unit?

Other evidence:
Include multiple types of learning to give a more accurate picture of learning.

Investigation 1, 2,3, and 4: Science notebook entry, Performance-based assessment, and Investigation checks for each investigation

What are some ways we could possibly differentiate instruction to reach all learners?

How shall we teach for understanding?
Incorporate different learning styles as well hands-on and engaging activities?

Centers-based rotations, student resources book, FOSS online videos and activities, focus groups, socratic seminar, partnership/small group explorations, content-specific anchor charts, content-specific word wall

Title: Sound and Light **Grade: 1**

Length: 8-10 weeks

Enduring Understandings:	**Standards to be addressed: NGSS, CCSS ELA, CCSS Math**
Investigation 1: Sounds are caused by vibrating objects. **Investigation 2:** Sound can be manipulated in different ways at the source. The way sound is manipulated is detectable by a receiver.	Physical Sciences: 1-PS4-1, 1-PS4-2, 1-PS4-3, 1-PS4-4 Engineering, Technology, and Applications of Science: K-2 ETS1-1, K-2 ETS1-2, K-2

<u>Investigation 3</u>: Shadows are made by an object, a surface and a light source. **<u>Investigation 4</u>**: Mirrors can be used to reflect light. Objects seen in mirrors produce a reversed image.	ETS1-3 Life Sciences: 1-LS1-1

Essential Questions:

What provocative questions will foster inquiry, understanding, and transfer learning? What questions can you use to connect this unit to Cross-Cutting Concepts?

<u>Investigation 1:</u> What causes sound? What kinds of sounds are easy to identify? What information does sound give us? How do objects make sound?

<u>Investigation 2:</u> How can we make loud and soft sounds? How can we change pitch? How can sound travel from the source to the receiver? How can we use sound to communicate over long distances?

<u>Investigation 3</u>: What makes a shadow? How can we use the sun to create shadows? What happens when different materials block light?

<u>Investigation 4</u>: How can a light beam be redirected? What can be seen with a mirror? What can be seen in the absence of light? How can people communicate with light?

Disciplinary Core Ideas:	**Scientific & Engineering Practices:**	**Crosscutting Concepts:**
<u>Investigation 1:</u> PS4.A: Wave properties ● Sound can make matter vibrate, and vibrating matter can make sound. **<u>Investigation 2:</u>** PS4.A: Wave properties ● Sound can make matter vibrate, and vibrating matter can make sound. PS4.C: Information technologies and instrumentation ● People also use a variety of devices to	**<u>Investigation 1:</u>** ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information **<u>Investigation 2:</u>** ● Asking questions and defining problems ● Developing and using models	**<u>Investigation 1:</u>** ● Cause and effect **<u>Investigation 2:</u>** ● Patterns ● Cause and effect ● Systems and system models **<u>Investigation 3</u>**: ● Patterns ● Cause and effect **<u>Investigation 4</u>**: ● Patterns ● Cause and effect ● Systems and system

communicate (send and receive information) over long distances. 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. **<u>Investigation 3</u>**: PS4.B: Electromagnetic radiation ● 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. **<u>Investigation 4:</u>** PS4.B: Electromagnetic radiation ● Objects can be seen only when light is available to illuminate them. Some objects give off their own light. ● Some materials allow light to pass through them, others allow only some light through, and others block all the light	● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations and designing solutions ● Obtaining, evaluating, and communicating information **<u>Investigation 3:</u>** ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information **<u>Investigation 4:</u>** ● Asking questions and defining problems ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations and designing solutions ● Obtaining, evaluating, and communicating information	models

and create a dark shadow on any surface beyond them, where the light cannot reach. Mirrors can be used to redirect a light beam. PS4.C: Information technologies and instrumentation ● People also use a variety of devices to communicate (send and receive information) over long distances. 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. ETS1.A: Defining and delimiting engineering problems ● Before beginning to design a solution, it is important to clearly understand the problem. 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 solution to other people. ETS1.C: Optimizing the design solution ● Because there is always more than one possible solution to a problem, it is useful to compare and test designs.		

Big Ideas-I want students to understand:

What scientific explanations and/or models are critical for student understanding of the content?
So what? Who cares?
What is the most important for students to understand about this topic?

Investigation 1: Vibration is a rapid back-and-forth motion. Vibrating objects make sound. A sound always comes from a vibrating source. Some sounds are unique, and are easier to identify than others. Sound sources can be natural or human-made.

Investigation 2: Objects can be different sizes and can vibrate at different rates, creating different pitches and volumes. Volume is how loud or soft a sound is. Pitch is how high or low a sound is. Sound vibrations travel from a source, through a medium (matter) to reach a receiver (ear). Large objects tend to vibrate slower than small objects.

Investigation 3: Shadows are made when an opaque object blocks the light source. Shadows can be different sizes, based on the location of the opaque object in relation to the source. Light travels from a source in all directions. Different materials create differently-shaped shadows. Some materials block light entirely or partially, while other materials allow light to travel through. The length and direction of a shadow depends on the position of the light source.

Investigation 4: Light travels in straight lines and can be directed in different ways. Light can be reflected from the source to the receiver. People can communicate to each other using light that is reflected between a source and receiver. Light is necessary for animals to see. Animal eyes are not all the same.

Do-I want students to be able to:

What scientific practices will we explicitly focus on in this unit?
What key knowledge and skills will students develop as a result of this unit?
(Use verb phrases)

Investigation 1: Produce sounds using different types of materials. Identify source of a given sound. Use words and phrases to describe different sounds. Learn how to discriminate between different kinds of sounds. Describe the information sounds convey. Identify and describe sounds made by different animals.

Investigation 2: Investigate ways to change the volume (loud/soft) and pitch (high/low) of sounds. Manipulate the volume and pitch of sounds. Develop models of how sound travels from a source to a receiver. Identify and describe sound receivers used by different animals.

Investigation 3: Block light and create and change shadows. Investigate how light interacts with objects that are transparent, translucent, and opaque.

Investigation 4: Investigate ways to reflect and redirect light to different locations using one and two mirrors. Experience what can be seen when there is no light, and conclude that objects can only be seen when light is present. Explore the shapes and location of eyes on different animals.

Know-What are the basics?:

What vocabulary formations or other facts do students need to know in order to understand the big ideas?

Investigation 1: Back and forth motion, motion, compare, ear, hear, identify, information, listen, loud, observe, pluck, property, soft, sound, sound, receiver, sound, source, table, fiddle, tuning, fork, vibrate, vibration

Investigation 2: communicate, direction (away, toward), gentle, guitar, hard, high-pitched, instrument, kalimba, length, low-pitched, medium-pitched, message, pitch, spoon-gong system, string, system, travel, volume, xylophone

Investigation 3: block, dark, flashlight, light, light source, opaque, shade, shadow, Sun, sunlight, translucent, transparent

Investigation 4: angle, eye, light detector, mirror, model, redirect, reflect, reflection, vision

How do I reinforce or build literacy or mathematics skills?

<u>Investigations 1, 2, 3 and 4:</u>

- Student Notebook entry
- Science Resources Book
- FOSS Web Video Clips
- Word Wall

<u>Investigation 1:</u>

- FOSS online activity ("sorting sounds")

<u>Investigation 2:</u>

- FOSS online video "All About Sound"

<u>Investigation 3:</u>

- FOSS online videos "Light and Shadows", "All About Light" and "My Shadow"

<u>Investigation 4:</u>

- FOSS online video "Light and Darkness"

Assessment: How will I know what students have learned?

<u>Performance Expectations:</u>
Does the formative or summative assessment require students to show their understanding in an observable way?
Does it make students' thinking visible?
Are there criteria and are the criteria relevant to the big ideas for the unit?

<u>Other evidence:</u>
Include multiple types of learning to give a more accurate picture of learning.

<u>Investigation 1:</u> Science notebook entry, Performance-based assessment, end-of-investigation assessment

<u>Investigation 2:</u> Science notebook entry, Performance-based assessment, end-of-investigation assessment

<u>Investigation 3:</u> Science notebook entry, Performance-based assessment, end-of-investigation assessment

<u>Investigation 4:</u> Science notebook entry, Performance-based assessment, end-of-investigation assessment

What are some ways we could possibly differentiate instruction to reach all learners?

How shall we teach for understanding?
Incorporate different learning styles as well hands-on and engaging activities?

Centers-based rotations, student resources book, FOSS online videos and activities, focus groups, socratic seminar, partnership/small group explorations, content-specific anchor charts, content-specific word wall

Title: Plants and Animals **Grade: 1**

Length: 8-10 weeks

Enduring Understandings:

Investigation 1: Seeds require certain conditions to grow.

Investigation 2: Plants reproduce in different ways and plant life requires conditions to survive. New plants grow from old plants in different ways.

Investigation 3: Artificial environments can be created for scientists to observe interactions among living things. Living things adapt to survive in their environment.

Investigation 4: Plants have certain structures that allow them to grow, survive and reproduce.

Standards to be addressed: NGSS, CCSS ELA, CCSS Math

Life Sciences: 1-LS1-1, 1-LS1-2, 1-LS3-1

Engineering, Technology, and Applications of Science K–2: ETS1-2

Essential Questions:

What provocative questions will foster inquiry, understanding, and transfer learning? What questions can you use to connect this unit to Cross-Cutting Concepts?

Investigation 1: What happens to ryegrass and alfalfa seeds in moist soil? What happens to the grass and alfalfa plants after we mow them? How does a wheat seed grow? How many different kinds of plants live in an area of the schoolyard?

Investigation 2: How can we make a new plant from an old one? What grows from the nodes of a potato? How do we keep our cuttings alive?

Investigation 3: What do plants need to live and grow in a terrarium? What do animals need to live in a terrarium? What structures or behaviors do plants or animals have that

help them live in their habitat? How do the behaviors of squirrels help them survive the winter?

<u>Investigation 4:</u> How does a bulb grow? What parts of the plant can grow new plants? How do the plants in the schoolyard compare to the plants studied in class? What do animal parents do to help their young survive?

Disciplinary Core Ideas:	**Scientific & Engineering Practices:**	**Crosscutting Concepts:**
<u>Investigation 1:</u> 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 good water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. 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. LS3.B: Variation of traits • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. **<u>Investigation 2:</u>**	**<u>Investigation 1:</u>** ● Asking questions ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Using mathematics and computational thinking ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **<u>Investigation 2:</u>** ● Asking questions ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information	**<u>Investigation 1:</u>** ● Patterns ● Cause and effect ● Structure and function **<u>Investigation 2:</u>** ● Patterns ● Cause and effect ● Structure and function **<u>Investigation 3</u>**: ● Systems and system models ● Structure and function **<u>Investigation 4:</u>** ● Patterns ● Cause and effect ● Structure and function

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 good water, and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. 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. LS3.B: Variation of traits • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. **<u>Investigation 3</u>**: 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 good water, and air. Plants also have	**<u>Investigation 3:</u>** ● Asking questions ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Using mathematics and computational thinking Constructing explanations ● Obtaining, evaluating, and communicating information **<u>Investigation 4:</u>** ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Obtaining, evaluating, and communicating information	

different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. 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. LS3.B: Variation of traits • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways. 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. **<u>Investigation 4:</u>** 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 good water,		

and air. Plants also have different parts (roots, stems, leaves, flowers, fruits) that help them survive and grow. 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. LS3.A: Inheritance of traits • Young animals are very much, but not exactly, like their parents. Plants also are very much, but not exactly, like their parents. LS3.B: Variation of traits • Individuals of the same kind of plant or animal are recognizable as similar but can also vary in many ways.		

Big Ideas-I want students to understand:

What scientific explanations and/or models are critical for student understanding of the content?
So what? Who cares?
What is the most important for students to understand about this topic?

<u>Investigation 1:</u> Seeds need water to grow into new plants. Not all plants grow alike. Plant roots take in water and nutrients, and leaves make food from sunlight. Seeds are alive and grow into new plants. Plants have different structures that function in growth and survival. Individuals of the same kind (of plant or animal) look similar but also vary in many ways.

<u>Investigation 2:</u> Leaves, twigs, and roots develop on stems at nodes. Potatoes are underground stems; potato eyes are nodes where buds grow. New plants can grow from

the stems of mature plants. Plants are living organisms that need, water, air, nutrients, light, and space to grow.

Investigation 3: Plants need water, nutrients, air, space, and light; animals need water, food, air, and space with shelter. A habitat is a place where plants and animals live. It provides what a plant or animal needs to live. Plants and animals live in different environments and have structures and behaviors that help them survive. Animals use sensory structures to take in information about their surroundings and act on it. Engineers learn from nature to solve problems.

Investigation 4: Plant bulbs are alive and grow new structures when provided with water. Some parts of roots will grow into new plants if they are provided with water. Other parts will not. Plants grow and change. Plants can produce new plants in many ways. Adult animals can have young (offspring), and the young resemble their parents. In many kinds of animals, parents and the offspring engage in behaviors that help the offspring survive.

Do-I want students to be able to:

What scientific practices will we explicitly focus on in this unit?
What key knowledge and skills will students develop as a result of this unit?
(Use verb phrases)

Investigation 1: Students plant miniature lawns with ryegrass and alfalfa. They mow the lawns and observe the response of grass and alfalfa to cutting. They plant individual wheat seeds in clear straws and observe how seeds germinate and grow, observing variation in the growth of the same kind of seed. They conduct a plant hunt in the schoolyard and continue to look for variation. They use media to look at variation in animals and how animals use their senses to gather information about their surroundings to help them survive.

Investigation 2: Students make new plants from stems of houseplants. They put sections of stems 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.

Investigation 3: Students set up terrariums using seeds and plants from Investigations 1 and 2. They add local animals such as snails and isopods and provide for the needs of the plants and animals. Students learn about other animals and plants through readings and multimedia and compare and sort structures and functions. Through an outdoor simulation, students learn about variations in how squirrels store food for winter survival. Students read about how engineers learn from nature to solve human problems.

Investigation 4: Students plant onion or garlic bulbs in moist cotton and observe as they develop into new plants. They plant parts of roots—carrots and radishes—to discover which parts will develop into new plants. Students adopt a schoolyard plant and compare it to other plants. They use media to learn about the behavior of animals and their young and how these behaviors help the young to survive. Students observe how young plants and animals resemble their parents.

Know-What are the basics?:

What vocabulary formations or other facts do students need to know in order to understand the big ideas?

Investigation 1: alfalfa, blade, fertilizer, function, grain, lawn, leaf, light, mow, nutrient, observe, plant, root, ryegrass, seed, soil, sprout, stem, structure, variation, wheat

Investigation 2: bud, cutting, eye node, potato, tuber

Investigation 3: behavior, desert, forest, grassland, habitat, map, map key, ocean; pond, predator, rain forest, shelter, survive, system, terrarium, tundra
Investigation 4: bulb, carrot, garlic, offspring, onion, parent, radish, vermiculite

How do I reinforce or build literacy or mathematics skills?

Investigations 1,2,3 and 4:
- Student Notebook entry
- Science Resources Book
- Video
- Word Wall

Investigation 1:
- **Science Resources Book:** "What Do Plants Need?"; "The Story of Wheat"; "Variation"
- **Videos: "**How Plants Grow"; "Animal Growth"

Investigation 2:
- Science Resource Book

Investigation 3:
- **Science Resources Book:** "What Do Animals Need?"; "Plants and Animals around the World"; "Learning from Nature"
- **Videos: "**How Plants Live in Different Places"; "Animal Growth"
- **Online Activity:** "Sorting Animals by Structures"

Investigation 4:

- **Science Resources Book**: "Animals and Their Young"
- **Video**: "Animal Offspring and Caring for Animals"
- **Online Activities**: "Watch It Grow!"; "Find the Parent"

Assessment: How will I know what students have learned?

Performance Expectations:
Does the formative or summative assessment require students to show their understanding in an observable way?
Does it make students' thinking visible?
Are there criteria and are the criteria relevant to the big ideas for the unit?

Other evidence:
Include multiple types of learning to give a more accurate picture of learning.

Investigations 1, 2, 3, and 4: Embedded Assessment Science notebook entries; Performance Assessment; Benchmark Assessment; Investigation I-Check for each investigation

What some ways we could possibly differentiate instruction to reach all learners?

How shall we teach for understanding?
Incorporate different learning styles as well hands-on and engaging activities?

Centers-based rotations, student resources book, FOSS online videos and activities, focus groups, socratic seminar, partnership/small group explorations, content-specific anchor charts, content-specific word wall