Title: Insects and Plants **Grade: 2**

Length: 30 Days

Enduring Understandings:

- All living things need food, water, a way to dispose of waste, and an environment in which they can live.
- Reproduction is essential to the continued existence of every kind of organism. Organisms have diverse life cycles.
- Organisms and populations of organisms are dependent on their environmental interactions both with other living things and nonliving factors.
- Biological evolution, the process by which all living things have evolved over many generations from common ancestors, explains both unit and diversity of species.

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

NGSS:
ETS1.A: Defining and delimiting engineering problems.
ETS1.B: Developing possible solutions.
ETS1.C: Optimizing the design solution.

LS1.A: All organisms have external parts. Different animals use their body parts in different ways.
LS1.B: Reproduction is essential to continued existence of every kind of organisms.
LS1:C:
LS2.A: Plants depend on water and light to grow. Plants depend on animals for pollination and to move seeds.
LS4.D: There are many different kinds of living things to see in any area, and they exist in different places on land and in water.

CCSS:
RI1: Ask and answer questions to demonstrate understanding.
RI2: Identify the main topic of a text.
RI5: Know and use text features.
W8: Gather information from

	provided sources to answer a question. SL1: Participate in collaborative conversations. SL2: Recount or describe key ideas. SL6: Produce complete sentences. L1: Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. L4: Determine or clarify the meaning of unknown or multiple-meaning words and phrases. L6: Use acquired words or phrases.

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: Mealworms</u>

- What do mealworms need to live?
- How do mealworms grow and change?
- What are the stages of a beatles life?

<u>Investigation 2: Brassica Seeds</u>

- How do you plant brassica seeds?
- How does a young plant change as it grows?
- What will happen to flowers on the brassica plants?
- Where is a good outdoor place for growing young plants?

<u>Investigation 3: Milkweed Bugs</u>

- What are the yellow objects and how do they change over time?
- What do milkweed bugs need in their habitat?
- How do milkweed bugs grow and change?
- Where do insects live?

Disciplinary Core Ideas:	**Scientific & Engineering Practices:**	**Crosscutting Concepts:**
<u>Investigation 1:</u> How do organisms live,	**<u>Investigation 1:</u>**	**<u>Investigation 1:</u>** Patterns

grow, respond to their environment, and reproduce? **<u>Investigation 2:</u>** How do organisms love, grow, and reproduce? How and why do organisms interact with their environment and what are the effects of these interactions? How can their be so many similarities among organisms yet so many different types of plants, animals, and microorganisms? How do engineers solve problems? **<u>Investigation 3</u>**: How do organisms love, grow, and reproduce? How can their be so many similarities among organisms yet so many different types of plants, animals, and microorganisms? How do engineers solve problems?	● Asking questions ● 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 ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in arguments from evidence ● Obtaining, evaluating, and communicating information **<u>Investigation 3:</u>** ● Asking questions and defining problems ● Developing and using models ● Planning and	Structure and Function **<u>Investigation 2:</u>** Patterns Cause and Effect Structure and Function **<u>Investigation 3</u>**: Patterns Structure and Function

	carrying out investigations ● Analyzing and interpreting data ● Constructing explanations and designing solutions ● Engaging in arguments from evidence ● Obtaining, evaluating, and communicating information	

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>

- Insects need air, food, water, and space.
- The life cycle of the beetle is egg, larva, pupa, and adult, which produces egg.
- Insects have characteristics structures and behaviors.
- Adult insects have a head, throat, thorax, and abdomen.
- Insects have predictable characteristics at different stages of development.

<u>Investigation 2:</u>

- Plants need water, air, nutrients, light, and space.
- As plants grow, they develop roots, stems, leaves, bugs, flowers, and seeds in a sequence called a life cycle. Seeds develop into new plants that look like the parent plant.
- Animals disperse seeds, moving them from one location to another where they grow.
- Bees and other insects help some other plants by moving pollen from flower to flower.

<u>Investigation 3</u>:

- Insects need air, food, water, and appropriate space including shelter; different insects meet these needs in different ways.

- The life cycle of some insects is egg, nymph stages, and adult, which produces eggs.
- Variations exist within a group of related organisms.
- As insects grow, they molt their exoskeleton.

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 will be able to:
- Observe beetles change from larvae to pupae to adults.
- Communicate observations of the structures, behaviors, and life cycle of insects in words and drawings.
- Provide for the basic needs of living insects in a classroom habitat.

Investigation 2: Students will be able to:
- Plant rapid-cycling brassica seeds in soil and observes changes over time
- Provide for the needs of plants
- Record and communicate observation of life cycle using the techniques of drawing, labeling, and captioning with numbers and words.
- Develop a simple model based on evidence to describe a process in the life cycle of plants.

Investigation 3: Students will be able to:
- Compare structures on milkweed bugs to other insects.
- Communicate observations of the structures, behaviors, and life cycles of insects in words and drawings.
- Design an insect habitat that meets the basic needs of living insects- air, food, water, space, and shelter.

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:
Vocabulary: air, bran, food, habitat, insect, living, mealworm, observe, organism, space, structure, water, abdomen, adult, antennae, beetle, dropping, exoskeleton, head, larvae, leg, molt, molting, pupae, segment, stage, thorax

Investigation 2:
Vocabulary: bud, flower, germination, leaf, pollen, pollination, seedling, sprout, stem

<u>Investigation 3</u>:
Vocabulary: hatch, milkweed bug, nymph, shelter

How do I reinforce or build literacy or mathematics skills?

Reading Skills:

- Have students ask and answer *who, what, where, when, why,* and *how* questions about readings in reference books to demonstrate understanding of key details.
- Have students describe the connection between scientific ideas or concepts, or steps in technical procedures in a text.
- Have students use reasons to support specific points the author makes in a text.

Students will also use the following skills:
Reading comprehension, identifying main ideas, using text features, using images to explain text.

Writing Skills:
Have students use notebooks to: strengthen writing by revising, recall information from experiences, gather information from provided sources to answer a question.

Mathematical Skills:
Have students create tables and graphs, read tables and graphs, reason abstractly and quantitatively, use appropriate tools strategically.

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>

- Notebook entries
    - Part 1: Students will answer: "What do living mealworms need to live?"
    - Part 2: Students will answer: "How do mealworms grow and change?"
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 3)

<u>Investigation 2:</u>

- Notebook entries
    - Part 1: Students will answer: "How did we plant the brassica seeds?"
    - Part 2: Students will answer: "How does a young plant change as it grows?"
    - Part 3: Students will label parts of brassica plant "notebook sheet 6/7)
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 4)

<u>Investigation 3:</u>

- Notebook entries
    - Part 1: Students will answer: "What are the yellow objects and how do they change over time?"
    - Part 2: Students will answer: "What do milkweed bugs need in their habitat?"
    - Part 3: Students will answer: "How do milkweed bugs grow and change?"
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 4)

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?

- Provide multiple representations of information
- Offer alternative ways for students to show what they know (different options for output)
- Provide optional graphic organizers
- Provide options for small group investigations and activities
- Provide written directions
- Provide visuals
- Identify roles for group work

Title: Pebbles, Sand, and Silt **Grade: 2**

Length: 30 days

Enduring Understandings:	**Standards to be addressed: NGSS, CCSS ELA, CCSS Math**
<u>Investigation 1:</u> ● Rocks are earth materials and can be described	**NGSS:**

by property of size. ● Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders. ● Weathering, caused by wind or water, causes larger rocks to break into smaller rocks. ● Some Earth events happen very quickly (volcanic eruptions, floods); others occur very slowly over a long period of time (weathering of rock). **<u>Investigation 2:</u>** ● Rocks are earth materials and can be described by property of size. ● Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders. ● Weathering, caused by wind or water, causes larger rocks to break into smaller rocks. ● Some Earth events happen very quickly (volcanic eruptions, floods); others occur very slowly over a long period of time (weathering of rock). **<u>Investigation 3</u>**: ● Earth materials are natural resources. ● The properties of different earth materials make them suitable for specific uses. ● Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth. ● Earth materials are commonly used in the construction of buildings and streets. ● Earth materials are used to make sculptures and jewelry.	**2-PS1-1** Plan and conduct an investigation to describe and classify different kinds of materials by their observable properties. **2-PS1-2** Analyze data obtained from testing different materials to determine which materials have the properties that are best suited for an intended purpose. **2-PS1-3** Make observations to construct an evidence-based account of how an object made of a small set of pieces can be disassembled and made into a new object. **2-PS1-4** Construct an argument with evidence that some changes caused by heating or cooling can be reversed and some cannot. **2-ESS1-1** Use information from several sources to provide evidence that Earth events can occur quickly or slowly. **CCSS ELA:** **RI.2.1** Ask and answer such questions as *who, what, where, when, why,* and *how* to demonstrate understanding of key details in a text. (2-PS1-4) **RI.2.3**

	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text. (2-PS1-4) **RI.2.8** Describe how reasons support specific points the author makes in a text. (2-PS1-2),(2-PS1-4) **W.2.1** Write opinion pieces in which they introduce the topic or book they are writing about, state an opinion, supply reasons that support the opinion, use linking words (e.g., *because, and, also*) to connect opinion and reasons, and provide a concluding statement or section. (2-PS1-4) **W.2.6** With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. *(2-ESS1-1)* **W.2.7** Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations). (2-PS1-1),(2-PS1-2),(2-PS1-3) **W.2.8** Recall information from experiences or gather

	information from provided sources to answer a question. (2-PS1-1),(2-PS1-2),(2-PS1-3) **SL.2.2** Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1) **CCSS Math:** **MP.2** Reason abstractly and quantitatively. (2-PS1-2) **MP.4** Model with mathematics. (2-PS1-1),(2-PS1-2) **MP.5** Use appropriate tools strategically. (2-PS1-2) **2.MD.D.10** Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph. (2-PS1-1),(2-PS1-2) **2.NBT.A** Understand place value. (2-ESS1-1)
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>
How can rocks be described and categorized?
How do weather and earth events change rocks and the earth's surface?

<u>Investigation 2:</u>
How can rocks be described and categorized?
How do weather and earth events change rocks and the earth's surface?

<u>Investigation 3</u>:
What are natural resources?
How do the properties of natural resources determine how they can be used?
How can natural resources/earth materials be used to make goods that human beings can use?

Disciplinary Core Ideas:	**Scientific & Engineering Practices:**	**Crosscutting Concepts:**
<u>Investigation 1:</u> ● ESS1: What is the universe, and what is Earth's place in it? ● ESS1.C: The history of planet Earth ● PS1: How can one explain the structure, properties, and interactions of matter? ● PS1.A: Structure and properties of matter **<u>Investigation 2:</u>** ● ESS1: What is the universe, and what is Earth's place in it? ● ESS1.C: The history of planet Earth ● ESS2: How and why is Earth constantly changing? ● ESS2.A: Earth materials and systems	**<u>Investigation 1:</u>** ● Asking questions ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **<u>Investigation 2:</u>** ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data	**<u>Investigation 1:</u>** ● Cause and effect ● Stability and change **<u>Investigation 2:</u>** ● Cause and effect ● Scale, proportion, and quantity ● Stability and change **<u>Investigation 3</u>**: ● Cause and effect ● Scale, proportion, and quantity ● Energy and matter

● ESS2.C: The roles of water in Earth's surface processes ● PS1: How can one explain the structure, properties, and interactions of matter? ● PS1.A: Structure and properties of matter **<u>Investigation 3</u>**: ● PS1: How can one explain the structure, properties, and interactions of matter? ● PS1.A: Structure and properties of matter ● ETS1: How do engineers solve problems? ● ETS1.A: Defining and delimiting engineering problems ● ETS1.B: Developing possible solutions ● ETS1.C: Optimizing the design solution	● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **<u>Investigation 3:</u>** ● Defining problems ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information	

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>

- Rocks are earth materials and can be described by property of size.
- Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders.
- Weathering, caused by wind or water, causes larger rocks to break into smaller

rocks.
- Some Earth events happen very quickly; others occur very slowly over a long period of time.

Investigation 2:
- Rocks are earth materials and can be described by property of size.
- Rock sizes include clay, silt, sand, gravel, pebbles, cobbles, and boulders.
- Weathering, caused by wind or water, causes larger rocks to break into smaller rocks.
- Some Earth events happen very quickly; others occur very slowly over a long period of time.

Investigation 3:
- Earth materials are natural resources.
- The properties of different earth materials make them suitable for specific uses.
- Different sizes of sand are used on sandpaper to change the surface of wood from rough to smooth.
- Earth materials are commonly used in the construction of buildings and streets.
- Earth materials are used to make sculptures and jewelry.

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 will be able to:
- Use tools to observe and compare physical properties of rocks.
- Compare and sort rocks in different ways, using two or more physical properties.
- Rub rocks together and observe that they break into smaller pieces.
- Observe rocks interacting with water.

Investigation 2: Students will be able to:
- Explore a river-rock mixture containing earth material particles of various sizes and use screens to separate and group river rocks by particle size.
- Separate sand and silt using water.
- Explore the properties of dry and wet clay particles.
- Describe a number of landforms.

Investigation 3: Students will be able to:
- Explore places where earth materials are naturally found and ways that earth materials are used.
- Observe and compare different grades of sandpaper.

- Use sand to make sculptures and clay to make beads, jewelry, and bricks.
- Search for earth materials outside the classroom.

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>
Vocabulary: basalt, bubble, color, data, dull, earth material, flat, geologist, granite, group, mineral, pattern, pointed, property, rock, rough, round, sand, scoria, shape, sharp, shiny, size, smooth, sort, texture, tuff, weathering

<u>Investigation 2:</u>
Vocabulary: beach, boulder, butte, canyon, clay, cobble, delta, erosion, gravel, layer, mesa, mixture, model, particle, pebble, plain, plateau, sand, sand dune, screen, separate, settle shake, silt, sink, valley, volcano

<u>Investigation 3</u>:
Vocabulary: asphalt, brick, build, coarse, concrete, engineer, fine, harden, matrix, medium, mortar, natural resources, sandpaper, sculpture, sidewalk

How do I reinforce or build literacy or mathematics skills?

Reading Skills:

- Have students ask and answer *who, what, where, when, why,* and *how* questions about readings in reference books to demonstrate understanding of key details.
- Have students describe the connection between scientific ideas or concepts, or steps in technical procedures in a text.
- Have students use reasons to support specific points the author makes in a text.

Students will also use the following skills:
Reading comprehension, identifying main ideas, using text features, using images to explain text.

Writing Skills:
Have students use notebooks to: strengthen writing by revising, recall information from experiences, gather information from provided sources to answer a question.

Mathematical Skills:

Have students create tables and graphs, read tables and graphs, reason abstractly and quantitatively, use appropriate tools strategically.

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:

- Notebook entries
    - Part 1: Students answer: "What happens when rocks rub together?"
    - Part 2: Students will answer: "What happens when rocks are placed in water?"
    - Part 3: Students will answer: "How are river rocks the same?"
    - Part 4: Students will answer: "What are the properties of schoolyard rocks?"
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 5)

Investigation 2:

- Notebook entries
    - Part 1: Students will answer: "How can rocks be separated by size?"
    - Part 2: Students will answer: "How else can rocks be separated by size?"
    - Part 3: Students will answer: "What are the materials in the vials?"
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 4)

Investigation 3:

- Notebook entries
    - Part 1: Students will answer: "How do people use earth materials?"
    - Part 2: Students will answer: "What does sand do for sandpaper?"
    - Part 3: *See performance assessment
    - Part 4: Students will answer: "What makes clay the best earth material for

making beads?"
- Performance Assessment
    - Observe collaborative group work
    - *Part 3: Students will look at partners' sand sculptures
- I-Check (part 5)

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?

- Provide multiple representations of information
- Offer alternative ways for students to show what they know (different options for output)
- Provide optional graphic organizers
- Provide options for small group investigations and activities
- Provide written directions
- Provide visuals
- Identify roles for group work

Title: Solids and Liquids **Grade: 2**

Length: 30 Days

Enduring Understandings:

- Solids and liquids are states of matter.
- Solids and liquids have many properties that describe them and can help identify them.
- Solids have their own shape.
- Liquids take the shape of their containers and can pour/ flow.
- Solids can occur in masses and small particles. Masses of particulate can be poured.
- Solids and liquids occur naturally in the outdoors.

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

NGSS:
PSI.1A: Structure and properties of matter
ETS1.A: Defining and delimiting engineering problems
ETS1.B: Developing possible solutions.

CCSS:
RI1: Ask and answer questions to demonstrate understanding.
RI2: Identify the main topic of

	a text. RI5: Know and use text features RI7: Explain how images contribute to and clarify a text. RI8: Describe how reasons support points the author makes in a text. W5: Strengthen writing by revising and editing. W8: Gather information from provided sources to answer a question. L4: Determine or clarify meaning of unknown or multiple meaning words or phrases. L5: Demonstrate understanding of word relationships and nuances in word meanings. SL1: Participate in collaborative conversations. SL3: Ask and answer questions.

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>

- How can solid objects be described?
- What can solid objects be made of?
- Can two or more objects have the same property?
- What are the properties of a successful structure?
- Are there solid objects outdoors?

<u>Investigation 2:</u>

- How are liquids different from one another?
- How can liquids be described?

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- How do liquids change in containers?
- Where are liquids outdoors?

<u>Investigation 3</u>:

- How are these materials solid and liquid?
- How can mixtures of particles be separated?
- How do particles move in bottles?
- What is a general rule for using screens to separate a mixture of small objects?
- Are there little pieces of solid materials outdoors?

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Disciplinary Core Ideas:

<u>Investigation 1:</u>
How can one explain structure, properties, and interactions of matter?
How can engineers solve problems?

<u>Investigation 2:</u>
How can one explain structure, properties, and interactions of matter?

<u>Investigation 3</u>:
How can one explain structure, properties, and interactions of matter?

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Scientific & Engineering Practices:

<u>Investigation 1:</u>

- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Constructing explanations and designing solutions
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

<u>Investigation 2:</u>

- Asking questions
- Developing and using models
- Planning and carrying out investigations
- Analyzing and interpreting data
- Using mathematics and

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Crosscutting Concepts:

<u>Investigation 1:</u>
Patterns
System and system models
Structure and function

<u>Investigation 2:</u>
Patterns
Cause and Effect
Scale, proportion, and quantity

<u>Investigation 3</u>:
Patterns
Cause and effect

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	computational thinking ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information **<u>Investigation 3:</u>** ● Developing and using models ● Planning and carrying out investigations ● Analyzing and interpreting data ● Constructing explanations ● Engaging in argument from evidence ● Obtaining, evaluating, and communicating information	

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: Solids</u>

- Solid is one state or phase of matter
- Objects are defined by their properties
- Objects are made of more than one material
- Natural and human made objects occur outdoors

<u>Investigation 2: Liquids</u>

- Liquid is one commons state of matter
- Liquids move freely in containers
- Liquids have many properties to help identify them
- Liquids take the shape of their containers
- The surfaces of liquids are flat and level
- Liquids pour and flow

Investigation 3: Bits and Pieces

- Solid materials can occur as masses of small particles
- A mass of particulate matter can form piles and support a more dense object on its surface
- Masses of particulate can pour
- The surface of mass and of particles is not flat and level
- Particulate solids can be separated by size
- Particulate matter occurs naturally in the outdoors

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 will be able to:

- Identify properties of solids.
- Sort and identify solids based on their properties.
- Identify naturally occurring solids in nature.
- Design structures using solid materials based on properties of solids.

Investigation 2:

- Investigate properties and behaviors of liquids.
- Practice vocabulary associated with liquids.
- Draw the level of liquids in containers as the container changes positions.
- Investigate puddles in naturally occurring settings (i.e. puddles).

Investigation 3:

- Experience solid materials such as pieces, grains, and particles.
- Observe the behavior of small solids in various settings.
- Combine and separate solid materials of different particle settings.
- Compare the behavior of solids and liquids in similar settings.

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>
Vocabulary: properties, solid, flexible, rigid, color, liquid, matter, object, properties, shape, smooth, rough, texture material, engineers

<u>Investigation 2:</u>
Vocabulary: liquid, properties, bubble, flow, foam, pour, shake, thick, thin, level, surface, gravity, puddle, prediction

<u>Investigation 3</u>:
Vocabulary: different, funnel, grain, largest, smallest, particle, pile, powder, scoop, size

How do I reinforce or build literacy or mathematics skills?

Reading Skills:

- Have students ask and answer *who, what, where, when, why,* and *how* questions about readings in reference books to demonstrate understanding of key details.
- Have students describe the connection between scientific ideas or concepts, or steps in technical procedures in a text.
- Have students use reasons to support specific points the author makes in a text.

Students will also use the following skills:
Reading comprehension, identifying main ideas, using text features, using images to explain text.

Writing Skills:
Have students use notebooks to: strengthen writing by revising, recall information from experiences, gather information from provided sources to answer a question.

Mathematical Skills:
Have students create tables and graphs, read tables and graphs, reason abstractly and quantitatively, use appropriate tools strategically.

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:

- Notebook entries
    - Part 1: Students will answer: "How can a solid object be described?"
    - Part 2: Students will name materials from which objects are made
    - Part 3: Students will answer: "Can two or more objects have the same property?"
    - Part 4: Students will answer: "What are the properties of a successful tower?"
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 5)

Investigation 2:

- Notebook entries
    - Part 1: Students will answer: "How are liquids different from each other?"
    - Part 2: Students will answer: "How can liquids be described?"
    - Part 3: Liquid Level in a Bottle Sheet/ Falling Bottle Puzzle
- Notebook entry share
- Performance Assessment
    - Observe collaborative group work
- I-Check (part 4)

Investigation 3:

- Notebook entries
    - Part 1: Students will answer: "Are these materials solids or liquids?" based on particulate materials from investigation.
    - Part 2: Students will answer: "How can mixtures of particles be separated?"
    - Part 4: Students describe a rule that could help someone separate mixture of materials of two sizes.
- Performance Assessment
    - Observe collaborative group work
- Whole Class Wrap up:

    - Part 3: Create and complete liquid/ solid particles compare/contrast chart with students.
- I-Check (part 5)

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?

- Provide multiple representations of information
- Offer alternative ways for students to show what they know (different options for output)
- Provide optional graphic organizers
- Provide options for small group investigations and activities
- Provide written directions
- Provide visuals
- Identify roles for group work