**Saturday Science – Fall 2015**

**Lesson Plan**

**Soil**

**What is in our soil?**

**K-2**

 **Week One**

A) LEARNING OBJECTIVES

* The students will be able to identify what soil is, what it is made up of, and will explore three types of soil: humus, sand, and clay.
* Students will have a basic understanding of soil and its components

B) STANDARDS (see<http://www.doe.in.gov/standards/science>)

● ***Content (Core Standards and sub-standards)***

1.2.3 Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.

1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.

● ***Process (Nature of Science and Design)***

* Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.
* Conduct investigations that may happen over time as a class, in small groups, or independently. Generate questions and make observations about natural processes.
* Make predictions based on observations.
* Discuss observations with peers and be able to support your conclusion with evidence.
* Make and use simple equipment and tools to gather data and extend the senses.

C) MATERIALS

* Cups for soil (24)
* Humus x10
* Clay x10
* Sand x10
* Rocks x10
* Backyard soil x10
* Combo of humus, clay, and sand (ideal soil) x4
* *What is Soil* Book (Molly has already)
* Sandwich-sized zip lock bags (30)
* 6 half-sheets of butcher paper or other large pieces of paper
* Large whiteboard that can be carried outside
* Small sand shovels (8)
* Magnifying glasses (16)
* Buckets (4)
* Sifter (4)

 D) TEACHER CONTENT KNOWLEDGE

Teachers must be familiar with the properties of different types of soil and be able to identify them. Teachers should be comfortable using outdoor tools: shovels, sifter, magnifying glasses. Teachers should know that soil is a topic taught in Indiana for the state’s agriculture.

E) REFERENCES
Rosinsky, Natalie M., & Boyd, Sheree (Illustrator). (2003). *Dirt: The Scoop on Soil*. Picture Window Books.

\*We are making all other handouts ourselves

F) DESCRIPTION OF YOUR LESSON

\*\*Prior to the lesson, we will talk to the students about classroom management, what is expected, and what they will be learning\*\*Expectations about the chairs\*\*

Expectation Chart-- what should our class look like? what should our class sound like?

**Introducing and Investigating Soil -**

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|  **ENGAGE:** Introduce book *Dirt: The Scoop on Soil*, ask what they notice about the cover, activate prior knowledge. The book hits on the main components of soil and what strategies are used to determine the type of soil. This story session will integrate reading and science wonderfully so that the students can be introduced to what soil is, or familiarize themselves with it. After reading the book, we will hold a brief discussion to hear the student’s thoughts. I will prompt them with questions such as: o “Can someone tell me about a time that they interacted with soil?” o “What else can you tell me about soil?” o “What are you interested in learning about soil?” |
| **EXPLORE** The students will then be sent back to the tables to investigate soil samples. On each of their tables will be five small bags of different types of soil (Ziploc bags to prevent messes). The soil samples on their desks will be 1) Sand Soil 2) Topsoil (Humus Soil) 3) Clay Soil 4) Rocks 5) and Backyard soil. The students will get 5 minutes to observe the five samples and each table will fill out their observations on a large sheet of paper (these will be provided). \*\*It will be made very clear that the students should keep the bags shut. Beforehand, we will demonstrate how to properly investigate the soil samples while keeping the bag closed. We will show them how they can use their eyes to see and their hands to feel texture outside of the bag. We will refer back to the book in order to make connections and use “research” to make predictions.   |
| **EXPLAIN** We will come together as a class to make connections between each table’s observations. Students will explain the different characteristics that they found. A class Soil Characteristic chart will be made to summarize ideas and findings. We will then refer back to the book and have the students make connections and compare and contrast what the book said and what the students said.   |
| **ELABORATION** Throughout each of the lessons, the students will fill out an Anchor chart that will elaborate on their knowledge of soil. The students will use their notes from this initial lesson to fill in the chart the following weeks. This chart will serve as a source of information for the kids to always build on to with their newfound knowledge.  |

**Soil in Our Natural Environment**

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| **ENGAGE:** We will go outside and the students will be given 5 minutes to run around (within boundaries) and explore soil in our natural environment. We will challenge them to look for the different types of soil they explored in our first activity.   |
| **EXPLORE** The students will be split up into groups of 6 with 1-2 teachers in each group. They will be told about 4 regions around the area that they get to explore. They will use materials (magnifying glasses, shifters, shovels, etc.) to explore the 4 regions and detect what soil (or soils) is/are located in the area. They will be encouraged to use the soil book for guidance if needed. One of the leading teachers will have it on hand.   |
| **EXPLAIN** Groups of students will all come together (inside or outside weather permitting) with the teachers and compare what they observed in the outside soil with what they observed in the dirt samples in the classroom. We will have our white board of the observations from the classroom   |
| **ELABORATION** Using the knowledge the students gained from the book and first activity, the students will be extending their knowledge into the natural world.   |

**Beginning the Experiment**

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| **ENGAGE:** After being outside, we will come back in and introduce their science journals. They will be using these to record/draw their observations throughout the five weeks of the seed they will be planting. We will have the students decorate the front and back.   |
| **EXPLORE** We will explain the experiment we will be starting and how it works. Students will then start exploring the different soils; each table will be working with a different type. Each student will have a plastic cup that the soil will be in. They will put their seed down in the soil. The teachers will be walking around and asking questions and having the students predict what will happen to the plant within the week.  |
| **EXPLAIN** We will have a group discussion about this experiment and have students explain why we are putting the seed in soil. We will refer back to the book to decide which soil the book says is best for plants to grow. We will then ask the students to draw a picture in their journal of what the cup/plant looks like on week 1, and to draw a picture of what they think will happen to the seed over the next week.   |
| **ELABORATION** While having the group discussion we will have students explain why they think seeds to need soil, water, and light to grow. We will also have them make connections and see if they know of anything else that started off as a seed.   |

 G) EMBEDDED FORMATIVE ASSESSMENT (the 5th “E”)

* We will assess the students’ knowledge through the class discussion. We will also assess them based on their prediction of what will happen to the seed throughout the week. For this first lesson, the students’ understanding will be evaluated by having group and one-on-one discussions with the students. We will use informal assessments. During the first part of the lesson, as the book is addressing the different types of soil, we will pause and ask the students questions. We will check for understanding by gauging their reactions and responses. We will also use the method of, “Put your thumb up if you understand and down if you don’t”. During the investigation, we will walk around and confer with student groups and individual students. In addition to conferring, we will also ask questions to the entire class and say, “turn to a partner and talk about the answer”. We will listen for responses and note who understands and who does not. Lastly, we will collect their observation charts to look over after the lesson is over. These papers will not be graded; we will use them to check for understanding. This way, if there is confusion, the next lesson can be adjusted to better fit their needs.

H) GEARING UP/GEARING DOWN

**1. Gearing up:** High achieving students will be asked to record their group’s observations when investigating the bagged soil samples in the first activity. When students have planted their seed in the last activity, they may be asked to write their observations in addition to drawing a picture, using the words that were compiled between groups’ observation sheets.

**2. Gearing down:** Students may draw pictures in lieu of sentences when recording observations. Supporting teachers may help students recognize properties by asking thoughtful questions.

 **Week Two**

**Soil: K-2**

**Is my soil sick?**

A) LEARNING OBJECTIVES

* Students will be able to tell the difference between the different types of soils; soil from the Jordan River (clay), soil from outside of the education building (backyard soil with less water access), and soil from the marsh area (backyard soil).
* Students will be able to test the soil to see if it is sick by testing the nitrogen, pH, phosphorus, and potash/potassium and share with their findings with their table.

 B) STANDARDS (see<http://www.doe.in.gov/standards/science>)

● ***Content (Core Standards and sub-standards)***

K.3.3 Describe and compare living plants in terms of growth, parts, shape, size, color, and texture.

1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.

1.2.3 Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.

 ● ***Process (Nature of Science and Design)***

1. Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.
2. Conduct investigations that may happen over time as a class, in small groups, or independently.
3. Generate questions and make observations about natural processes.
4. Make predictions based on observations.
5. Discuss observations with peers and be able to support your conclusion with evidence.
6. Make and use simple equipment and tools to gather data and extend the senses.

C) MATERIALS

* 2 Soil Test Kits
* Different types of soil
	+ Jordan River soil
	+ soil close from school of Ed
	+ marsh area right outside school of Ed
* 12 Shovels (hand trowels)
* 6 Buckets
* Distilled Water (50 cups)
* 24 pipette
* Crayons
* Coloring Sheets
* Book for a read aloud in opening activity
* Lawn game possibly (break outside)
* Plant Journal
* Worksheet (2 copies of each soil chart)

**Time:** \*during the soil test there will be a 10 minute wait period for the students and the teacher will read a book

9:30 to 10 Collecting soil and mixing up soil solutions. (The teachers will have a pre made solution that has already been sitting for the required 30 minutes)

\*1 cup soil and 5 cups of water mix (if we go outside)

10 to 10:20 rotation 1 (Jordan River soil tests/plants observations(Marsh)/extra activity(School of Ed)) \*\***Each lead teacher is in charge of a group, i.e. Jordan River Group, so we will all lead each part of the rotation and not just one activity three times.\*\***

10:20 to 10:40 Rotation 2 (extra activity(Jordan) /plant observations(School of Ed)/ Marsh soil test)

10:40 to 11:10 Snack break/ video

11;10 to 11:30- Rotation 3 (Plant observation(Jordan) /school of ed soil test/extra activity(Marsh))

11:30 to noon- explain phase (book if time)

D) TEACHER CONTENT KNOWLEDGE

 The teacher should be able to distinguish the different types of soils used, and recognize certain properties of the soil (jordan river soil, marsh area soil, backyard soil). The Jordan river soil will be darker in color, similar to clay, and easily absorb moisture. Marsh area soil will be nutrient rich, have a neutral PH level in comparison to the other types of soil. Ph is a measure of the acidity of the soil. This can be adjusted and monitored. The lower the number, the higher the acidity. If the soil is over a ph of 7, the alkalinity will increase. This means that the soil will more easily neutralize the acidity of the soil. Nitrogen helps stems and leaves grow. If there is too much nitrogen it will dry out the leaves. Phosphorous makes plant roots grow strong and healthy. If there are too little the leaves, they will be blue-grey. If there is too much potassium, the plant will take in too much water, if there is too little, the plant’s leaves will be yellow in color.

Backyard soil will vary depending on the source of the soil. In most cases it will have higher oxygen levels due to the earthworm population in the soil, and the vegetation growing in the area. Teachers will be able to use the sick soil kits and be familiar with how to use them as a tool in the lesson. The Teacher will have knowledge about what the test results mean, and be able to identify and describe what “sick soil” is. (balance of nitrogen phosphorus, potash, and proper PH levels) Sick soil will have unbalanced levels of these elements.

E) REFERENCES

* Rapitest Soil test Kit- Luster Leaf Products Inc
* Bloom, A., & Jones, N. (2012). *Little sweet potato.* New York: Katherine Tegan Books.

F) DESCRIPTION OF YOUR LESSON **\*\*Begin lesson by having students water their plants and make observations in their journals**

 To make sure there is enough time,

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| **ENGAGE** * Begin the lesson with a class discussion about what they observed last week when they went outside and saw the different types of soil around the education building. Ask the students questions like “did you see any plants or other forms of life in the soil we dug up?” Introduce the topic of “sick soil” and how plants need food (nutrients) for healthy growth. Students will start the explore phase by going outside to the three spots in their soil groups. They will dig up one sample of soil from each spot and bring their soil back up to the classroom to test.
 |
| **EXPLORE*** Students will work in their table groups. Each group will have their own specific soil they will become experts on. Because there are three samples, and there are six groups, there will be two groups looking at the same soil type. (Jordan River, marsh soil, and backyard soil)
* Students will be participating in three rotations due to time so they will be able to do each soil test. Rotation 1 would be the Jordan River group, the first two tables will stay in the classroom and add the water and soil to their testing container. They will have to wait ten minutes for the soil to settle and develop color. During that ten minutes a teacher will be reading the book, *Little Sweet Potato,* and having a discussion about the book with the students. After the ten minutes the students will record their data down on their worksheets. We are providing a chart for the whole class that has smiley faces for where the healthy numbers are, and sad faces for the unhealthy numbers. Students will record the number that the soil test shows and also a sad/happy face depending on their findings and the class chart. After all students at that table record their findings, they will add up how many happy faces and sad faces they have and write it at the bottom of their worksheet. During this 20 minute rotation, the second group (Marsh Soil) will be watering their plants and recording their observations in their journal. They can draw and write down their observations, and any extra time they can use to finish decorate the journal covers. During this same 20 minute rotation, the third group (School of Ed Soil) will be either going outside if the weather permits or going to the windows in the front atrium of the ed building and drawing what they see outside with the soil and the plants growing in the soil as a third activity.
* During Rotation 2 the Marsh soil group will be doing soil tests, School of Ed soil group will be watering their plants and doing their observations, and the Jordan soil group will be doing the art activity.
* During Rotation 3 the School of Ed soil group will be doing soil tests, Jordan soil group will be watering their plants and doing their observations, and the Marsh soil group will be doing the art activity.
* Record data for the four tests on their group worksheet (see attached). The tests will be rotated between the groups so that all groups get a chance to test for the each one (P, K, N, PH). After all groups have gone through the rotations we will come back together to fill out the class data chart for each type of soil, and discussing how many smiley/sad faces there are per type of soil.
* The teachers will have a class data chart prepared on the whiteboard for the students to refer to and fill out together.
* This will occur over the three rotations matching the timeline.

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| **EXPLAIN (CER)*** Class discussion answering the focus question after looking at their data on the class chart (which types of soil are “sick” and why)
* Students can add to their own individual charts anything that they missed that was included in the class chart
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| **ELABORATION*** Refer back to the book read during the soil tests and compare how our findings relate to the story.
* Review the different types of soil they have seen in the past two lessons and properties of the soil that they learned about
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G) EMBEDDED FORMATIVE ASSESSMENT (the 5th “E”)

 During the discussion at the beginning of the lesson, the teacher will allow the students to openly discuss what they thought and make note of prior knowledge, and what they retained from previous lessons. While the students are outside collecting their specific soil types the teachers with those groups will be monitoring participation and asking the students: What do you see? Why do you think there are certain plants growing here? Will all plants grow here? Which soil do you think will grow the most plants? As the students are doing the test kit, the teachers will be monitoring students’ understanding and progress. They will ask questions like: “what do you notice about the color on the tests? Do you think that color makes the soil healthy or sick? Can a soil be considered sick if it only grows certain plants? The main part of the assessment will be during the discussion of the healthy or sick soil chart at the end. We will listen to responses collect the group data and see what they have learned.

H) GEARING UP/GEARING DOWN

**1. Gearing up:**

For students who are not challenged by the activities in the lesson, we will have them write descriptions of their observations on their charts, discussing what specific properties of the soil made it sick or not. This is a bit more challenging than having them draw pictures of their observations because they will have to use descriptive language and explain what their data means. If this is still not challenging enough, we could look deeper into the properties of the soil that are included in the soil test kit (P, K, N, PH).

**2. Gearing down:**

If students are having trouble with each table doing a different soil sample, we will narrow it down to the whole class only testing one soil together. We will do all four tests so they can see how the tests work. After the whole class does the one type of soil as a whole they will be able to do one of the two soil types left at their desks and each member of the table will be responsible for one test. If the students do well with the different types of soils but we need to still gear down we will have each table just responsible for one of the soil tests. Then they can see all of the tests when we come together.

**Week Three**

**Soil: K-2**

**What is Soil Used For?**

**Learning Goal(s)**

* Students will be able to identify the main purposes of soil.
* Students will also be able to claim which soil is the most efficient to grow plants.

**Focus Question - What is soil used for?**

 A) LEARNING OBJECTIVES

* Students will learn what is the best type of soil to grow plants by recording information in their plant charts about the number of leaves, height of plants, etc.
* Students will learn that many of the things they use in everyday life come from plants/soil by sorting through the list of materials that they are given.

B) STANDARDS

Standard 2: Earth and Space Science

Core Standard:

Observe, describe and ask questions about soil components and properties.

* 1.2.1 Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.
* 1.2.2 Choose, test and use tools to separate soil samples into component parts.

1.2.3 Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.

Standard 3: Life Science

Core Standard:

Observe living organisms, compare and contrast their characteristics, and ask questions about them.

* K.3.1 Observe and draw physical features of common plants and animals.
* K.3.2 Describe and compare living animals in terms of shape, texture of body covering, size, weight, color and the way they move.
* K.3.3 Describe and compare living plants in terms of growth, parts, shape, size, color and texture.
* 1.3.2 Observe organisms closely over a period of time in different habitats such as terrariums, aquariums, lawns and trees. Draw and write about observations.

Standard 4: Science, Engineering and Technology

Core Standard:

Determine properties of natural and man-made materials and their most important uses.

* 1.4.1 Use all senses as appropriate to sort objects as being composed of materials that are naturally occurring, human made or a combination of the two.

Process (Nature of Science and Design)

* Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.
* Conduct investigations that may happen over time as a class, in small groups, or independently.
* Generate questions and make observations about natural processes.
*

C) MATERIALS

* 2 carrots
* 1 pair of shoes
* 2 pieces of paper
* 2 tshirts
* 2 tree branches
* 2 leaves
* 2 coffee beans
* 2 chip bags
* 2 remotes
* 2 sunglasses
* 2 water bottles
* 2 computers
* 2 paper towels
* 2 cups of applesauce
* 2 squirts of aloe labeled aloe in 2 separate cups
* 30 magnifying glasses
* 24 copies of plant recording chart to glue in plant journals
* plant journals
* markers/crayons
* 24 chart paper for their sorting activity
* 24 pencils
* 12 one foot rulers with metric (mm and cm)
* masking tape

D) TEACHER CONTENT KNOWLEDGE

Soil is used in farming which it serves as a nutrient base for plants. It helps to provide water and minerals to plants to make them grow healthy. Soil varies between different regions which also depends about which types of soil grow there. Soil can tell us the acidity of the ground and from that we can then determine what crops will grow more efficiently.

Soil is also a crucial role in purifying and filtering water. After it rains, some water enters the ground and becomes groundwater. As the water moves through different areas such as, forests and wetlands, many pollutants are removed. Pollutants are filtered out by the soil and organisms in the soil.

 Soil is important to humans because it gives us the foundation for our lives. Our food, water, and clothes. Some people even make their houses out of soil, specifically clay. These houses are called adobes.

E) REFERENCES

* Primarily Plants - AIMS Activities - Grades K-3
	+ Used to bounce ideas back and forth for the basis of our lesson
* <http://dessainducil.blogspot.com/2011/01/soil-and-its-uses.html>
	+ Used for our teacher content knowledge
* Downloaded October 20, 2015: <http://dessainducil.blogspot.com/2011/01/soil-and-its-uses.html>
	+ teacher content knowledge

 F) DESCRIPTION OF YOUR LESSON

 Plants - During each of these lessons, all other IU teachers will be placed at one table each and will guide the students through the activities and will prompt discussion. When it is whole class discussion, the IU teachers will be monitoring behavior.

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| **ENGAGE** In order to engage the students, we ask them for some predictions about what happened to their plants over the course of a week. We will then have them pull out their plant journals and we will talk about what we have seen thus far in the plants. We will introduce that we will be investigating which type of soil grew the best plants. We will have to have a conversation about what is the “best”. We will incorporate what plants look the healthiest and tie that into the discussion about the “best”.  |
| **EXPLORE** We will then have each soil type with the plants at one of the 6 tables. We will assign groups to each of the 6 stations. We will have each group visit each station and observe the soil samples and possible plants. We will have them discuss why they think the plants grew/did not grow in each soil. We will prompt them with discussion about what factors of the soil contributed to their growth or lack of growth. They will use their science worksheets to measure number of leaves, heights, color of the plant, do you see roots, and amount of buds.  |
| **EXPLAIN**  We will then come back together as a class to make a class chart and go over data. We will prompt the students to “talk like scientists” and use sentences such as, * “I feel like this soil is the best because…”
* “I observed this so my hypothesis was correct…”
* “I do not agree because…”
* “I agree with you because…”

 We will summarize the data together and will again talk about what soil is the best for different purposes.  |
| **ELABORATION** We will go into depth about how claim and evidence play a specific role in what we were doing. We will discuss with the students how they made a claim about which soil would grow the healthiest plants and will tie in how they use their evidence collected to support their claim. We will ask them to talk like scientists to tell us their claim and use evidence to support their claim. In addition to this, we will have the students make predictions in their journals about what they think their plants will look like after two weeks. We will not see the soil for two weeks since the next week we are going on a field trip, so this will be a great way for the students to start thinking about what happens when plants grow and what they might turn into.  |

Sorting Activity: During each of these lessons, all other IU teachers will be placed at one table each and will guide the students through the activities and will prompt discussion. When it is whole class discussion, the IU teachers will be monitoring behavior.

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| **ENGAGE** We will begin this lesson by prompting the students by asking what they use soil for in their own lives. We are assuming that they will say things like, “play in the mud” and “make pies with it”. We will tell the students that there are many other uses for soil and that we will are going to explore the many benefits! We will then introduce the activity to them where we will be guessing what originated, or came from, soil/plants.   |
| **EXPLORE** We will be doing an activity where we will have many different objects on each table (we will have 3 stations with two tables each representing one station) that may or may not have originated from soil. We will split the students up into groups of 4 and they will rotate through the activity and look at each of the items and hold a discussion about whether or not the items were made from soil or not. They will be prompted to think back to what the item was in its natural state and then decide if soil partook in the process. They will fill out a sheet (listed below) where they will identify if each item was from soil.  |
| **EXPLAIN** In either partners or singles (depending on time) groups will choose an item from one of the tables and will place it in a yes/no chart made out of tape in the center of the room. This will be an engaging way to talk about each item as a class. We will encourage the students to talk about why they think it goes in that category and to talk as scientists. The students will respond to their classmates’ reasoning as scientists as well and will say whether or not they agree and why.  |
| **ELABORATION**  We will then prompt the students with the questions, “What would happen if there was no soil or plants?”. We will have them discuss the repercussions in their groups and will ask for their ideas. We will use this as a way to summarize the day and leave the students with important takeaways, primarily, why soil is so essential to our lives as humans. It will be a great lesson before the next lesson, which is why soil is important for insects.  |

 G) EMBEDDED FORMATIVE ASSESSMENT (the 5th “E”)

● At the beginning of the lesson, we will ask the students how soil and plants have impacted their life. We will check for understanding by gauging their reactions and responses. We will also use the method of, “Put your thumb up if you understand and down if you don’t”. We will assess the students’ knowledge through the class discussion. For the first activity, the students’ understanding will be evaluated by having group and one-on-one discussions with the students at their table. We will use informal assessments. In addition, they will be evaluated during the class discussion where we create the class chart based on their recordings and observations. As a class, we will discuss which type of soil is “best” and will talk about what best actually means. During the investigation of the materials made from soil or not made from soil, we will walk around and confer with student groups and individual students. In addition to conferring, we will also ask questions to the entire class and say, “turn to a partner and talk about how you came about that answer”. We will listen for responses and note who understands and who does not. Lastly, we will collect their Yes/No charts to look over after the lesson is over. These papers will not be graded; we will use them to check for understanding. This way, if there is confusion, the next lesson can be adjusted to better fit their needs.

H) GEARING UP/GEARING DOWN

**1. Gearing up:** If students are finding the lessons easily within their ability reasoning teachers will ask students to think about why they think the way they do about the particular part of the lesson. Teachers can also have students make a more detailed observation and have them make claim and evidence statements in their journal.

**2. Gearing down:** Students can “phone a friend” when working to talk out what they think. Teachers will monitor student talk and ask questions about student thinking to help the discussion lead to the correct conclusion. Questions in the Explore phase will use pictures and drawings to support English language learners and those that are not yet reading.

J) Timeline

9:30-9:35: recap from last week and announcements

9:35-9:50: talk about what we have seen thus far from plants/hand out plant journals

 read excerpt from Dirt, introduce that we will be investigating about which type of soil grew the best plants. Make a chart about “What does the best plant mean?”

9:50-10:25: As a class model one type of soil and how the students will collect the data on their charts. Then the students will rotate through the other 5 stations to fill in their plant data table. They will spend 6 minutes at each station.

10:25-10:35: go over the data they found and synthesize this in a class chart

10:35-10:40: Make a claim from the evidence from the class chart together as a class about what is the best soil to grow plants in

10:40-11:10: snack/bathroom break

11:10-11:20: Engage students with “What do you use soil in your life?”

11:20-11:35: Student go through the sorting activity through each of the 3 stations. Spending 5 minutes at each station.

11:35-11:45: Each student (or pairs if we are running short on time) and the students will place items in a chart on the floor. They must also explain why they are putting their item in a yes/no category.

11:45-11:55: “What would happen if there was no soil or plants?”

11:55-12:00- wrap up/reminders

**Week Four**

**Soil: K-2**

**Hilltop Garden**

**Focus Question: What lives in our soil?**

1. LEARNING
* Students will understand that many organisms live in our soil by looking through the soil and finding different types of bugs in our soil.
* Students will understand that plants and organisms break down to create compost that becomes soil by walking through the compost stations at Hilltop and seeing it at the different levels of composition.

B) STANDARDS

* ***Content (Core Standards and sub-standards)***
	+ *1.2.4 Observe over time the effect of organisms like earthworms in the formation of soil from dead plants. Discuss the importance of earthworms in soil.*
	+ *1.3.1 Classify living organisms according to variations in specific physical features (e.g., body coverings, appendages) and describe how those features may provide an advantage for survival in different environments*
* ***Process (Nature of Science and Design)***
	+ Use a scientific notebook to record predictions, questions, and observations about data with pictures, numbers, or in words.
	+ Generate questions and make observations about natural processes.
	+ Make and use simple equipment and tools to gather data and extend the senses.

C) MATERIALS

* 24 magnifying glasses
* coloring pages
* crayons
* markers
* 24 clipboards
* 24 pencils
* 24 of each of the 2 worksheets
* 2 expo markers
* laptop (Sam)
* Book *Wiggly Worms at Work*

MATERIALS PROVIDED BY HILLTOP

* 24 small shovels
* gloves (for the students to use while digging in the dirt)
* 6 containers for the soil samples for bug activity
* Bug worksheets

D) TEACHER CONTENT KNOWLEDGE

About 90% of all insects spend some part of their lives in the soil. This includes a variety of good and bad bugs. Good bugs, which help to provide a variety of nutrients to the soil. While bad bugs can cause damage to the plants roots, bulbs, etc.

There are a variety of bugs that fall into one of these categories. There are thousands of insects in the soil, and are an effective substitute for chemical pesticides and have no harmful side effects to other bugs that live throughout the soil.

One of the core skills of a scientists is to know how to make a good observation. Making an observation requires you to use your senses to look at something in the world around you. After using your senses, a scientist should record the information they observed. While making observations you can use tools and instruments to help you make detailed observations. Any data that is recorded during an observation can be used in the scientific process.

A scientific observation is a main point of the scientific process. A scientific process requires you to use observations and to help you form a claim based on your evidence. Reasoning through your claim and evidence helps to connect to the science behind the observations made during the experiment.

E) REFERENCES

* Soil Pests
	+ used in our teacher content knowledge
	+ retrieved on November 1, 2015
	+ <https://greenmethods.com/soil-pests/>
* Soil Dwelling Pests
	+ used in our teacher content knowledge
	+ retrieved on November 1, 2015
	+ [http://www.buglogical.com/soil-dwelling-pests](http://www.buglogical.com/soil-dwelling-pests/)
* Scientific Process/Observations
	+ used in our teacher content knowledge
	+ retrieved on November 3, 2015
	+ <https://explorable.com/scientific-observation>
* *Wiggly Worms at Work*
	+ used in our lesson
	+ Pfeffer, W. (2004). *Wiggly worms at work.* New York, NY: HarperCollins.

F) DESCRIPTION OF YOUR LESSON

Bug Search Activity - During each of these lesson, all of the other teachers will be placed with one group and will guide the students through the activities and will prompt discussion. When it is whole class discussion, the teachers will be monitoring behavior.

|  |
| --- |
| **ENGAGE** In the engage phase of the lesson, we will have the students recall back to when we tested if our soil was healthy or not. We will ask them what is in our soil when it is healthy. When we tested our soil, a few students threw out that our soil is healthy if worms are in it, so hopefully some students will recall that information. If the students do not recall this information, we will tell them that the healthier our soil is, the more life we will find in it, whether the life be plants or or different organisms like decomposers. We will read a short sample from the book *Wiggling Worms at Work*. We will read an excerpt from pages 6, 10, 12, and 30. These pages help explain what worms do for our soil and our plants to help them grow better. We will explain to the students that we are going to be digging through small samples of dirt from two areas of the garden and looking for different decomposers in our soil samples. We want the students to focus on what is in our soil, and does it make our soil healthier? |
| **EXPLORE**Students will be divided into six groups of four and each group will be given one container of soil and a handout with pictures of the decomposers that could be found in the soil (this handout is provided by Hilltop). Students will be given compost soil or garden soil. Students will use this handout as a reference when trying to figure out what kind of decomposers are in their soil sample. Each group will be given a worksheet to record the number of bugs that they find in each soil sample on their group worksheet. Each group will have to share the compost soil between the 4 of them so all students get the chance to look at the compost soil. The students will be given gloves, shovels, and hand magnifying glasses to look at the compost. While the students are looking through the soil we will ask them questions about how many decomposers they are finding, and how do they think this affects the soil and plant life.  |
| **EXPLAIN**  After the students have gone through their soil samples we will have the students share out the different types of bugs they found in their soil type. We will record the number of each bug that a group found on the board, in a class chart. We will compare the two soil types, compost soil and garden soil, and the life in the soil to see which soil is the healthiest. **Evidence:** Students will take their data they collected from the explore phase and add it to the class chart. We will add up the amount of each decomposer so students can see the relationship between the two soil types and also the relationship of all of the decomposers.**Reasoning:** Students will use the book *Wiggling Worms at Work* to help them create their reasoning for their claim. The book will give them examples to how worms help soil and also how worms help plants grow. I.e. worms create tunnels in the soil that allows water and air to flow through the soil (6), the food worms digest creates worm castings that is good plant food (10), and worms pull down dead leaves and plants that can send out roots and new plants begin to grow (12).**Claim:** Worms and other decomposers make our soil healthier and help plants grow bigger and better.  |
| **ELABORATION** After discussing if this particular soil is healthy or not, we will bring up the other soils that we tested two weeks ago; Jordan River soil, marsh soil, and School of Education soil and ask the students what kind of life they think is in that soil. We will remind them which soil was the healthiest and which was the least healthy to help with the discussion. We will ask them if they think the same amount of decomposers are in each soil or if they think one specific soil would have the most living in it. This will help bring connections back to previous lessons, and will also help with them making connections with their own plants and how healthy their particular soil might be.  |

 Observation and Scavenger Hunt

During these lessons, the teachers will be divided up so that they will have approximately 4 students in their group. There will be 6 groups in this activity. 3 of the groups will be completing the observation of the tea leaf activity while the other 3 groups will be completing a scavenger hunt around the property. The IU teacher will guide students through the activities and will prompt discussion. When it is whole class discussion, the IU teachers will be monitoring behavior.

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| **ENGAGE** To engage the students, we will prompt them with discussion about how to make good observations. During this discussion we will brainstorm the different ideas of using smell, touch, sight, taste, and hearing. The teacher will introduce that we are going to use these things while exploring different herb tea plants and on a scavenger hunt on the property. We will remind the students that they are going to keep track of all of their information about the plants on their worksheets that we will give them. We will also allow them a place to write questions that they might have. We will walk through an example of how to make a good observation using all of your senses and to record everything that they see in their journals.We will also introduce that we will be dividing the students in half. While half of them are creating observations the other half of them will be going on a scavenger hunt around the property. We will switch half way through so that everyone will get to complete both activities.  |
| **EXPLORE** The students will be divided in 6 groups of 4 with a teacher in each group. 3 groups of students will be completing the observation of plants while the other 3 groups will go on a scavenger hunt around the property. Students in the observation of tea plants:They will be given a worksheet where they will record their information on (see handouts below for the actual worksheet). The students will investigate the different plants by looking, touching, smelling, and tasting them. We want them to record their detailed observations on the worksheets provided. Some information that we want to see recorded is what it smells like, what it feels like (bumpy, smooth, etc.), what does it taste like (sweet, bitter, etc.), and what it looks like (students will be given crayons to color what they see). They will also be given hand lenses so they can look more closely at the different parts of the plants. There will also be a section at the bottom of the worksheet in which the students can make notes or pose questions that they might have regarding what they are observing. Students on the scavenger hunt:The students will be given a worksheet (which can be found below in the handouts section) and will be trying to find a variety of different plants throughout the gardens. Some of the examples of what they will be trying to find are “a plant that starts with F”. The students will be required to draw it and write one fact about it before they find another plant. All plants are labeled throughout the gardens.  |
| **EXPLAIN** In coming back to the classroom to facilitate discussion we will begin with encourage the students to talk as scientists and use prompts such as* “I observed this….”
* “I found out this….”
* “I agree with you because….”
* “I do not agree with you because….”
* “I observed this so my hypothesis was correct/incorrect because….”

We will summarize what the students found both in the scavenger hunt and in the observation of tea plants. We will talk about what makes good observations and how the different bugs in the soil helped the variety of plants grow. If there is time we will allow the different groups to sit down and show each other what they discovered in the observation of tea plants and in the scavenger hunt. We will prompt them to ask questions like scientists so that they can dig deeper into the information.  |
| **ELABORATION** To elaborate on the students findings we will go through the other questions or observations that the students noticed while completing the two activities. We will use this to form questions together that we could investigate or discuss based off of our observations. This allows the students to ask any questions that they might have and clarify any information as well.  |

G) EMBEDDED FORMATIVE ASSESSMENT (the 5th “E”)

 At the beginning of the lesson, we will ask the students the students to remember how we knew if our soil was healthy or not. We will ask then if they know what is in soil to make it healthy. We will allow some time for discussion with partners to see if they can brainstorm different things. This will allow us to see if the students can make connections with previous content that was learned. For the first activity, the students will be evaluated by having group discussion with the students at their tables. During our class discussion we will use their worksheets as a place to reflect on and use that stimulate their understanding of the concept through class discussion. In our second activity we will use discussion in the small groups while investigating as a form of informal assessment. During our whole class discussion upon coming together we will prompt the class to “turn and talk to a partner about what you discovered”. We will listen to the class responses in their partner groups and use this as a starting point in our whole class discussion when we come back together. Finally we will also collect all of their worksheets to reflect upon when the lesson is over to see if we need to touch upon any material in our next lesson so we can adjust to the needs of the students.

H) GEARING UP/GEARING DOWN

**1. Gearing up:** To gear up the lesson we will provide students with some information about the different bugs they found in the soil and what those bugs specifically do in the soil to help it become healthy soil.

**2. Gearing down:** If the information seems too difficult for students to grasp we will only have the students complete some portions of the worksheets. Some sections that we will leave out will be finding a fact about the plant and recording questions or observations. We will have the teacher try to facilitate these in a whole class discussion rather than in individual groups.

I) TIMELINE

9:30-9:40: recap from last week, announcements, and introduce the people their that work at Hilltop.

9:40-9:50: introduce the lesson and make connections on what makes our soil healthy and introduce the bug activity

9:50-10:25: The students will investigate what different types of bugs that they see in the soil and record this information on the worksheets that will be given to them

10:25-10:40: go over information about what they found in the soil

10:40-11:10: snack/bathroom

11:10-11:20: engage in the observations of plants

11:10-11:45: explore the tea plants/scavenger hunt

11:45-11:55: explain what the students observed and go through any questions that they might have.

11:55-12: wrap up/reminders

**Week Five**

**Soil: K-2**

**Erosion and Soil: Keeping Our Soil Safe**

**Focus Question - How does soil type impact erosion?**

A) LEARNING OBJECTIVES

* Students will understand and be able to define what erosion is, and how it affects the soil
* Students will understand what forces in nature cause erosion and how running water moves earth and creates new landforms.

B)     STANDARDS (see<http://www.doe.in.gov/standards/science>)

* ***Content (Core Standards and Sub-Standards)***
	+ Core Standard: Observe, describe and ask questions about soil components and properties.
* 1.2.1  Observe and compare properties of sand, clay, silt and organic matter. Look for evidence of sand, clay, silt and organic matter as components of soil samples.
* 1.2.2  Choose, test and use tools to separate soil samples into component parts.

1.2.3  Observe a variety of soil samples and describe in words and pictures the soil properties in terms of color, particle size and shape, texture, and recognizable living and nonliving items.

Standard 4: Science, Engineering and Technology

Core Standard: Determine properties of natural and man-made materials and their most important uses.

* 1.4.1  Use all senses as appropriate to sort objects as being composed of materials that are naturally occurring, human made or a combination of the two.

Process (Nature of Science and Design)

* Use a scientific notebook to record predictions, questions and observations about data with pictures, numbers or in words.
* Conduct investigations that may happen over time as a class, in small groups, or independently.
* Generate questions and make observations about natural processes.

C)    MATERIALS

* Sand, enough for four bins
* Humus, enough for four bins
* Rocks, enough for four bins
* 12 strainers (we will provide)
* 12 styrofoam cups
* 12 large beakers to fill with water
* 12 medium size clear plastic tubs
* 12 rulers
* 24 wooden blocks to prop up tubs
* Masking tape
* 12 towels
* Student provided toys/objects
* Toy cars
* Toy boats
* Duplo blocks
* Pipe Cleaners
* Playdoh

D)      TEACHER CONTENT KNOWLEDGE

* Erosion is where the earth is worn away by wind, water or ice. Weathering is wearing down or breaking down rock. Erosion moves rock and soil from one place to another. Wind can move small bits of rock or soil from one place to another. These small bits can cause erosion of landforms such as mountains. Erosion by water changes the shore of lakes and oceans when waves crash and move the rocks, sand or soil. Rivers change shape when the water carries the banks downstream. Ice in the form of glaciers will erode any landform by scraping and transporting the material in the direction the ice is moving. Glaciers can occur in mountains or across land.
* Erosion is a natural process but humans can cause or speed up erosion. Cutting down forests or plowing natural grasslands for farming exposes soil. The exposed soil can then easily be carried by water or wind. Where trees are removed from hilly or mountainous areas, landslides carry the earth rapidly down to valleys and possibly into rivers where the soil is carried away.

E)   REFERENCES

National Geographic, Education

* + teacher content knowledge
	+ Downloaded November 3, 2015

<http://education.nationalgeographic.com/encyclopedia/erosion/>

World Wildlife Fund WWF, Threats, Soil Erosion and Degradation

<http://www.worldwildlife.org/threats/soil-erosion-and-degradation>

* + teacher content knowledge
	+ Downloaded November 3, 2015

F)     DESCRIPTION OF YOUR LESSON

PLANT ACTIVITY: All cooperating co-teachers will be at each table working with the groups to assist with any issues and help further explain specific directions.

|  |
| --- |
| **ENGAGE:** Revisit predictions from two weeks ago (write or draw in journals.) Why is it good to have healthy soil? (Expected discussion: it will be better for plant growth.) This week we will explore something that can happen to soil when plants are not able to live or are having a difficult time growing. Let’s think about how our plants might look, now that we know what soil grows plants the best. Can anyone predict what soil types will have the healthiest plants at our final observation? What do you think would happen if we tried to grow our plants in compost soil? Have the students work on connecting previous lessons and understanding the importance of our culminating plant activity.  |
| **EXPLORE:** look at plants→ gather evidence→ observations -discussion which soil was best and why After students have made their predictions for what their plants will look like after a week of growth, the teachers will bring out their plants. The students will make observations and gather data similar to lesson three. Each table will get their own cup of soil with their plant. Every table will have a cooperating teacher to work with them, and help them do three things in their journal: record height of their plant, record number of big and small leaves, and a drawing or description of what the plant looks like regarding color, stem, roots, etc. This activity will not be very structured, and will encourage the students to write down as much as they can observe about their plants. The teachers will be asking their students to look back at what they have recorded over time in their journals and be ready to share their thoughts about their soil type and why they think their soil produced the plant it did.  |
| **EXPLAIN:** After students have explored their plants and made observations, the class will get together for a group discussion about what they observed, and why they think their plant has grown the way it did. We will encourage our students to think about all of the lessons so far, and talk about how each topic,  |
| **ELABORATION:** Discuss with the students how they might change the activity in the future. Are there any soil types we did not discuss that they might like to explore?  |

EROSION ACTIVITY: All cooperating co-teachers will be at each table working with the groups to assist with any issues and help further explain specific directions.

|  |
| --- |
| **ENGAGE:** Revisit predictions from two weeks ago (write or draw in journals.) Why is it good to have healthy soil? (Expected discussion: it will be better for plant growth.) This week we will explore something that can happen to soil when plants are not able to live or are having a difficult time growing.  |
| **EXPLORE:** Students will be sitting in groups of four at their tables. Each table will be given a specific soil type and one large tub with the soil in it. (The soil will be the same types they looked at when growing their plants: sand, rocks, clay, humus, mixture,and backyard soil). The teacher will ask students to create their own landforms within the bin (volcanoes, tunnels, mountains, hills, caves, etc.) Once all the groups have finished building their landforms, the teachers will go around to each table and add a ruler with a styrofoam cup taped to one end of the bin. While the teacher is doing this, students will be drawing a picture of how they arranged the objects in their bins so they can see the effects of erosion once the experiment is complete. Once they are done with their drawings, students will then poke a hole in their cup and prop up the bin with wooden blocks. Once this is done, they can begin pouring the water into the styrofoam cup at a steady pace. The water will begin trickling down and students should be making close observations to see how it changes the landform and the overall layout of the materials within their bins during and after the water starts flowing. The students will then draw the “after” picture in their journals to show how the landforms and soil had been displaced and moved due to the force of the water erosion. After the initial activity, we will then hand out the soil rating worksheet (attached below) and explain to the students that we are going to rate the impact erosion had on the soil with a 1 being none or little change, 2 being some change, and 3 being large amount of change. We will make sure to explain to them we are looking for movement of soil, landscapes disturbed, and visible paths where water cut into the soil. To do this as a class, we will have a “museum walk” and go to each table to see what has happened to their bin and soil and make observations about what they see. The teachers will be using probing questions to get the students to think about what the force of the water has done to erode the soil, and how the soil type and its consistency affect the results.  |
| **EXPLAIN:** The activity is followed by a discussion of the results. The students describe what happened to their landscape and if it was what they had predicted would happen. There will be a class chart where the students can gather the results and the teacher will discuss what the data shows. We will then use the data to make a claim that water, acting as a force, causes more erosion of some soil than other soils. We will then make sure to explain that the amount of erosion varies (according to our experiments in the bins) and that  certain soils are better for growing plants because of this.It will be important to have the students think back to which soil type grew the best plants, and show the connection between healthy soil, plants, and erosion.  We will use the data chart as our evidence, and then come up with the reasoning for why there is one soil that is the best for the growth of plants. Discuss the importance of plants and roots in reducing erosion. The aboveground part of plants can reduce the force of rainwater hitting soil and reduce runoff. Roots can either hold the soil in place or absorb water to reduce the amount of water running off.  |
| **ELABORATION:** The students have learned and made conclusions about which types of soil foster the best plant growth and have now learned that plants help prevent erosion. Students will be asked to make connections about which type of soil is most resistant to erosion because it has more plants.The teacher will display the charts that show the findings from the previous weeks activities which show the healthiest types of soil as well as the chart made today for the best type of soil for preventing erosion. We will discuss how these two data sets show us how soil health contributes to the severity of erosion. All of the teachers will lead a discussion about all of the different soil types that have been introduced over the past 5 weeks. This will sum up the unit and give students an opportunity to ask any remaining questions about the topic.   |

**During Snack:** Video about weathering (21 minutes)

* + Magic School Bus
	+ <https://www.youtube.com/watch?v=MyPYzr0caVw>

**Gear up:** discuss chemical weathering with vinegar and baking soda

**Gear down:** Limit the number of soils we look at and focus in on one type.

**Erosion Activity Step-By-Step:**

Step 1: give students their bins of sand/soil/rocks

Step 2: Have them create their own landforms in their bins (volcanoes, mountains, hills, caves)

Step 3: Tape a ruler at one end with a styrofoam cup on top of it

Step 4: Have students poke a hole in the cup with their pencil so that water can drip onto the sand/rocks/humus slowly

Step 5: Prop up the bin on a textbook on the end with the ruler/cup (make sure there is a towel under the bins so water doesn’t spill)

Step 6: Use beaker to pour water into styrofoam cups

Step 7: Students make observations about water trickling out forming a “river” and finally collecting to form a bigger body of water

Step 8: Have students rotate around the room to see others bins

**Citations:**

* Learning Lab Resources - Erosion and Landforms Science Activity, 2015
* <http://www.learninglabresources.com/2014/01/erosion-and-landforms-science-activity.html>
* The Magic School bus: *Rocks and Rolls.* February 7th, 2015.
<https://www.youtube.com/watch?v=MyPYzr0caVw>

**Timeline**

9:30-9:35: recap from last week and announcements

9:35-10:40: Plant Activity

10:40-11:10: snack/bathroom break

11:10-11:45: Erosion Activity

11:45-11:55: “What would happen if there was no soil or plants?”

11:55-12:00- wrap up/reminders course eval with parents

**Handouts**

|  |
| --- |
|  **Jordan River Soil** |
| **pH Test** |  |
| **Nitrogen Test (N Test)** |  |
| **Phosphorus Test (P Test)** |  |
| **Potash Test (K Test)** |  |

|  |
| --- |
| **Marsh Area Soil** |
| **pH Test** |  |
| **Nitrogen Test (N Test)** |  |
| **Phosphorus Test (P Test)** |  |
| **Potash Test (K Test)** |  |

|  |
| --- |
| **Soil Outside the School of Education** |
| **pH Test** |  |
| **Nitrogen Test (N Test)** |  |
| **Phosphorus Test (P Test)** |  |
| **Potash Test (K Test)** |  |

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
|  | # of big leaves |  # of small leave | Height of Plant |
| Rocks | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |
| Humus | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |
| Clay | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |
| Sand | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |
| Mixture | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |
| Backyard | # Big Leaves\_\_\_\_\_ | # Small Leaves \_\_\_\_ | \_\_\_\_\_\_\_\_\_cm |

Name:\_\_\_\_\_\_\_\_

Am I From A Plant/Soil?

|  |  |  |
| --- | --- | --- |
| img-thing.jpeg | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |
|  | Yes | No |

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type of plant | What does it look like? | What does it taste like? | What does it smell like? | What does it feel like? |
|     |   |  |  |      |
|    |    |   |   |   |
|   |    |   |   |   |
|  |   |   |   |   |

|  |
| --- |
| Questions or other observations? |
|    |

 Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What can I find around Hilltop?

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|   | What is its name? | What does it look like? | What does it feel like? | What does it smell like? | Something you learned about the plant |
| A plant that starts with the letter “P” |   |   |   |   |   |
| A plant that is the color purple |   |   |   |   |   |
| A plant that has a leaf bigger than the size of your hand |   |   |   |   |   |
| A plant that is the color red |   |   |   |   |   |
| A plant that has red leaves |   |   |   |   |   |
| A plant that starts with the letter “N” |   |   |   |   |   |
| A plant that is more than one color |   |   |   |   |   |
| A plant that is smaller than the size of your hand |   |   |   |   |   |
| A plant that is pink |   |   |   |   |   |
| A plant that you find interesting |   |   |   |   |   |

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| **Group # \_\_\_\_\_\_** |
| **Decomposer 1** | **Decomposer 2** | **Decomposer 3** | **Decomposer 4** | **Decomposer 5** | **Decomposer 6** | **Decomposer 7** | **Decomposer 8** |
|   |   |   |   |   |   |   |   |

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | Group #1 | Group #2 | Group #3 | Group #4 | Group #5 | Group #6 | Total |
| Decomposer 1 |  |  |  |  |  |  |  |
| Decomposer 2 |  |  |  |  |  |  |  |
| Decomposer 3 |  |  |  |  |  |  |  |
| Decomposer 4 |  |  |  |  |  |  |  |
| Decomposer 5 |  |  |  |  |  |  |  |
| Decomposer 6 |  |  |  |  |  |  |  |
| Decomposer 7 |  |  |  |  |  |  |  |
| Decomposer 8 |  |  |  |  |  |  |  |

(give each co-teacher a small sample of dry version of each soil→ have students discuss why they think it moved that way)

|  |  |
| --- | --- |
|  | How much change does erosion cause in each example? |
|  | None or Little change | Some change | Large change |
| Sand |  |  |  |
| Rock |  |  |  |
| Clay |  |  |  |
| Humus |  |  |  |
| Mixture |  |  |  |
| Back yard soil |  |  |  |