

GROW YOUR PALS PROGRAM GUIDE



THE NATIONAL FFA MENTORING PROGRAM

Sponsored by



LESSON 1.2

What's the Word? SOIL!

Unit:
PLANTS AND GARDENING

PRECEPTS

- J. Mental Growth
 - J1. Think critically



Lesson Type:
Large Group

NATIONAL STANDARDS

- NRS.01.02.05.b. Identify rock, mineral and soil types.
- PS.02.02.01.c. Formulate and prepare growing media for specific plants or crops.
- PS.02.02.02.b. Discuss how soil drainage and water-holding capacity can be improved.
- NL-ENG.K-12.12 – Applying Language Skills
- NS.K-4.3 Life Science
- NS.K-4.6 Science in Personal and Social Perspectives

STUDENT LEARNING OBJECTIVES

As a result of this lesson, the student will ...

- Identify different types of *soil texture*.
- Explain how plants use soil.





TIME

Instruction time for this lesson: **50 minutes.**



RESOURCES

National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success



TOOLS, EQUIPMENT AND SUPPLIES

Supplies needed for instruction:

- ✓ PALS1.2.LG.TM.A-C
- ✓ PALS1.2.LG.AS.A – one per student
- ✓ PALS1.2.LG.AS.B – one per group
- ✓ Writing utensil – one per student
- ✓ Three large glasses or transparent containers
- ✓ Sample of a large-sized breakfast cereal – example: Peanut Butter Captain Crunch)
- ✓ Sample of a medium-sized breakfast cereal – example: Rice Krispies
- ✓ Sample of a small-sized breakfast cereal – example: Oatmeal
- ✓ Approximately ½-gallon chocolate milk
- ✓ Small, potted plant
- ✓ Small cup of drinking water - one per student
- ✓ Small snack item – one per student; example – cookie or a pretzel
- ✓ Plain white computer paper – one piece per student
- ✓ Markers/crayons/colored pencils/paint – any one or combination will work

KEY TERMS



The following terms are presented in this lesson and appear in *bold italics*:

Soil texture

Soil particle

Sand

Silt

Clay

Activity Supplies needed for each group:

- ✓ Three, clean containers - small bowls or cups will work
- ✓ Sample of brown sugar
- ✓ Sample of cocoa powder
- ✓ Sample of a spreadable material - like a cinnamon spread
- ✓ Three clean half-gallon milk cartons, tops removed with around 6 inches of the container remaining
- ✓ Gravel
- ✓ Sand
- ✓ Clay soil
- ✓ Potting soil
- ✓ Well-drained lawn or garden soil
- ✓ Seeds
- ✓ Water bottle
- ✓ Paper towels
- ✓ Sand paper
- ✓ Laminated piece of construction paper



CONTENT OUTLINE

Objective 1. | Identify different types of *soil texture*.

- I. Define *soil texture*
 - A. *Soil texture* is the fineness or coarseness of soil
- II. Define *soil particle*
 - B. *Soil particle* is one piece or part of soil
- III. *Soil particle* sizes
 - A. *Sand*: the largest mineral particle
 - B. *Silt*: medium-sized mineral particle
 - C. *Clay*: the smallest mineral particle
- IV. Activity: *Soil texture*
 - A. Materials
 1. One container labeled #1 with a sample of brown sugar
 2. One container labeled #2 with a sample of cocoa powder
 3. One container labeled #3 with a sample of spreadable material
 4. Paper towels

B. Procedure:

1. Make sure hands are washed before starting the activity
2. Carefully touch and feel the sample of Container #1; record observations of what the material feels like
3. Wipe and clean hands
4. Carefully touch and feel the sample of Container #2; record observations of what the material feels like
5. Wipe and clean hands
6. Carefully touch and feel the sample of Container #3; record observations of what the material feels like
7. Wipe and clean hands

V. Why is **soil texture** important?

- A. Water-holding capacity
- B. Permeability: how easily air or water can pass through the soil

Objective 2. | Explain how plants use soil.

I. Three reasons plants need soil:

- A. Water
- B. Nutrients
- C. Anchor

II. Activity: What Type of Soil is Best?

A. Materials needed:

1. Three clean half-gallon milk containers
2. Gravel
3. **Sand**
4. **Clay** soil
5. Well-drained garden or lawn soil
6. Package of seeds (six seeds per group)
7. Cup of water
8. Marker

B. Procedures:

1. Obtain three milk cartons, all with the tops cut off (leaving around 6 inches)
2. Fill the cartons with about an inch of gravel
3. Fill one carton with 4 inches of **sand**
4. Fill another carton with 4 inches of **clay** soil
5. Fill the third carton with 4 inches of potting soil
6. Plant seeds in each container
7. Water the plants and put them in a sunny place
8. Collect data as plants begin to germinate

INTEREST APPROACH

*Before students arrive, set up the classroom materials early at each desk location for the interest approach activity and also the **soil texture** activity. This material would be, per group of three students: a piece of sandpaper, a laminate piece of construction paper, Container #1 with a sample of brown sugar, Container #2 with a sample of cocoa powder, Container #3 with a spreadable material and paper towels. Each student will need a writing utensil and PALS1.2.LG.AS.A.*

As students arrive, allow them to choose their seats, limiting groups to three students each. Advise them as they arrive that there are materials at their seats and to wait for instruction before touching anything. Once everyone has arrived and found a seat, gain the attention of the students, welcome everyone and give introductions where necessary.



At your table is a piece of sandpaper (*Hold up the demo sandpaper*) and a piece of laminated paper (*hold up the laminated paper*). Allow each person at your table to feel the sandpaper. Touch it with your fingers.

Demonstrate to students.



Who will share with the group how this feels?

Allow students to respond.



Those are great words! The sandpaper is what we call coarse, or rough.

Now pick up the laminated paper. Allow each person at your table to feel this paper. Touch this one with your fingers. The laminated paper is what we call smooth.

When you hear the word, THINK, take 30 seconds to think of other items that are coarse and smooth. There are no limits! Think of as many things as you can, from items around your home or school, to things that you might see outside.

What questions are there? *Answer any questions.* OK.

THINK!

As students think, prepare PALS1.2.LG.TM.A to record student data. This can either be on an overhead or can be just completed on a board. These words will be referenced later in the lesson, so make sure the words are able to be used again. At the completion of 30 seconds, refocus the group.



Great job thinking quietly to yourself! Who will be first to share an example of something that they would consider coarse or rough?

Allow students to share. As they share, record their items on PALS1.2.LG.TM.A. Continue allowing students to share ideas of rough items as long as time permits.



Great job! Those are great examples of things that we could consider rough. Now, who will be first to share an example of something that they would consider to be smooth?

Allow students to share their smooth items. As they share, record these as well on PALS1.2.LG.TM.A. Continue allowing students to share ideas of smooth items as long as time permits.



Those are more great examples! Excellent job brainstorming those ideas!

Now think about soil, or dirt. Would you consider soil coarse or smooth?

Allow students to reply. They may or may not agree. If they do, have them explain how they see soil the same as some of the items on their list.



Well, what you might not realize is the soil that is in our ground can be categorized, very similar to these items, as either coarse, smooth or somewhere in between. The way a soil feels can play a big part in making sure we have healthy plants. Let's take a closer look today at why this is important and how plants rely on soil in order to live. Get ready to get your hands dirty and learn more about soil!

SUMMARY OF CONTENT AND TEACHING STRATEGIES

Before starting the content, have PALS1.2.LG.TM.B and PALS1.2.LG.TM.C available for instruction. If an overhead or technology is not available, have the content on posters that can be displayed large enough in the room for all students to see.

For the first activity, students will remain in their groups from the interest approach activity. One set of demo materials is needed to demonstrate the procedures of the activity during explanation. Materials for the 'soil texture' activity should already be at each group's tables. Invite students to leave the materials untouched until instructed to do so.



Did you know that we could also call soil rough or smooth?

Just like the sandpaper or the laminated piece of paper you just felt, soil can feel differently. When we describe soil by the way it feels, we call this a soil's **texture**, or the smoothness or coarseness of the soil.

OBJECTIVE 1. | Identify different types of *soil texture*.



I. Define **soil texture**

A. **Soil texture** is the fineness or coarseness of soil.



For the next activity we will look at **soil particles**. If you were to take soil and break it up into individual pieces, we would be looking at particles. Let's see if we can learn about the individual **soil particles** and what makes it important to have a good mixture.

II. Define **soil particle**

A. **Soil particle** is one piece or part of soil.

III. **Soil particle** sizes

- A. **Sand**: the largest mineral particle
- B. **Silt**: medium-sized mineral particle
- C. **Clay**: the smallest mineral particle

IV. Activity: **Soil texture**

A. Materials

1. One container labeled #1 with a sample of brown sugar
2. One container labeled #2 with a sample of cocoa powder
3. One container labeled #3 with a sample of spreadable material
4. Paper towels

B. Procedure:

1. Make sure hands are washed before starting the activity
2. Carefully touch and feel the sample of Container #1; record observations of what the material feels like
2. Wipe and clean hands
3. Carefully touch and feel the sample of Container #2; record observations of what the material feels like
4. Wipe and clean hands
5. Carefully touch and feel the sample of Container #3; record observations of what the material feels like
6. Wipe and clean hands

In order to better illustrate the activity, have a demo set of supplies identical to the students' group supplies. These will illustrate different points throughout the interest approach activity and lesson.



In front of each group are three different bowls of materials, paper towels, a writing utensil and a sheet to record observations (*Hold up each as discussed*). Listen carefully to the following directions before touching anything.

Find the container labeled #1.

Demonstrate this by holding up a demo container labeled #1.

When you hear the word TOUCH, carefully feel the material located in the container, rubbing it between your fingers.

Demonstrate this for all students to observe.



After you feel the material, wipe your hands off with the paper towel and think of one word that would help you remember what this material feels like and one word that will help you remember what the material looks like. Record your observations on your observation chart next to Container #1. When you are done with this step, put your pencils down and wait for your next instructions. Who will explain to the group the activity we are about to complete?

Allow a student to explain the steps that will take.



What questions are there before we get started?

TOUCH

Walk around the room and assist students in thinking of a word that would best describe the material. Make sure they concentrate on what the material feels like, not what it looks like.



Thanks for following directions. Now find Container #2.

Demonstrate this by holding up demo container labeled #2.



When you hear the word SOIL, carefully feel the material located in this container, rubbing it between your fingers.

Demonstrate this for all students to observe.



After you feel the material, wipe your hands with the paper towel and think of one word that would help you remember what this material feels like and one word for what it looks like. Record your observations on your observation chart next to Container #2. When you are done with #2, put your pencil down and wait for the next step. What questions are there?

SOIL

Walk around the room and assist students in thinking of a word that would best describe the material. Make sure they concentrate on what the material feels like, not what it looks like.



Locate Container #3.

Demonstrate this by holding up demo container labeled #3.



When you hear the word TEXTURE, carefully feel the material located in the container, rubbing it between your fingers.

Demonstrate this for all students to observe.



After you feel the last material, wipe your hands with the paper towel and think of one word that would help you remember what this material feels like and one word that will help you remember what the material looks like. Record your observations on your observation chart next to Container #3. When you are done with #3, put your pencil down. What questions are there?

TEXTURE

Assist students where needed as they finish the observations.



Great job observing these new materials! As we finish up, let's make sure we clean up! At our tables, let's throw away all paper towels and wash our hands before we move forward.

Help students locate the trash can and make the trip to the sink as orderly as possible and completed in a timely manner.



Let's look back at all three of the items and see what words we came up with to describe how the material felt and looked.

Hold up the observation sheet that students should have completed.



Looking at your observation sheet, who will share one word they wrote down for Container #1 describing what the material felt like?

Allow several students to share their descriptive words. Do this as long as students would like to share. As students share their ideas, record their observations on PALS1.2.LG.TM.B or on a writing surface large enough for everyone to see. Do the same thing for how Container #2 looked as well.



Those are great words! When we felt the material between our fingers, the material fell through easily. The material is very similar to something we would see outside. Where might we see this type of material naturally occurring?

*Guide students to say the beach, desert, playground with a sandbox or any location that may have sand. They should see the material as something similar to **sand**.*



Great! The material in Container #1 actually represents **sand**. We could feel each little piece of the material when we rubbed it through our fingers. It didn't stick together and would fall through our fingers as we were observing it.

Let's look at Container #2. Who will share one word they wrote down for this material to describe what the material felt like?

Allow several students to share their descriptive words. Repeat the question for descriptive words for appearance. Do this as long as students would like to share. As students share their ideas, record their observations in the same location as Container #1.



Thanks for sharing! What was different about the way this material felt from that in Container #1?

Allow students to share the differences they felt between the two containers. If they are not sure, have them also look at the two containers that are still in front of them and have them understand that they cannot see individual particles in Container #2, but can in Container #1.



So, do you think each individual piece in Container #2 is bigger or smaller than Container #1?

Students should understand after looking at them again and talking about it that the pieces in Container #1 are bigger than those in Container #2.



That's right. The pieces in Container #1 are larger than those in Container #2. The medium-sized pieces in Container #2 represent what we could call **silt**. **Silt** is smaller than **sand**. We could not feel the individual pieces of **silt** like we could the example in Container #1.

Let's now take a look at Container #3 and see how it is different from the other two. Who will share one word they wrote down for this material for what the material felt like?

Again, as students share their ideas, record their observations in the same location as Container #1 and #2. Repeat the same procedures for students to describe how the material looked.



Those are great words that help us better understand what the material in Container #3 looked and felt like. What was one thing noticeably different in the third material than the first two?

Students will probably have a variety of answers, but focus on the fact that the last material stuck together instead of falling apart.



The material in Container #3 was very different from Containers #1 and #2 because the material stuck together.

Hold up the demo containers of these two items to allow students to see the difference.



Container #3 represents **clay**. **Clay** is the smallest; smaller than **sand** and **silt**.

*The next illustration will require Container A, Container B, and Container C to illustrate the importance of **soil texture**. Container A should be a larger cereal, similar to Peanut Butter Captain Crunch. Container B should be a medium size cereal, like Cocoa Crispies or Rice Krispies. Container C should be oatmeal that has been mixed with water. Make sure they are labeled and that each Container Can be observed by the entire group. Also needed for this illustration is the supply of chocolate milk.*



So why is this all important? Take a look at these three jars.

Reference the three jars that are at the front of the room filled with three different types of cereal.



Let's look at Container A. *Hold up Container A.*

Just by looking at similarities from the activity we just did, who will tell me what type of soil this cereal could represent?

*Allow students to respond. They should determine that it is **sand**.*



That's right. From looking at all three jars, we can determine that this jar is representing **sand**.

Let's look at Container C. Looking at the similarities from before, what type of soil might this cereal represent?

*Allow students to respond. They should determine that it is **clay**.*



That's right. If we look at the consistency of this oatmeal, we can see that it is very similar to Container #3 we observed earlier that represented the **clay**.

Finally, look at Container B.

Looking at the similarities from before, what type of soil might this cereal represent?

*Allow student to respond. They should determine the final jar is **silt**.*



Great job. Container B represents **silt**. For this next illustration, we need some assistance. Who will be the volunteer? *Choose one student from the group to come help.*

Our volunteer is going to show us why **soil texture** and particle size is so important. As she/he adds chocolate milk to each container, imagine that you are actually seeing water. Please slowly add the chocolate milk to Container A.

Have student slowly add the chocolate milk to the container until a desired amount is reached.



As our volunteer so kindly adds the chocolate milk to this jar, imagine what you are seeing is **sand** and water. Is the water easily going through the **sand**? Allow students to respond yes.

Good. Our volunteer will slowly add our liquid to Container B (*Hold up Container B*), or the cereal that represents **silt**. Is the water traveling as easily through this Container As it was the first time?

Students should respond no. This time the chocolate milk should move slower, but still move through the cereal and be absorbed.



In Container B we see that the water is still moving through the material, but this time we see that it is a little slower. The material still absorbs the water, but just at a different pace.

OK, last container, Container C. Volunteer, please SLOWLY add the water to this material.

Allow the volunteer to slowly add the chocolate milk to Container C.



Who will tell us what is happening in this container?

Allow students to respond that the chocolate milk is actually pooling on top of the material in Container C.



Container C represented what type of **soil particle**?

Allow students to respond clay.



That's right. It was **clay**. Does water move through the **clay** as easily as **sand**?

Hold up Container C and Container A. Allow students to say no.



That's right. As we saw in these three jars, there was a definite difference in how easily the chocolate milk could move through the cereal. **Soil particle** size can play a big part in determining whether a plant has what it needs to survive. **Soil particle** size is important because some plants, like we just observed, are planted in soil that have lots of space between particles and have the ability to move water and air easily. Others are planted in soil that have very little space between particles, making it difficult for movement of water or air. Depending on the plant, this could have a good or a bad effect on whether it will grow up to be strong and healthy.

- V. Why is **soil texture** important?
- A. Water-holding capacity
 - B. Permeability: how easily air or water can pass through the soil



After observing all three different materials in our containers, we were able to see that, even in all three, there were major differences. What if we combined them all together? Have you ever thought about what plants actually do with the soil they are planted in? Plants take soil and use it everyday, very similar to some things we do in our daily lives. Let's take a closer look at what they do.

OBJECTIVE 2. | Explain how plants use soil.



- I. Three reasons plants need soil:
- A. Water
 - B. Nutrients
 - C. Anchor

Hold up a small potted plant for students to observe.



Look at this plant. Who will share one thing that the plant might gain out of being planted in soil?

Allow students to answer. Students may struggle with this.



Everyone stand up! When you hear the word MOVE, take 10 seconds to move around the room and find a new seat at a new learning station. It does not matter where you travel to, just get up and move! What questions do you have? *Answer any questions.* OK. Here we go.

MOVE!

As students move around the room, if available, play some upbeat music. Move around with them as well, dancing and moving to the music. At the completion of 10 seconds, either stop the music or warn students it is time to find a new position.



Great job getting up and moving! Isn't it great that we can move to a new place whenever we want to?

Allow students to respond.



Let's look at this potted plant. Can this plant move like we just moved?

Allow students to respond no.



That's right. A plant is in one location for the majority of its life. The plant has a part called the roots that helps keep it anchored in the soil.

Display PALS1.2.LG.TM.C.



If it doesn't anchor itself in the soil well, what could happen?

Allow students to respond. If they struggle, have them think about when it is windy outside.



If there is a strong wind, would this plant be able to stand up on its own? What helps it do this?

Allow students to respond the roots and soil.



That's right. The roots anchor themselves in the soil to make sure they don't move, almost like a boat uses its anchor in the water to stay in one place. The soil is very important so the plants stay put.

Are there other reasons the soil is important to plants? When you hear the word THINK, take one minute to think how else soil is important to plants. What questions do you have?

Answer any questions that might come up.

THINK

As students think to themselves quietly, walk around the room and pass out one small cup of drinking water and one snack item per student. Instruct students to not touch the items until they are instructed to do so. At the end of one minute, or whenever all the items are passed out, refocus the group's attention.



Thanks for thinking quietly! Who will share one idea of how soil is important to plants?

Allow students to share their ideas quickly.



As you were thinking quietly, I thought everyone might enjoy a snack. In front of each of everyone is a glass of water and a snack. Go ahead – eat and drink away!

As students consume their 'snack' walk around and dispose of trash as you are able. Move this process along and encourage students to wrap up their snack.



Wasn't that good? I was hungry as well. Have you ever thought how a plant gets its food and water?

Allow students to respond. Most will probably say no or talk about rain.



Plants are anchored in the soil and do not have the ability to get food like we do. They actually use the soil again to their advantage. Soil contains important food, or nutrients, and holds water from rain so that plants can use them to grow.

Every soil is different. Some soils do a better job than others in providing food, water and a strong place to live. Let's put together an activity to test what we have learned today about texture and see how soil can play an important role in making sure plants receive food, water and a good place to anchor.

II. Activity: What Type of Soil is Best?

A. Materials needed:

1. Three clean half-gallon milk containers
2. Gravel
3. **Sand**
4. **Clay** soil
5. Well-drained garden or lawn soil
6. Package of seeds (six seeds per group)
7. Cup of water
8. Marker

B. Procedures:

1. Obtain three milk cartons, all with the tops cut off (leaving around 6 inches)
2. Fill the cartons with about an inch of gravel
3. Fill one carton with 4 inches of **sand**
4. Fill another carton with 4 inches of **clay** soil
5. Fill the third carton with 4 inches of potting soil
6. Plant seeds in each container
7. Water the plants and put them in a sunny place
8. Collect data as plants begin to germinate



Thinking back to Containers A, B and C (*Reference the containers that should still be in place at the front of the room*), let's put together an experiment that will test to see if these three types of soil and their particle sizes can have an effect on the growth rate of a newly planted seed.

At this point, break students into groups of no larger than three. The smaller the groups the better, however make sure there are enough 'teachers' to circulate among all the groups for questions. Hand out the materials needed for 'What Type of Soil is Best?' activity. Place the demo materials at the front of the room for all students to see. For each step, demonstrate what to do while talking through the procedures. This will allow students to see exactly what they should be doing.



Before moving forward, let's make sure everyone has all the necessary materials to complete the experiment. Instructions are very important, so let's leave the materials on the table until we hear the proper way to use them. Each group should have three cut-off milk containers, a cup of **sand**, a cup of **clay**, a cup of well-drained garden soil, a cup of gravel, six seeds and a cup of water. Which groups lack any of those materials? *Make sure all groups have the supplies listed. Make any adjustments if needed.*

We will go through this demonstration together. If you are unsure what you need to do, please raise your hand so someone can come help you out. What questions are there before we get started?

Answer any questions students might have.

During the following activity, go through each step with the demo materials to help students understand what is expected of them.



Have one person in your group take the marker and carefully label your containers **sand** (label demo container **sand**), **clay** (label demo container **clay**) and garden soil (label demo container garden soil). When your group has finished this step, please close your marker and place it on your desk. *Wait for groups to complete this task. Help where needed. Remind students as needed to close the marker and place it on the desk when they finish.*

OK. For the next step, carefully fill each milk carton with around one inch of gravel.

Illustrate adding one inch of gravel to a milk carton.



What questions are there? *Field any questions students might have.*

When your group has done this to all three milk cartons, put down everything and raise your hand.

Assist any groups that might need help. Make sure that about an inch of gravel is in all three milk cartons.



Thanks for staying together. Next, we will add the different types of soil to each milk carton. In the milk carton labeled '**sand**' (*Hold up the demo milk carton labeled **sand***) pour all of the **sand** from the cup over the gravel. Repeat this step for both the '**clay**' and the 'garden soil'.

*Demonstrate adding the **clay** and the garden soil from the cups into the appropriately labeled milk cartons.*



What questions do you have?

Field any questions that students might have.



Great. When your group has completed this step, have everyone in your group put everything down and raise your hands.

*Circulate the room and ensure that all students get the **sand**, **clay** and garden soil into the appropriate milk cartons. Once all students have their hands raised, proceed to the next step.*



Here is the important step! Take two seeds per container (*hold up two seeds*) and plant them carefully into your milk cartons. Each carton should get two seeds. (*Demonstrate planting the seeds*). What questions are there?

Field any questions.



When your group has completed this step, every group member will raise a hand.

Circulate the room and ensure that all students get two seeds planted into each container. Once all students have their hands raised, proceed to the next step.



Here's the last step: carefully water each milk carton.

Demonstrate watering the milk cartons.



Based on what we've already learned, why is this important?

Students should respond to help the seeds grow or germinate.



Great. Raise your hands when your group has completed this final step.

Have students collect their cartons and place them in a sunny area of the classroom where they will not be in the way. Once students have finished, have them clean up their space. As they clean up, pass out PALS1.2.LG.AS.B, one per student. Wait until all students have returned to their seats before moving on.



Great job listening to directions! It will be neat to see how **soil particle** size and **soil texture** play a role in how well our plants grow. In the coming weeks, even if we are not here, keep observations on what you see. Let's take a look at our observation worksheet together and make sure we all understand what we need to do to uncover the importance of **soil texture** to plant growth!

Hold up PALS1.2.LG.AS.B.



Over the next few weeks, it will be very important to look at your plants every day, determine if they need to be watered and write anything down that might be important in letting us know what type of soil was best.

Point to the chart at the top of PALS 1.2.LG.AS.B.



Look at the chart at the top of this paper. There are three lines – **Sand**, **Clay** and Garden Soil. For each of those lines, there are two pieces of information each group will collect about the seeds as they begin to grow. The first question, located in column one asks, “What date did you first see the plant sprout?” If you arrive to class one day and you see something different, write down the date that you see a plant coming out of the soil. You will do this for each container of soil. What questions do you have?

Answer any questions.



Who will explain for the group what we will do in the first column?

Call on a student to rephrase the procedure.



Thanks for going over that again for us! The second column tells us to ‘Rank which plant grew the tallest.’ Once all three plants have sprouted, wait one week and then measure which plant is the tallest of the three. Rank them in this column, with a number one being the tallest plant and a number three being the shortest. What questions do you have on that section?

Answer any questions.



Who will explain to the class what we will do in the second column of our observation chart? *Allow one student to rephrase this step.*

Awesome! Once the data is collected and recorded, consider the soil and how it affected the way our seeds grew. There are questions below the chart that will help guide your thinking for this step. What final questions do you have about the observation chart for our growing seeds? *Answer any last questions for this worksheet.*



Wow. We have had a super-filled time together today, learning all about **soil texture**, particles and the importance of soil to plants. I cannot believe we did so much fun stuff! Let’s take a few minutes and review the information we learned today!



REVIEW / SUMMARY



We talked a lot today about how soil can be different and how those differences are important to plants. Before you leave today, let's use our creative sides and show me what you learned!

Picasso e-Moment®

When you hear the word, ARTIST draw a picture about the words **soil texture**. Think about all the different activities we did today – from feeling the different materials to watching the chocolate milk travel through the different types of cereal. What makes **soil texture** stick out in your mind? When you are finished, we will take these pictures home so that we remember how important soil is to plants. Who will describe the activity we are about to complete?

Allow a student to rephrase the activity.



Thank you!

Explain at this time what students will have access to for coloring and drawing their picture. Depending on availability, students could use anything from crayons, colored pencils, markers or paint.



These pictures will be exciting for us to see when they are finished! What questions do you have before we get started? *Answer any final questions.* Great.

Then let's...

ARTIST!

As students complete the activity, circulate around the room and make sure they are on the right track. As the majority of students wrap up, refocus the group for the closing statements.



Thanks for being such hard workers and great thinkers today! It was really fun doing all of our different activities and learning about soils. It will be even cooler to see what your seeds do in a few weeks. Make sure you keep up with those charts, and we will visit again about how things are going!

APPLICATION



Small Group Idea

*Allow students to mix the different **soil particles** and determine if there is an ideal mixture that would promote plant health and growth.*

*Allow students to have samples of the different cereal used above for a more hands-on approach to see the importance of **soil texture**. Students can have dry cereal and try to insert a pencil through it or other type of straight object. It will be easier to insert the pencil through the '**sand**' cereal. When you try and remove the pencil from the '**clay**' cereal, the pencil will come back coated with the oatmeal. This illustrates how easily items can move through the different types of particles.*

With additional supplies, have students create a mixture after completing the 'Which Soil is Best?' activity. Before they can create the mixture, have them consider why they are including more of a certain component or none of another. Allow them to plant an additional milk carton and record observations to determine if their mixture was successful and the results.



One-on-One Idea

Read together with your PALS Dirt: The Scoop on Soil, by Natalie M. Rosinsky

PALS1.2.LG.ASSESS.A | EVALUATION ANSWER KEY

Answers to PALS1.2.LG.ASSESS.A:

1. Soil texture
2. Sand
3. Clay
4. (Two of Three) Water, Food and Anchor



PALS1.2.LG.TM.A

Coarse or Smooth?

Coarse

Smooth



PALS1.2.LG TM.B

What's the Word?

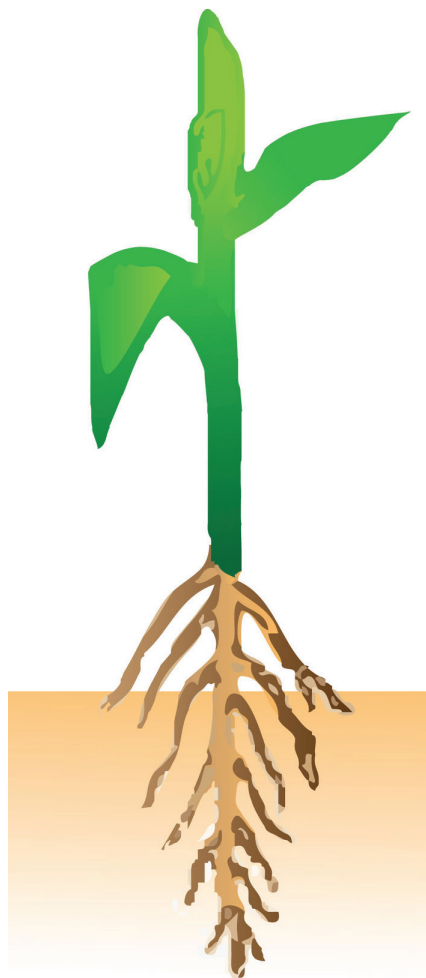
Container #1

Container #2

Container #3

PALS1.2.LG.TM.C

How Roots Use Soil



PALS1.2.LG.AS.A

That Material Feels and Looks Like What?

As you feel the material in Containers #1, 2, and 3, write down a one-word description to help you remember each one.

	<u>What did the material feel like?</u>	<u>What did the material look like?</u>
Container #1		
Container #2		
Container #3		

PALS1.2.LG.AS.B

Plant Growth Observation Sheet

Collect the following data and then answer the questions at the bottom to help us better understand soil particle size and soil texture!

	What date did you first see the plant sprout?	Rank which plant grew the tallest (1 is the tallest plant, 3 is the shortest plant)
Milk Carton #1 – Sand		
Milk Carton #2 – Clay		
Milk Carton #3 – Garden Soil		

1. What were the seeds planted in that sprouted first?
2. Why would those seeds sprout before the other two?
3. Which plant grew the tallest?
4. Why do you think that plant grew larger than the other two?



PALS1.2.LG.ASSESS.A

What's the Word on Soil?

1. What is another word for the smoothness or roughness of the soil?
2. Which soil particle had the largest individual size?
3. Which soil particle has the smallest individual size?
4. List two reasons why plants need soil.