

# **Feed the Soil... and the Soil Will Feed You!**



- 1. What Is Soil Made Of?**
- 2. How Do Different Soils Affect Our Plants?**



## Feed the Soil... and the Soil Will Feed You

Unit Introduction and Background	-	87
Lesson #1: What Is Soil Made Of?	-	88-91
Lesson #2: How Do Different Soils Affect Our Plants?	-	92-98
Reinforcement Recipes:	-	99-100
• Soil Parfait	-	99
• Soil Salad Recipe	-	100
<b>Instructor Handouts</b>	-	101-111
• Soil Nutrients	-	101
• What is Soil Made of?	-	102
• Soil Ingredients	-	103-109
• Black and White Copies of the Recipes	-	110-111



## Introduction:

Plants and humans require many of the same things to survive, such as air, water, and space. This unit focuses on one unique plant necessity, soil. Learners will discover that soil is a complex ecosystem made up of a mixture of living and non-living components. The “Soil Shake-Up” activity will reveal the different particle sizes that are mixed together in garden soil, and a drainage experiment will show how these particles affect the movement of water and nutrients through the soil. Learners are introduced to the idea that nutrients in our food originate in the soil, and that by taking care of the soil, they can help ensure that our plants grow to be healthy and nutritious.

## Background:

Soil is a complex ecosystem consisting of inorganic (non-living) mineral particles, organic matter (plant parts, bacteria, fungi, and other invertebrate fauna that are living, dead or decomposing), air, and water. The inorganic mineral component is derived primarily from weathered rock. Organic matter is derived from the decomposition of dead plant material (roots, leaves, or materials on the surface), or can be added to the soil in the form of compost or organic mulches such as leaves and straw. Understanding your soil starts with a description of two basic properties: texture and structure.

Inorganic mineral particles, the portion of the soil from broken down rock, make up the largest portion of the soil. Soil texture refers to the relative proportion of different particle sizes making up the inorganic mineral component. These particles are classified as sand (the largest particles), silt (medium-sized particles), and clay (very fine particles). Soil texture affects how well water and nutrients are retained in the soil. Soil with large amounts of sand drains well but does not retain moisture or nutrients. On the other hand, soil with large amounts of clay holds moisture and nutrients, but can prevent moisture from penetrating deep into the soil, and can suffocate roots when rain water is not able to drain away. Heavy clay soils are also very difficult for plant roots to penetrate. The ideal soil texture is one that has a balanced mixture of sand, silt, and clay; this mixture is referred to as loam.

Soil structure refers to how all of the components of soil (mineral particles, organic matter, air and water) are arranged around one another. For example, if you have very little space between the solid components of the soil for water and air to move through, your soil structure would be described as compacted. You can improve soil structure by adding organic matter.

As plants grow, they will use nutrients from the soil to provide energy for growth. When this occurs, nutrients are removed from the soil. If these nutrients are not replaced, the soil becomes infertile, and the garden will eventually stop growing. By adding organic matter (compost, mulch, tree leaves, etc.) these nutrients are replaced more efficiently than adding fertilizer. Most fertilizers are formulated to provide the major nutrients plants need (nitrogen, phosphorus, and potassium), but organic matter that is derived from decomposed plant material, contains the nutrients that are removed from the soil when the plant grows. Adding organic matter also improves soil structure and drainage.



## Lesson #1: What is Soil Made Of?

*Time required: 65 minutes (Classroom activities: 45 minutes, Recipe: 20 minutes)*

### Process:

#### Introduction

1. Explain to learners that plants, like people, have basic needs in order to survive. These needs include food, water, space to grow, and air to breathe.
2. Ask learners to brainstorm with a partner and list the basic needs that all humans must have to survive.
3. Ask participants to compare these human needs to plant needs.

#### Engagement

##### Discussion

Read the questions below aloud and ask learners to discuss them with a partner. Ask for volunteers to share responses.

1. What are some living things that can be found in soil?
2. What are some non-living things that can be found in soil?

##### Key Points

1. Soil covers the Earth's surface and provides a place for plants to grow. Soil is the scientific word for dirt.
2. Soil keeps plants anchored and upright, and provides moisture and nutrients to the roots.
3. Soil is a mixture of many different ingredients, both living and non-living.
4. There are many different types of soil, but all soils in Maryland have the same basic ingredients: sand, silt, and clay.

### Lesson Overview:

1. Learners will explore the special role that soil plays in plant growth. They will conduct an experiment that will reveal that their garden or yard soil is made up of different types of particles.
2. Learners will explore the ingredients that are needed for soil to be healthy for growing plants.

### Learners will discover that:

- Soil provides plants with nutrients, support, and water.
- Soil contains mineral particles, organic matter, and living organisms.
- Different types of soil contain mineral particles of various sizes, organic matter, and organisms in different proportions.

##### Gather

- Clock or watch with a second hand
- 1 pint-size jar with a lid, for each team
- Garden trowel
- 1 Cup of water for each team
- 1 clear gallon-size storage bag for each team
- Pen and paper

### Setup:

- Using a garden trowel, take a scoop (approximately 1 cup) of soil from the yard or garden. Remove grass and large rocks from the soil and pour it into a glass jar. For each jar, repeat this process in a different location in the yard or garden and label the jars to indicate where the samples were taken from.
- Make copies of the "Soil Ingredients" photo cards for each team.



### Activity #1: Soil Shake Up Experiment

1. Using the photo cards found at the end of this unit, evenly divide the cards and pass out one card to each learner. Ask learners to find others with matching cards to pair up for the next group activity.
2. Give each team one jar of soil and a cup of water.
3. Explain that soil is made from many different ingredients mixed together, and in this experiment we hope to be able to see these different ingredients in the soil.
4. Ask each team to pour the cup of water into the jar and secure the lid tightly on the jar.
5. Next, each team member will take a turn shaking the jar for about 30 seconds in order to mix the soil with the water.
6. Instruct groups to carefully place the jars back on the table and observe what happens when the soil is allowed to settle.
7. Ask groups to record their observations as the soil settles over 5 minutes.



### SUMMARY OF ACTIVITIES

1. The class will complete an activity that will reveal that their garden soil is made up of a mixture of different particle sizes. They will shake up jars of soil and water and allow the soil to settle out. The particles settle at different speeds, depending on their size. Once all the soil has settled, they can observe the layers of sand, silt, and clay that were previously mixed together in the soil.
2. The learners will discover that soils from different places all have the same ingredients, but they differ in the amounts of each of those ingredients.

#### NOTE:

Some possible observations may include:

- Some of the soil will settle and other particles will remain floating in the water.
- The soil will settle and look different than before it was shaken.
- The soil will look like it has different color layers, once it settles.



### Activity Process #2: Ingredients in Soil

1. Give each group a set of Soil Ingredients photo cards and a gallon-sized, clear freezer bag.

2. Explain that soil is made up of both living and non-living ingredients. In this activity, we will look at what makes soil healthy in order to grow healthy plants.

3. SAY

The 3 main ingredients in soil are sand, silt, and clay. These items are all non-living ingredients.

4. SAY

The largest non-living ingredient is sand. Sand is formed when different kinds of rocks break into tiny pieces.

5. SAY

Silt is a granular material made of quartz and feldspar and is of a size somewhere between sand and clay.

6. SAY

The smallest non-living ingredient in soil is clay.

7. Ask learners to add these three ingredient cards to the storage bag.

8. Explain to learners that soil also contains living ingredients.

9. Ask groups to look through the remaining ingredients to see if they can pick out items that make up the living ingredients. Examples of living ingredients include pieces of plants, sticks, worms, and insects.

10. Ask for volunteers from each group to share the living ingredients they found and explain why they think they are living.

11. SAY

Earthworms, good bacteria, insects, and fungi are all living things that are part of the soil ecosystem. Many of these ingredients are tiny and are referred to as microorganisms. Approximately 1 billion microorganisms can be found in soil the size of your fingertip.

12. Explain that there are other living things that can be found in soil. When plants die, they leave behind parts of themselves in the soil, such as roots and leaves. These plant parts break down, or decompose, and become part of the soil. Things that were once living that decompose and become part of the soil are referred to as organic matter. Organic matter provides nutrients to plants, as food does for humans.



13. Ask learners to find the photo cards for organic matter and living things as they take a look at their jar. Living things and organic matter are larger than the other ingredients in soil, but can be found floating in the water above the non-living ingredients. As learners compare their cards to their jars, they can add these ingredient cards to the bag.

14. Explain that two important ingredients in soil are also important for humans to survive. These ingredients are water and air and they are needed to keep the living things ingredients alive.

15. Ask learners to find the water and air photo cards and add them to the bag.

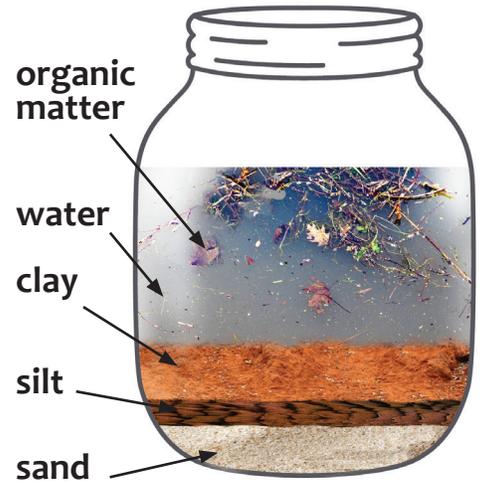
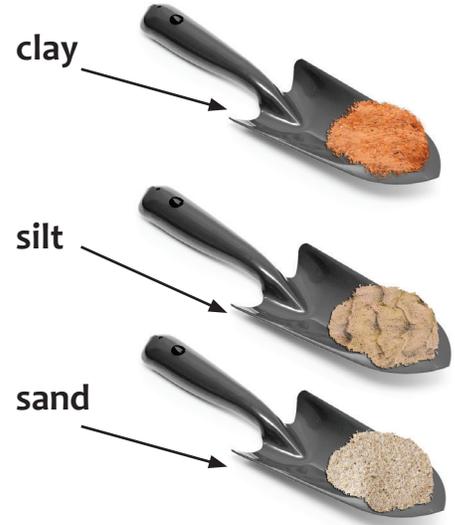
16. Explain to learners that we have added ingredient cards for many of the “ingredients” found in soil. Ask them to compare the items in their bag with their jar.

17. Explain that soil is made up of a mixture of different ingredients and not all soils have the same amounts of these ingredients. This can be compared to recipes for different kinds of bread, because while the recipes may call for the same ingredients, the amounts of each ingredient may be different for each recipe. The proportion of the different ingredients present in a sample of soil determines how healthy the soil is and how the plants will grow.

**Activity Process #3: Soil Parfait Recipe**

1. Explain to learners that they will be working in an assembly line to prepare individual tastings using ingredients that represent the different layers and ingredients in soil.

2. Distribute copies of the “Soil Parfait” recipe to learners.



You will find the “Soil Parfait” recipe at the end of this unit to use as a reinforcement for this lesson.

**Soil Parfait**

This recipe represents the layers of the soil particles, as well as some of the important living things that help to make the soil healthy. To prepare this recipe, learners can line up and assemble their own.

Makes 20 sample-size portions

<b>Ingredients</b>	<b>Ingredients to Soil</b>
2 cups granola or dry cereal	Sand
2 cups vanilla yogurt	Silt
1 1/2 cups sunflower butter or peanut butter	Clay
1 cup honey	Water
1 cup dried, sweetened coconut (optional)	Organic matter or living things
2 cups sunflower seeds or pumpkin seeds (optional)	Insects living in the soil

**You will need:**  
Small disposable cups  
Plastic spoons

**Directions:**

- Put out ingredients in the order of the list above.
- Review what each ingredient represents in the soil.
- Show students spoon in each ingredient.
- Have learners line up to assemble their soil cups and have them take 1/2 portions of each item.
- Once the cups have been assembled, ask them to first look at the layers that have formed in the cups.
- Finally, have learners sit up their cups, as the soil would be mixed up in nature and enjoy.

**REMEMBER TO WASH YOUR HANDS!**

Soil Parfait Recipe 98

**NOTE:**

Remember to review with learners the importance of clean hands when preparing food. Have all learners wash their hands before they begin to handle food. The curriculum introduction has a useful description of proper hand-washing techniques and proper use of disposable gloves.



## Lesson #2: How Do Different Soils Affect Our Plants?

*Time required: 50 minutes (Classroom activities: 30 minutes; Recipe; 30 minutes)*

### Process:

#### Introduction

1. Review the concept that soil is made of many different “ingredients” and the fact that while all soils have the same basic ingredients, soils differ because they may contain different amounts of these “ingredients.”

#### Engagement

##### Discussion

Read the questions below and ask learners to discuss them with a partner. Ask for volunteers to share responses.

1. Why is healthy soil important for growing healthy plants?
2. What are some ways that plants use soil to grow?

##### Key Points

1. Plants, like people need nutrients for good health.
2. Roots are the part of the plant that absorb water and nutrients from the soil.
3. Organic matter that is found in the soil is the best source of nutrients for plants.

### Lesson Overview:

1. Learners will draw conclusions from the “Soil Shake Up Experiment” started in Lesson #1 of this unit to understand how soil texture affects plant growth.

2. Learners will conduct an experiment to determine how soil texture affects how water moves through soil.

### Learners will discover that:

- Soil provides plants with nutrients, support, and water.
- Different types of soil contain different amounts of sand, silt, clay, and organic matter.
- The amount of these different soil “ingredients” affects how quickly water and nutrients move through soil.

##### Gather

The class will be paired into small groups for this activity. Gather enough of each item for each group.

- Soil jars from the previous lesson
- “Soil Ingredient” photo cards
- Dry-erase marker or wax crayon
- 4 quart-sized plastic containers (such as yogurt containers)
- Dried kidney beans (about 1½ cups)
- Flour (about 1½ cups)
- Sink or large plastic bin for catching water during experiment

### Setup:

- Punch holes in the bottoms of two of the plastic containers using scissors or a pointed knife.
- Fill the plastic containers (without holes) with water.



### Activity Process #1: A Closer Look at Soil

1. Divide the learners into groups of 2-3 by counting off 1's, 2's, and 3's, then have them join others with the same number. Make sure that each group has a soil jar and a set of the photo cards from the previous lesson. Unlike the last time we saw these jars, the water is now clear at the top of the jar.
2. Without disturbing the jars, ask learners to draw a line on the jar to show each layer that formed at the bottom of their jar.
3. Ask each team to look at their photo cards to try and determine the layers that have formed in the jar and discuss.
4. Ask for volunteers to share their answers and review that sand (the largest particles) is the bottom layer, the middle layer is silt and the top layer is clay.
5. Ask teams to look at their jars and discuss how each layer has formed.
6. Discuss that the larger particles will settle faster than smaller particles and that not all samples will look the same.
7. Ask teams to compare their jars with others.

8. SAY

9. SAY

10. Display the kidney beans and the flour. Explain that these two items will represent different particle sizes in the soil. Ask learners which parts of the soil the flour and the beans represent (kidney beans will represent sand, which are the largest particles and flour will represent clay, which are the smallest particles).

### SUMMARY OF ACTIVITIES

1. Learners will observe the jar from the "Soil Shake Up Experiment" that has completely settled to determine the texture of the garden soil. This will prepare them to consider how soil affects plant growth.
2. You will use different sized food items to represent different sized particles that make up the mineral component of the soil. By pouring water over these particles, learners will notice the differences in drainage time between the varying sized particles. The largest particles will allow water to drain through the fastest, and the smallest particles will drain the slowest.

Our jar experiment showed us the layers of sand, silt, and clay in our soil. But remember that soil also includes other ingredients. The items floating on the top of the water is organic matter. Organic matter is the part of the soil that comes from living things that have died, decomposed, and turned back into soil. Soil that contains a lot of organic matter is dark in color, provides nutrients to plants, and is soft in texture. Plant roots can easily grow through it, and air and water can reach the roots.

We will now complete an experiment to show how different soils affect how roots absorb water and nutrients from the soil.



11. SAY

12. Ask learners to discuss within their groups, what they think will happen with each experiment. Possible responses may be:

- The water will drain through the flour faster than through the beans.
- The water will drain through the beans faster than through the flour.
- The water will drain through the beans and flour at the same speed.

13. Instruct each group to begin the experiment:

- Add the kidney beans in one of the containers with holes in the bottom, and add flour to the other container.
- Hold each of the containers over the bin or sink.
- Starting at the same time, pour water over each container.
- Have volunteers time how long it takes for the water to drain from each container and write down the times or counts for each.

14. Ask for volunteers to share the results their groups observed and whether their predictions for the experiment were correct.

15. Explain that the kidney beans (sand) allowed the water to drain through the quickest because the large particles also leave large spaces between them, allowing water to drain through. The small particles in the flour lay right on top of one another and don't allow water in between them.

16. Have learners combine the flour and kidney beans in one container and repeat the experiment.

17. SAY:

18. Ask learners to think of how quickly the water in the experiment drained through the flour and beans alone and how that changed when they were combined. Explain that a mixture of sand, silt, and clay in soil is important, because too much sand can cause the soil to dry out too quickly, too much clay doesn't allow water to penetrate plant roots, and silt fills in the spaces in between to promote better drainage.

You will find 2 containers at your station with holes in the bottom. These containers will represent the roots of the plant. We will then place the beans (sand) in one container and flour (clay) in the other and compare how the water will drain through each of these soil particles.

**NOTE:**

Emphasize that it is important to pour the same amount of water over each type of "soil," and to try to pour it at the same speed.

Sand allows water to drain down deep to the roots. Clay holds onto water and nutrients and keeps the roots moist when the weather is dry. Silt fills in between the sand and clay.



19. SAY:

20. Ask learners to discuss organic matter with their group and answer the following questions:

- What are some examples of organic matter?
- What are ways that you could add organic matter to soil?

Organic matter (things that were once living) is another important ingredient in soil. Ideal soil contains lots of organic matter because it provides nutrients to plant roots. Furthermore, it makes the soil loose and soft so that water can drain through it, but it also absorbs water like a sponge and stores it for when the weather is dry. No matter what kind of soil you have, adding organic matter to soil will help plants grow better.

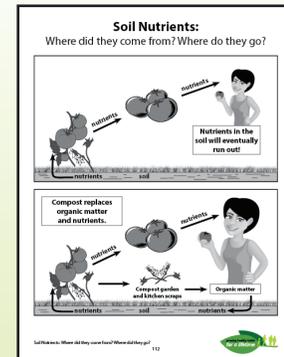
21. SAY:

Our experiments have focused on real soil from the ground. When we plant in containers, we use something called potting soil, which is not soil at all! Potting soil is made from a variety of natural materials and organic matter that are blended to encourage good drainage. Drainage is more important in pots than in the ground because water doesn't have anywhere to spread to like it does in the ground. Most real soil is too heavy and dense to use in pots.



**Activity Process #2 Soil Nutrients: Where did they come from? Where did they go?**

1. Pass out handout: "Soil Nutrients: Where did they come from? Where did they go?" Direct learners to the graphic at the top of the page.



2. SAY:

3. Guide learners to the conclusion that the nutrients in vegetables move out of the soil, into the plants, and into our bodies.

4. Ask learners to discuss with a partner what would happen to the nutrients in the soil if we kept growing and harvesting every year without adding additional nutrients each year? Would nutrients run out? How would our plants grow?

5. SAY:

6. Ask learners to brainstorm ideas with a partner about things that we, as gardeners, can do so that the soil does not run out of nutrients.

7. Direct learners' attention to the graphic at the bottom of the page.

8. SAY:

9. Explain that this is why worms are important in the garden, because worms eat dead plant parts in the soil and turn it into organic matter that provides nutrients to the soil.

When a plant absorbs nutrients from the soil and we eat part of that plant, where do the nutrients go?

The soil would run out of nutrients if we did not replace them and plants would stop growing!

Plants remove nutrients from the soil. However, if we take plant parts, such as scraps from our kitchen or leaves from our yard, and let them breakdown, or decompose, the nutrients that those plants soaked up from the soil while they were growing can be added back into the soil. This process of recycling plant nutrients is called composting. Composting is a way of making organic matter to add to our soil, and it helps keep our garden growing.



**Activity Process #3: Soil Salad Recipe**

1. Explain to the class that you are all going to prepare a “Soil Salad.” The salad will not contain any soil, but each ingredient will represent a component of the soil.

You will find the “Soil Salad” recipe at the end of this unit to use as a reinforcement for this lesson.



**NOTE:**  
Remember to review with learners the importance of clean hands when preparing food. Have all learners wash their hands before they begin to handle food. The curriculum introduction has a useful description of proper hand-washing techniques and proper use of disposable gloves.

2. Display all ingredients: kidney beans, brown rice, salt, dressing, vegetables, and shredded cheese and explain that we will add the ingredients in the order they are listed in the recipe to form layers, as we saw in the previous experiment before we mix it up.

3. Provide each group with a set of “Soil Ingredients” photo cards and the “Soil Jar” diagram.

4. SAY:

The kidney beans represented sand in the soil drainage experiment, because they are the largest particles in the soil. We will look at the other ingredients to determine which soil ingredients they will represent.

5. SAY:

We will now add just a little bit of salt to the salad to represent clay. It is important to have a little bit of clay in your soil because it holds onto moisture and nutrients, but too much clay can prevent water from draining deep into the soil and reaching plant roots. Similarly, we need to have a little bit of salt in our diets, but not too much.

6. Remind learners that the medium-sized particles in soil are called silt and explain that the brown rice will represent the silt in this recipe and explain that the brown rice will represent the silt in this recipe.

7. Point out that although we used flour to represent clay, the smallest particle in our drainage experiment, we aren’t going to use flour in our recipe because that wouldn’t taste good. Instead, we will use salt.

8. SAY:

We will now add the brown rice to the recipe. Take notice of how we can clearly see the beans (sand) and rice (silt) layers.



9. Point out that you now have three ingredients left: vegetables, cheese, and dressing. Invite learners to guess which soil components these ingredients represent.

10. SAY:

15. Review the layers represented in the salad and mix or place a lid on the bowl and mix it up prior to serving.

16. Encourage learners to share the “Soil Salad” recipe with their friends and family.

The vegetables represent organic matter in the soil, because they were once living plants and will add nutrients to the soil. The next layer will be cheese, which represents worms, and finally the dressing will represent water.

# Soil Parfait Recipe

This recipe represents the layers of the soil particles, as well as some of the important living things that help to make the soil healthy. To prepare this recipe, learners can line up and assemble their own.

Makes 20 sample-size portions



## Ingredients

- 2 cups granola or dry cereal .....
- 2 cups vanilla yogurt .....
- 1½ cups sunflower butter or peanut butter .....
- 1 cup honey .....
- 1 cup dried, unsweetened coconut (optional) .....
- 2 cups sunflower seeds or pumpkin seeds (optional)

## Ingredients in Soil

- Sand
- Silt
- Clay
- Water
- Organic matter or living things
- Insects living in the soil

## You will need:

- Small disposable cups
- Plastic spoons

## Directions:

1. Put out ingredients in the order listed above.
2. Review what each ingredient represents in the soil.
3. Place a plastic spoon in each ingredient.
4. Have learners line up to assemble their soil cups and have them take 1-2 spoonfuls of each item.
5. Once the cups have been assembled, ask them to first look at the layers that have formed in the cups.
6. Finally, have learners stir up their cups, as the soil would be mixed up in nature and enjoy.



**REMEMBER TO  
WASH YOUR HANDS!**

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# Soil Salad Recipe

This recipe for a healthy rice and bean salad is used to demonstrate the different components of soil. The beans and rice represent different sized soil particles (sand and silt); the vegetables represent organic matter (things that were once living); the dressing represents water; and the cheese represents worms! Healthy soils contain all of these things.

Makes 20 sample portions  
Serves 6-8 as a side dish



## Ingredients:

- 1 can kidney beans, drained and rinsed
- 1 cup cooked brown rice
- ¼ teaspoon salt
- 1-2 carrots, washed, peeled, and shredded
- ½ can corn, drained
- ½ pint-sized container cherry tomatoes, washed and cut in half
- ½ green pepper, washed and chopped
- ⅓ cup vinaigrette dressing (store bought or homemade, recipe at right)
- ½ cup shredded low-fat cheese

## You will need:

- Can opener
- Colander
- Mixing bowl
- Serving spoon
- Measuring spoons

## Directions:

1. Place beans, salt, rice and vegetables in a large bowl.
2. Add dressing.
3. Mix thoroughly.
4. Top with cheese (if desired).

**Cook's note:** Vary your veggies! The vegetables suggested here are only suggestions. This recipe works with just about any vegetable that you might include in a salad. Experiment and enjoy!

## Tex-Mex Vinaigrette

### Ingredients:

- 1-2 Tablespoons red wine vinegar
- 1½ teaspoons mustard
- ½ teaspoon ground cumin
- Pinch cayenne (optional)
- 3 Tablespoons olive oil
- Salt and pepper to taste

### Directions:

1. Place vinegar, mustard, and cumin in a bowl.
2. Whisk in olive oil.
3. Season with salt and pepper.
4. Taste and adjust seasonings.
5. Use in "Soil Salad," or other salads.

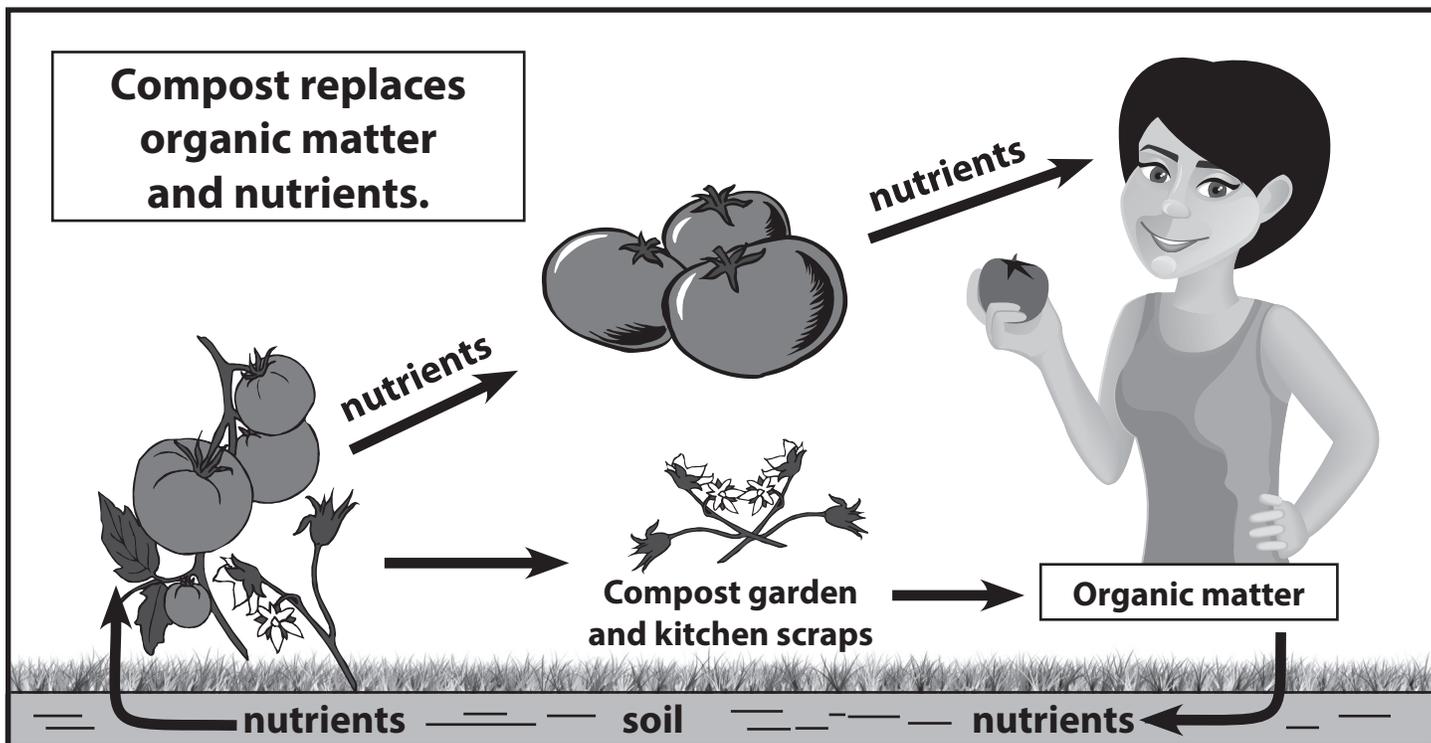
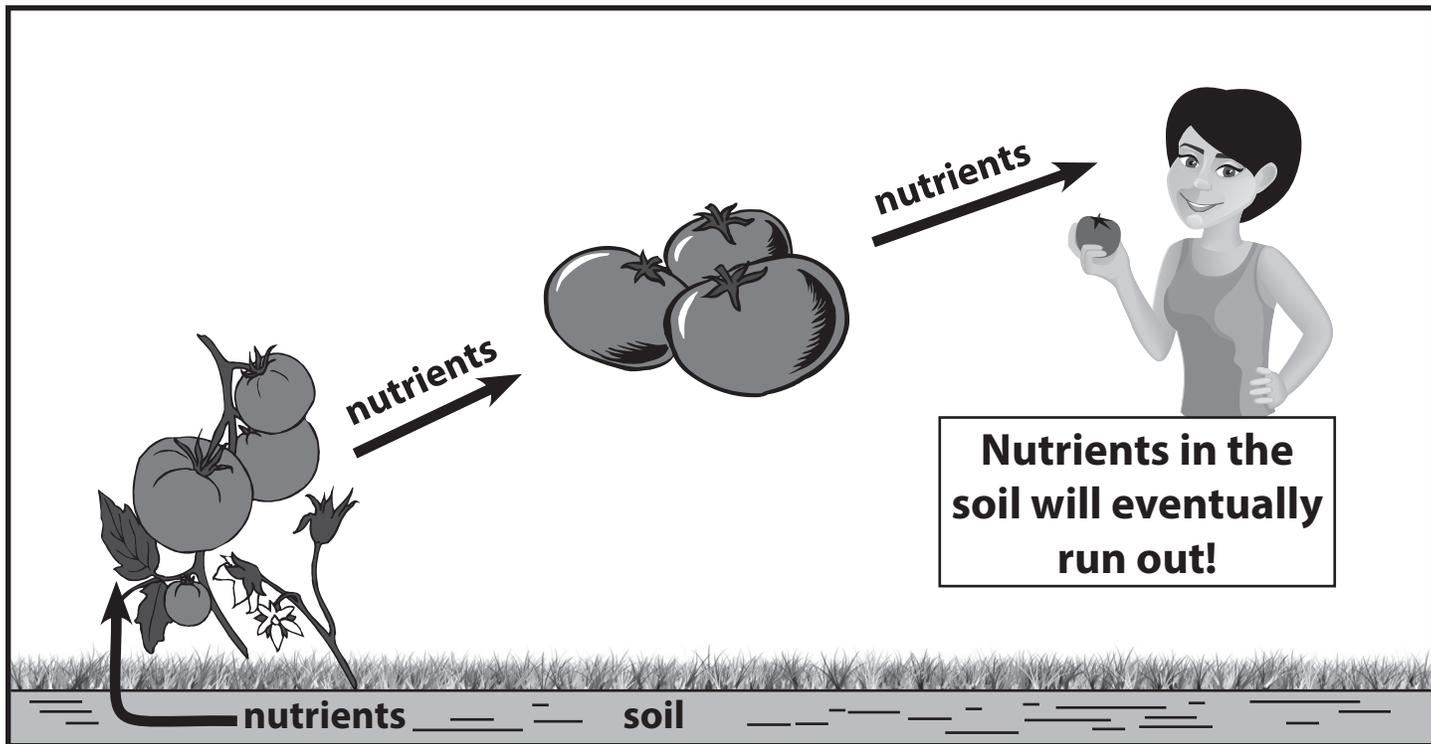


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# Soil Nutrients:

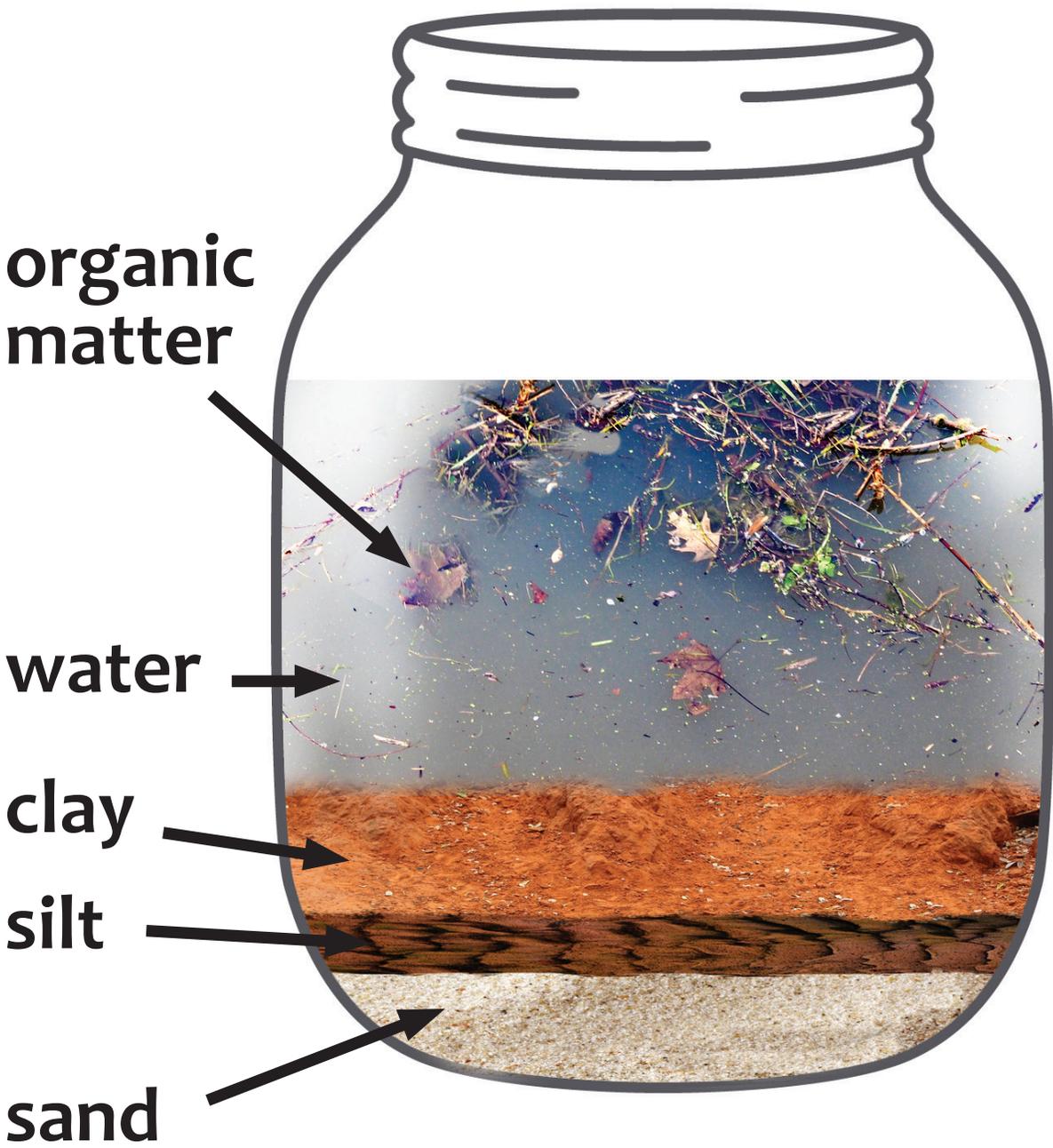
Where did they come from? Where do they go?



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# Soil Jar





sand



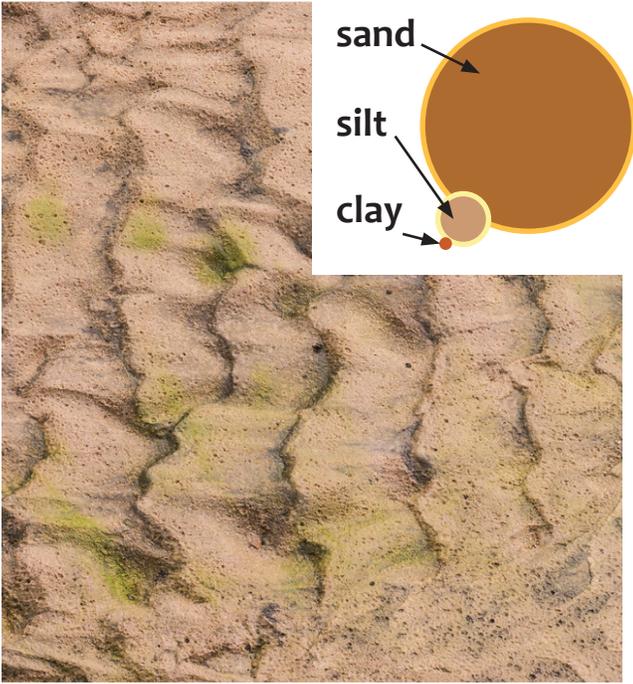
sand



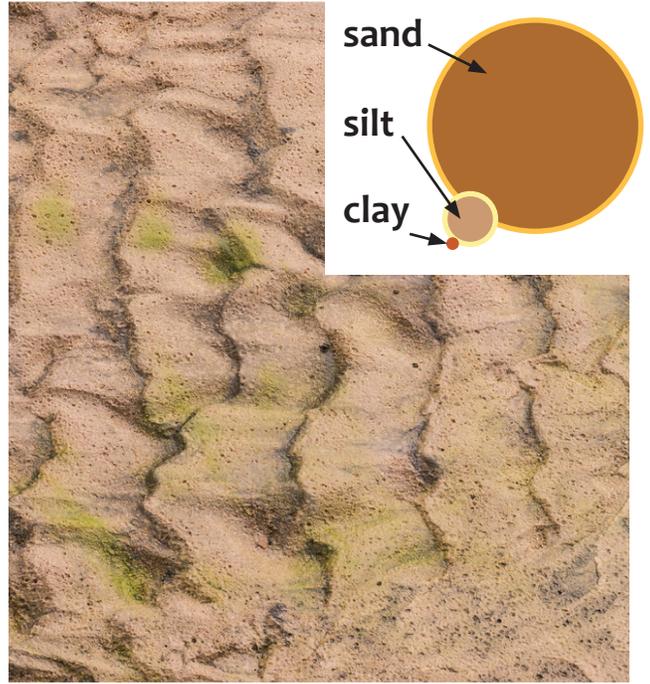
sand



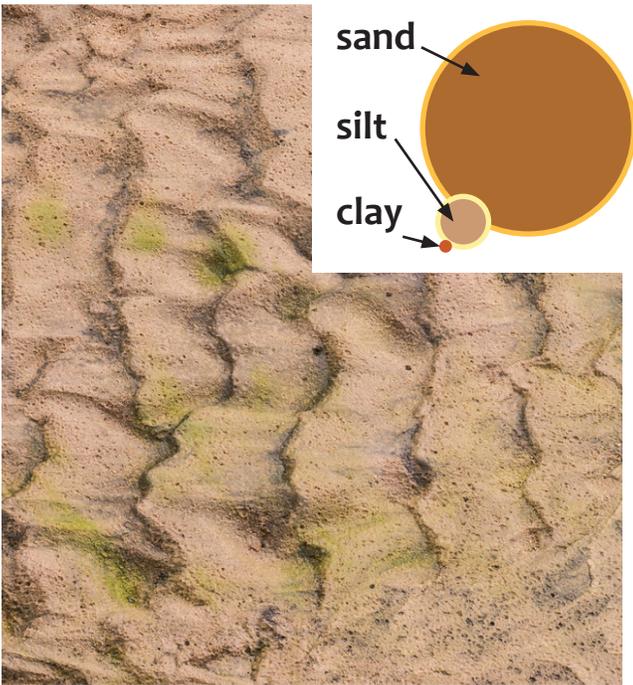
sand



silt



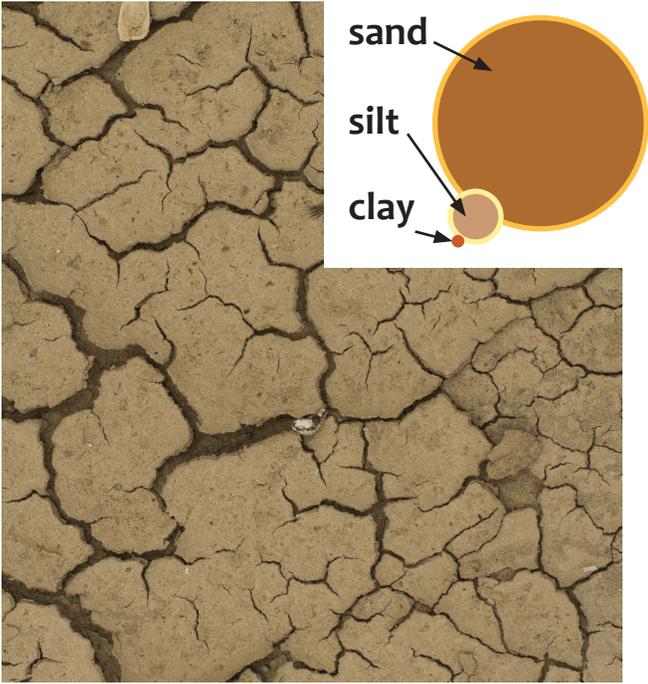
silt



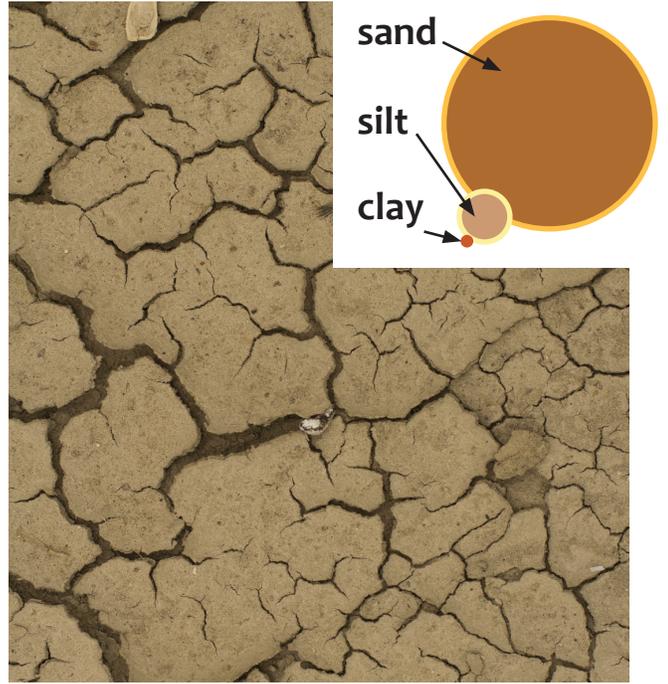
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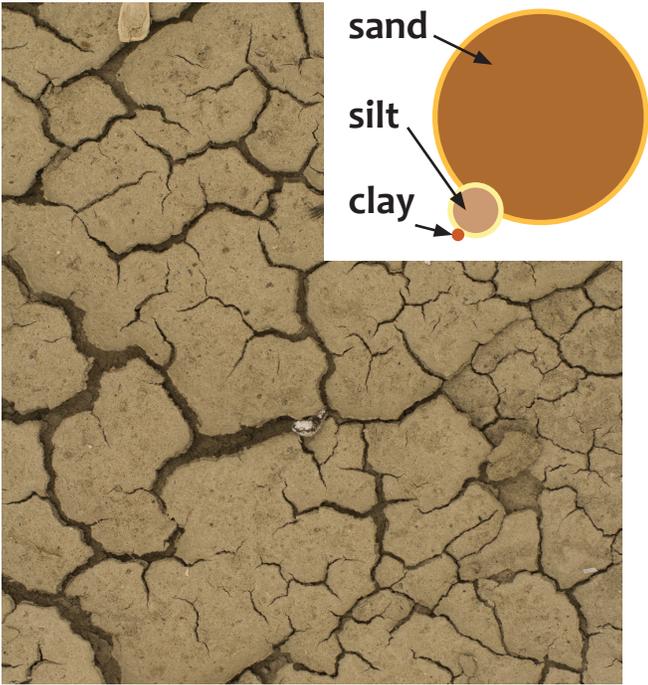
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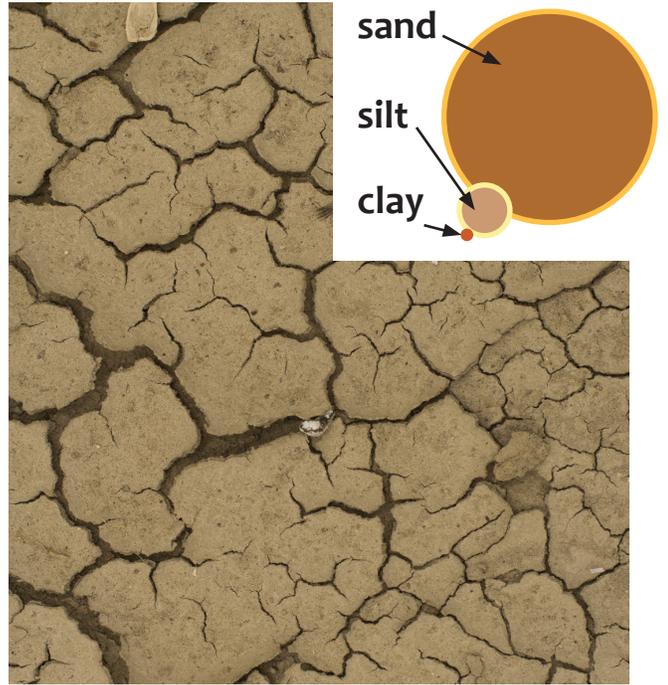
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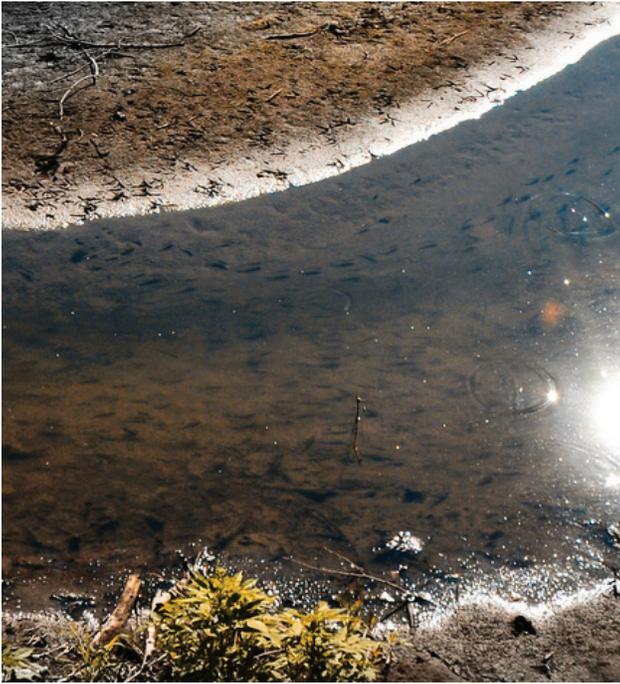
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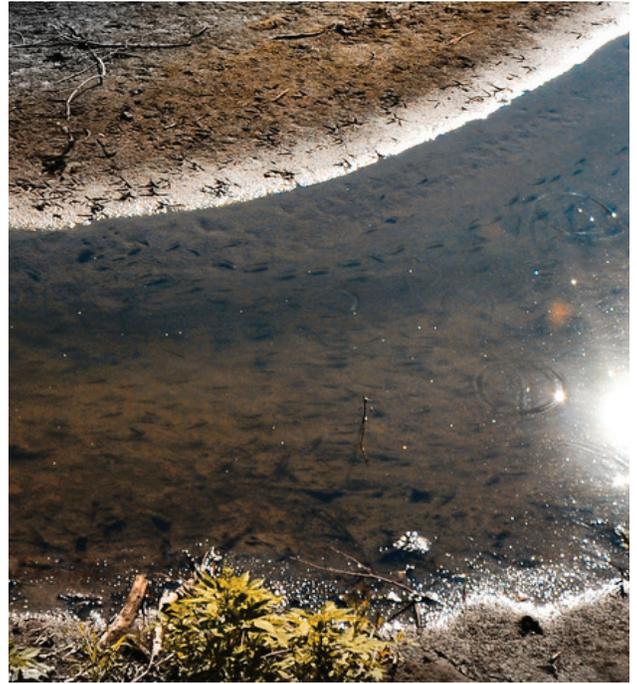
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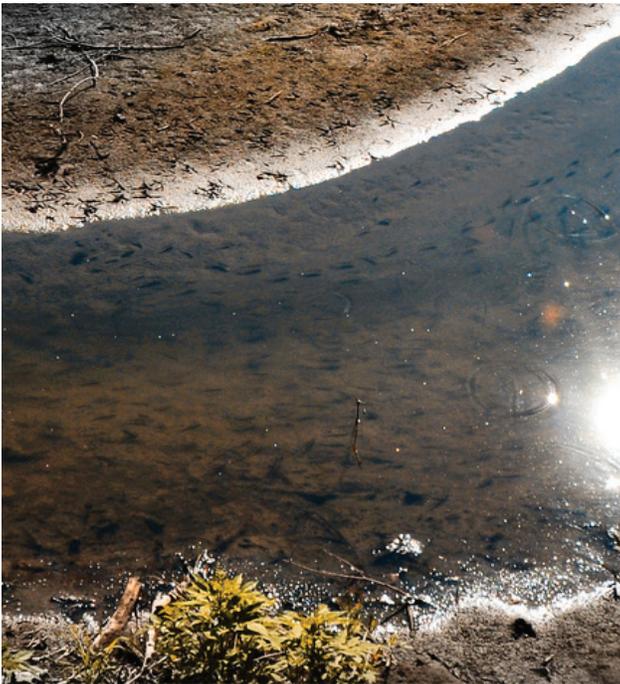
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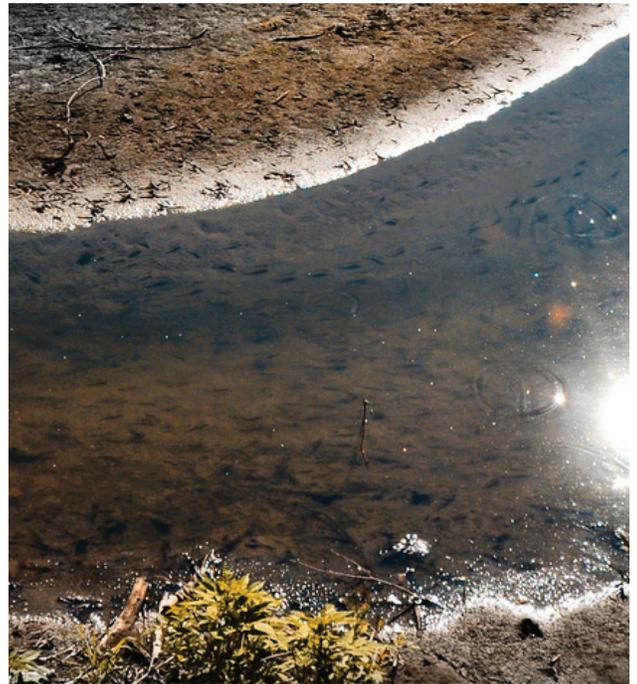
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**water**



**water**



**water**



air



air



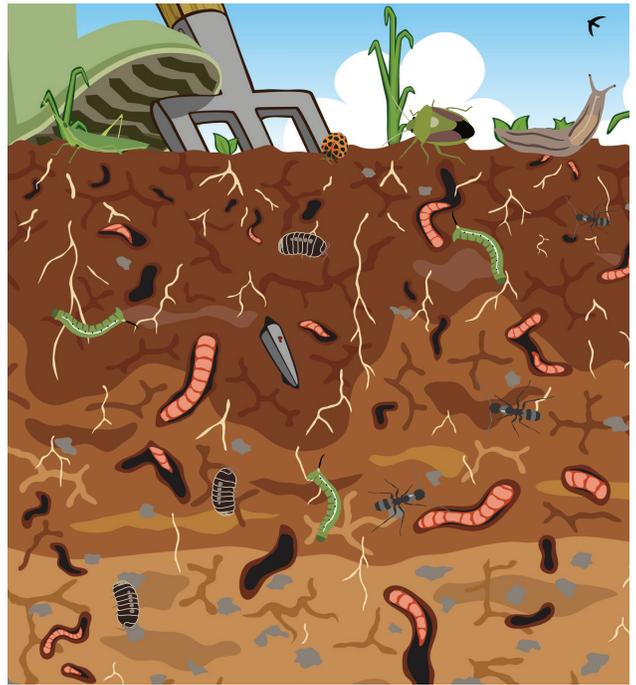
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air



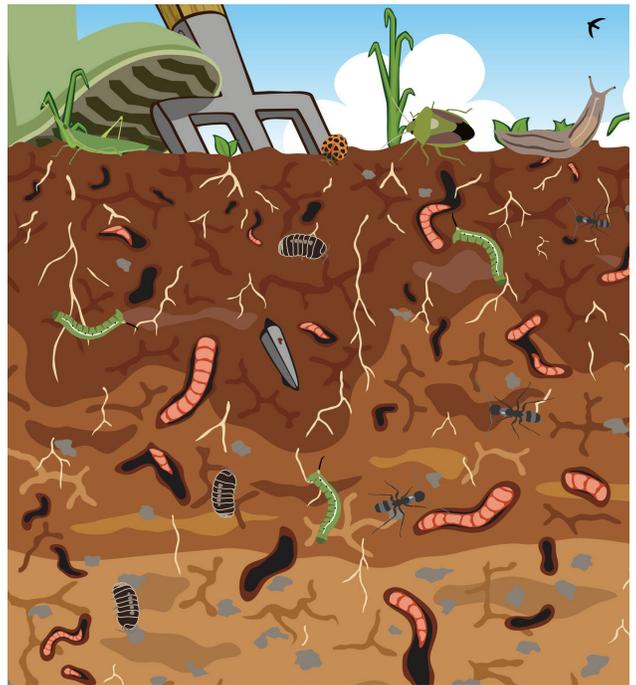
living things



living things



living things



living things



**organic matter**



**organic matter**



**organic matter**



**organic matter**

# Soil Parfait Recipe

This recipe represents the layers of the soil particles, as well as some of the important living things that help to make the soil healthy. To prepare this recipe, learners can line up and assemble their own.

Makes 20 sample-size portions

## Ingredients

- 2 cups granola or dry cereal .....
- 2 cups vanilla yogurt .....
- 1½ cups sunflower butter or peanut butter .....
- 1 cup honey .....
- 1 cup dried, unsweetened coconut (optional) .....
- 2 cups sunflower seeds or pumpkin seeds (optional)

## Ingredients in Soil

- Sand
- Silt
- Clay
- Water
- Organic matter or living things
- Insects living in the soil



## You will need:

- Small disposable cups
- Plastic spoons

## Directions:

1. Put out ingredients in the order listed above.
2. Review what each ingredient represents in the soil.
3. Place a plastic spoon in each ingredient.
4. Have learners line up to assemble their soil cups and have them take 1-2 spoonfuls of each item.
5. Once the cups have been assembled, ask them to first look at the layers that have formed in the cups.
6. Finally, have learners stir up their cups, as the soil would be mixed up in nature and enjoy.



**REMEMBER TO  
WASH YOUR HANDS!**

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# Soil Salad Recipe

This recipe for a healthy rice and bean salad is used to demonstrate the different components of soil. The beans and rice represent different sized soil particles (sand and silt); the vegetables represent organic matter (things that were once living); the dressing represents water; and the cheese represents worms! Healthy soils contain all of these things.

Makes 20 sample portions  
Serves 6-8 as a side dish



## Ingredients:

- 1 can kidney beans, drained and rinsed
- 1 cup cooked brown rice
- ¼ teaspoon salt
- 1-2 carrots, washed, peeled, and shredded
- ½ can corn, drained
- ½ pint-sized container cherry tomatoes, washed and cut in half
- ½ green pepper, washed and chopped
- ⅓ cup vinaigrette dressing (store bought or homemade, recipe at right)
- ½ cup shredded low-fat cheese

## You will need:

- Can opener
- Colander
- Mixing bowl
- Serving spoon
- Measuring spoons

## Directions:

1. Place beans, salt, rice and vegetables in a large bowl.
2. Add dressing.
3. Mix thoroughly.
4. Top with cheese (if desired).

**Cook's note:** Vary your veggies! The vegetables suggested here are only suggestions. This recipe works with just about any vegetable that you might include in a salad. Experiment and enjoy!

## Tex-Mex Vinaigrette

### Ingredients:

- 1-2 Tablespoons red wine vinegar
- 1½ teaspoons mustard
- ½ teaspoon ground cumin
- Pinch cayenne (optional)
- 3 Tablespoons olive oil
- Salt and pepper to taste

### Directions:

1. Place vinegar, mustard, and cumin in a bowl.
2. Whisk in olive oil.
3. Season with salt and pepper.
4. Taste and adjust seasonings.
5. Use in soil salad, or other salads.



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