Workbook Preview

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Grade 3 Science – 2022 Curriculum

Soils in the Environment

	Curriculum Expectations	Pages
E1.1	assess the importance of soils for society and the environment	36-37, 99-103
E1.2	assess the impact of human activity on soils, and describe ways in which humans can improve the quality of soils and/or lessen or prevent harmful effects on soils	77-81, 84-92, 96-98, 104-105, 108-114
E2.1		, 33
E2.2		87
E2.3	examine different types of soils found in Ontario, and describe how different soils are suited to growing different types of food, including crops	21-26, 38-46, 51-59, 62-76
E2.4	explain the process of erosion, including its causes and its impact on soils	104-105, 108-114
E2.5	identify various strategies used to maintain and improve soil health in Ontario	88-90, 96-98
E2.6	describe the process of composting, and explain some benefits of composting	88-92

Preview of 90 pages from this product that contains 180 pages total.

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Grade 3 Science Unit

Strand A - STEM Investigation and Communication Skills

	Curriculum Expectations	Pages
A1.1	use a scientific research process and associated skills to conduct investigations	120-123
A1.2	use a scientific experimentation process and associated skills to conduct investigations	34-35, 47-50
A1.3	use an engineering design process and associated skills to design, build, and test devices, models, structures, and/or systems	18-20, 31-32, 47-50, 60-61, 94-95, 106-107
A1.4	follow established health and safety procedures during science and technology investigations, including wearing appropriate protective equipment and clothing and safely using tools, instruments, and materials	18-20, 31-32, 34-35, 60-61, 94-95, 106-107
A1.5	communicate their findings, using science and technology vocabulary and formats that are appropriate for specific audiences and purposes	18-20, 31-32, 34-35, 60-61, 94-95, 106-107
A2.1	write and execute code in investigations and when modelling concepts, with a focus on decomposing problems into smaller steps	82-83, 93, 115-118
A2.2	identify and describe impacts of coding and of emerging technologies on everyday life	82-83, 119-123
A3.1	describe practical applications of science and technology concepts in their home and community, and how these applications address real-world problems	119-123
A3.2	investigate how science and technology can be used with other subject areas to address real-world problems	119-123
A3.3	analyse contributions to science and technology from various communities	119-123

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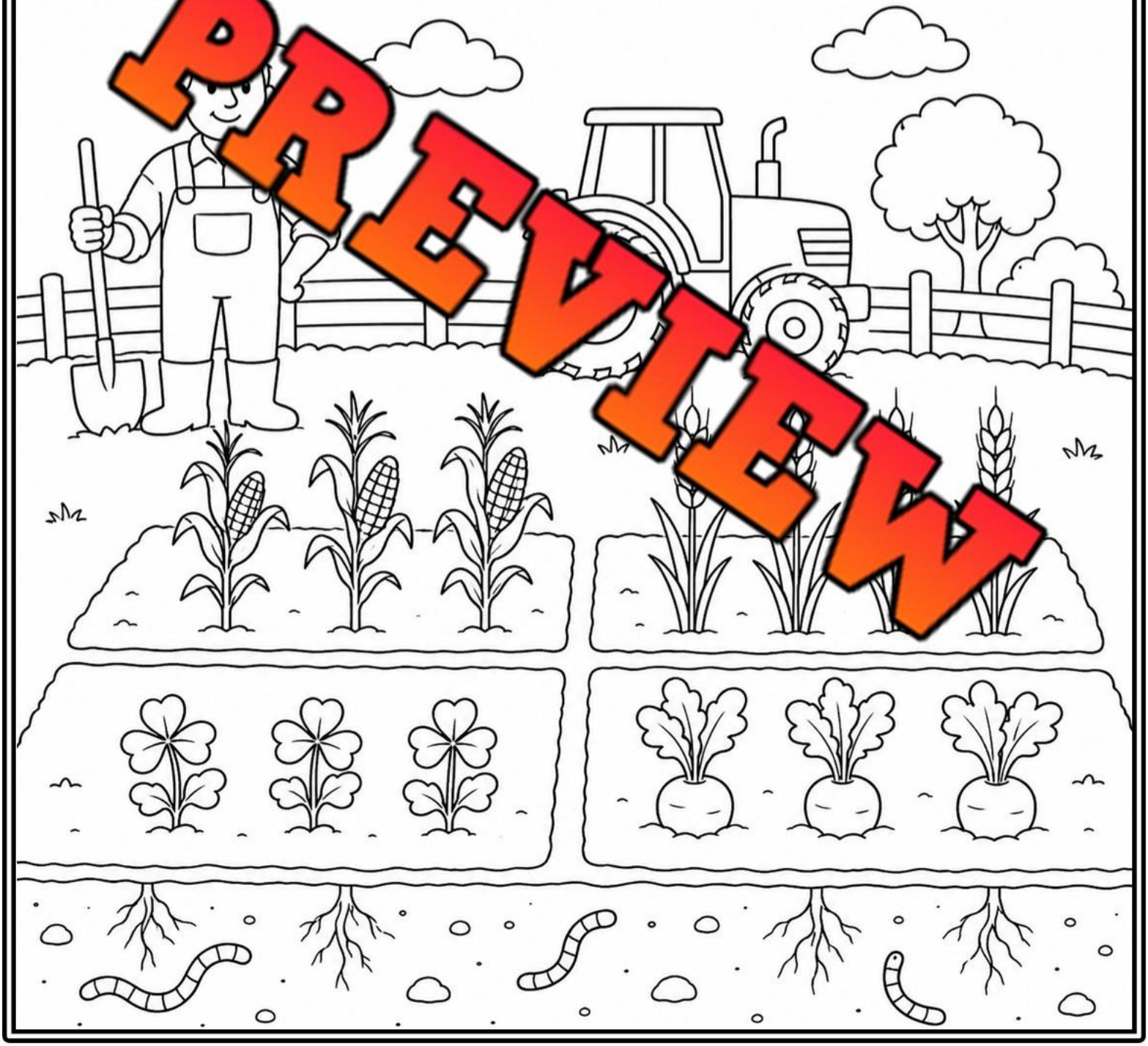
SOILS IN THE ENVIRONMENT



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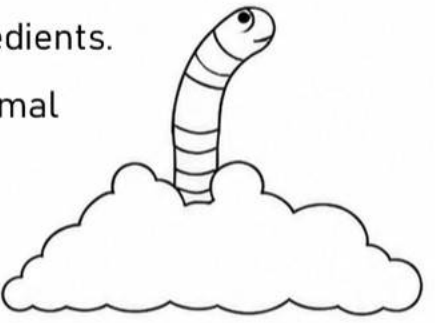
Curriculum Connection
E2.1

All About Soil

All About Soil



Soil is like a cake that is made from a lot of different ingredients. Soil has little bits of rock or sand, clay, dead plant and animal remains, fungi, and even manure – animal poop!

Soil contains lots of little creatures! Earthworms are important for soil because they turn plant and animal remains into nutrients. They also dig through the soil. This helps loosen the soil so plants can grow better.

PREVIEW

Importance of Soil

We need soil to provide plants with the water and nutrients they need to grow. This means that without soil, plants could not grow and without plants, humans could not survive either!



Soil is very important!

Interesting Facts About Soil

- Soil is alive! There are more microorganisms in a handful of soil than there are people on Earth
- Soil prevents floods because it soaks up and stores water
- Soil acts as a water filter as it filters out pollutants in our groundwater
- Without soil, humans could not survive because we need soil to grow plants
- Not all soil is the same. There are six main types of soil
- Sand is a type of soil that can grow some types of plants
- Darker soil is better for growing plants because it has more nutrients in it
- Erosion is the movement of soil from one place to another

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Curriculum Connection
E2.1

Questions Answer the questions below using evidence from the text.

1) What is soil? What is in it?

_____

_____

_____

2) Why is [illegible] important to humans and animals?

_____

_____

_____

PREVIEW

Questioning Write 3 [illegible] you [illegible] ut soil.

1)	
2)	
3)	

True or False Is the statement true or false?

1) Soil is alive because it has living things in it.	True	False
2) Soil is not very important to humans.	True	False
3) Nothing grows in sand.	True	False
4) The darker the soil, the better it is for growing plants.	True	False
5) Worms make soil better for plants.	True	False

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Curriculum Connection
E2.1

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark ____

Check only the true statements.

Statement	✓
There are fewer organisms in soil than people on Earth.	
Humans can live without soil easily.	
Sand is not a type of soil.	
Soil helps filter pollution from water.	
Darker soil has more nutrients in it.	
There are six main soil types.	
Soil is alive and full of life.	
All soil has the same nutrients.	
Soil can soak up rainwater.	

Name: _____ Mark ____

Check only the true statements.

Statement	✓
There are fewer organisms in soil than people on Earth.	
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All soil has the same nutrients.	
Soil can soak up rainwater.	

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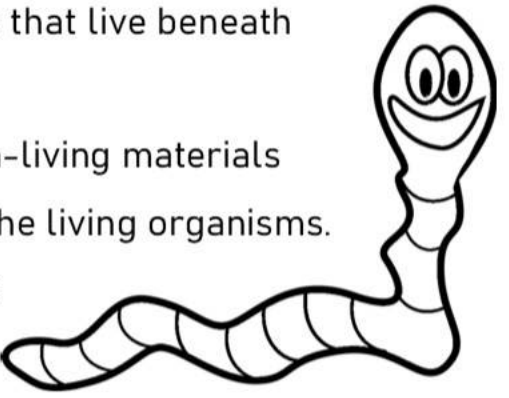
Curriculum Connection
E2.1

Soil is Alive!

Soil is Alive!

We often think that there is nothing more than the dirt beneath our feet, but it's not true! There is a whole other world of living creatures that live beneath our feet.



The ...isms that live in the soil need the non-living materials in the s... ...living things in the soil need the living organisms. Since ... need ..., they are interdependent!

Living Organi...

An **organism** is one ... That means we are all organisms as we are all animals. Some org... re ...t we cannot see them. One square metre of rich soil can contain ... organisms!

Living Organisms Interdependence with Non-L... Mat...

The living organisms in the soil need the non-... ...e. For example, earthworms are living organisms that fee... gr... leaves (non-living). They need this non-living material for food so they can have energy.



Their manure goes back into the soil to make rich, nutrient packed soil. **Manure** is animal poop that has a lot of nutrients in it. Worm manure is the best manure on Earth because it has the nutrients soil needs to help plants grow.

Living Things – Worms Get	Non-Living Things – Soil Gets
• Food for energy	• Nutrient rich manure that makes their soil better

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Curriculum Connection
E2.1

Questions

Answer the questions below using evidence from the text.

1) What is an organism? How many organisms live in one metre of soil?

2) Why do worms need soil and why does soil need worms?

PREVIEW

Draw

Draw a picture of soil (showing different types – sand, silt, clay) and worms digging through it. Label it and colour it in.

True or False

Is the statement true or false?

1) Worm manure is the best manure in the world.	True	False
2) Manure is special soil made from old food.	True	False
3) An organism is one animal or plant.	True	False
4) In one square metre of soil, there are over one billion organisms.	True	False
5) Worms need soil so they can eat the rocks.	True	False

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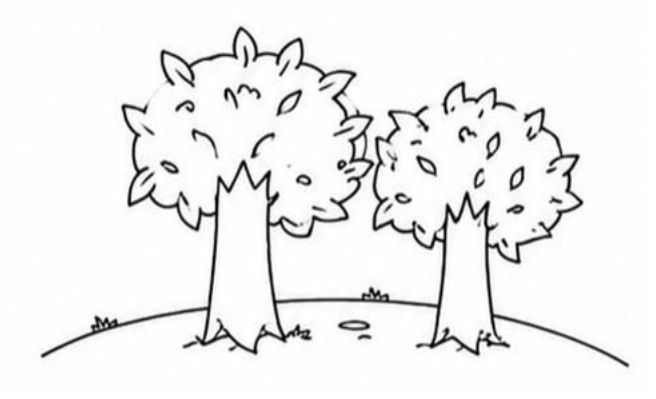
Curriculum Connection
E2.1

What is In Our Soil?

What Is Soil Made Of?



Soil is made up of rocks, organic material, living organisms, and water. These four ingredients make one of the Earth's most important [illegible]al resources.

Rock

We ha[illegible] seen [illegible]nd our schoolyard or in our backyard. Rocks are slowly weathered, m[illegible] brea[illegible] small pieces of rock that form soil.

Weathering [illegible]ns a[illegible] to deal with rain and snow as well as heat and freezing temperatu[illegible] facto[illegible] rocks into tiny grains of soil. Soil is made up of different sized roc[illegible] epe[illegible]er of soil.

Organic Material

Soil also has organic material in it. **Organic m[illegible]** is an [illegible] was alive and is now dead. So the leaves that fell in the Fall season [illegible]rganic [illegible]ial because they are now dead. Sticks, twigs, and even dead plants a[illegible]ial[illegible]o[illegible]nic material. Organic material is found on the top layer of soil.

Living Organisms

The soil also has many living organisms in it. Worms, moles, grubs, centipedes, slugs, mushrooms and many others all live in the soil. Most living things are found in the topsoil, which is the layer of soil close to the surface.



Water

Depending on the types of rocks in the soil, water could make up over 60% of the soil. Clay soils have a lot of water in them, making them fun to mould them!

PREVIEW

Name: _____ 16

Curriculum Connection
E2.1

Questions Answer the questions below using evidence from the text.

1) What four things are in soil?

_____

_____

2) How are each of the things below in soil?

Rock	
Organic Material	
Living Organism	
Water	

PREVIEW

Visualizing Draw what you were picturing while you were reading. Explain the picture.

_____

_____

_____

_____

_____

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Curriculum Connection
A1.3, A1.4, A1.5

Experiment – Soil Composition Test

Research Questions

What are we learning about?

Soil is usually made up of different types and textures of rocks. Soil could be mostly clay, silt, sand, or it could be a combination of all three. Today we will test soil from [illegible] environment to learn more about what is in it.

Materials

What do we need for our experiment?

- Mason jar with [illegible]
- Water
- Shovel or trowel
- Dish soap





Method

How do we complete the experiment?

1) Find an area with soil that you can see – perhaps a garden [illegible] a ditch.
2) Use the shovel to dig down about 20 cm.
3) Fill the mason jar half full of soil.
4) Add water to the mason jar so that it is three-quarters full.
5) Add a teaspoon of liquid dish soap.
6) Shake the jar for at least three minutes.
7) Leave the jar for at least 24 hours and if the soil has heavy clay, leave it for 48 hours.
8) Observe the different layers in your soil.

PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Observations | Common results you may see

Soil Types	Common Results
Sandy Soil	Sandy particles will appear on the bottom of the jar. The water will be fairly clear.
Clay	The water will still look cloudy. There will be a thin layer of dirt particles on the bottom. The water stays cloudy because it takes [illegible] for the clay particles to settle.
Peaty Soil	[illegible]e will [illegible] of floating pieces on the surface with a small [illegible]unt [illegible] the bottom. The water will be a bit cloud[illegible].
Chalky Soil	There will be a la[illegible] white s[illegible]nt on the bottom of the jar and the water will be a grayi[illegible]lou[illegible]
Loamy Soil	The water will be clear and the [illegible]e in la[illegible]n the bottom with the smallest particles [illegible]op.

PREVIEW

Observations | What did you notice?

Which type of soil is in your jar? Explain how you know.

_____

_____

_____

_____

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Curriculum Connection
A1.3, A1.4, A1.5

Diagram Draw the mason jar with the soils in it. Colour and label the layers.



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Curriculum Connection
E2.3

Memory Game: Soil Components

Objective

What are we learning about?

To reinforce students' understanding of key terms related to soil components and their characteristics through a memory matching game.

Material

What will you need for the activity?

- Memory ga[illegible]ro[illegible]ed) with the terms on one set and [illegible]efiniti[illegible]ther set.
- A flat surface like a [illegible]he fl[illegible]out the cards.



Instructions

How will you complete the [illegible]?

1) Divide the class into groups of 3 or 4. Give each [illegible] set [illegible]mory Game cards. (Provided)
2) Have each group lay all the cards face down in a grid on a [illegible]loor.
3) The students take turns flipping over two cards at a time, trying [illegible]nd a matching term and its definition.
4) If a student finds a match, they remove those cards from the grid and keep them.
5) If the cards do not match, they are turned back over, and the next student takes a turn.
6) The game continues until all the cards have been matched.
7) After the game, review the terms and definitions with the class.
8) Discuss why these terms are important to understand soil components and their characteristics.

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Curriculum Connection
E2.3

Cards | List of soil components and their characteristics

Soil Components	Definition
Rocks	Broken pieces of larger rocks that form soil through weathering.
Org[illegible]ateri[illegible]	Dead plant and animal matter found on the top layer of soil.
Living Organisms	[illegible]like worms and ins[illegible]t live in [illegible] top[illegible]
Water	Can constitute [illegible]60% of soil composition, particularly in clay soils.
Soil	A mixture of rocks, organic material, living organisms, and water.

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Curriculum Connection
E2.3

Cards | List of soil components and their characteristics

Soil Components	Definition
Weathering	The process of rocks breaking into small pieces due to rain, snow, and temperature changes.
[illegible]	The top layer of soil that is rich in organic material and living organisms.
Clay Soil	[illegible] holds a lot of [illegible] moldable [illegible]
Sand Soil	Soil with large [illegible] particles that drain water quickly.
Silt Soil	Soil with fine particles, smaller than sand but larger than clay.

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Curriculum Connection
E2.3

Cards | List of soil components and their characteristics

Soil Components	Definition
Chalky Soil	Soil with a layer of white sediment, often leading to a grayish water colour after stirring.
[illegible] Soil	Soil that is rich in organic matter and retains a lot of water.
Loamy Soil	[illegible] mix of sand, silt, [illegible] ideal for [illegible].
Sediment	Particles that se[illegible]at the bottom of water in peaty or chalky soil.
Grains of Soil	Tiny pieces of rock that result from weathered rocks.

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Curriculum Connection
E2.3

Cards | List of soil components and their characteristics

Soil Components	Definition
Decomposition	The breakdown of dead material into soil.
Sedi[illegible]y Ro[illegible]	Rocks formed by the deposition of material at the Earth's surface and within bodies of water.
Soil Layers	[illegible]levels of soil [illegible]ith varying [illegible]on.
Permeability	The ability of soil t[illegible] water flow through it, which varies among different soil types.
Soil Texture	The feel and composition of the soil based on the size of its particles, like sand, silt, or clay.

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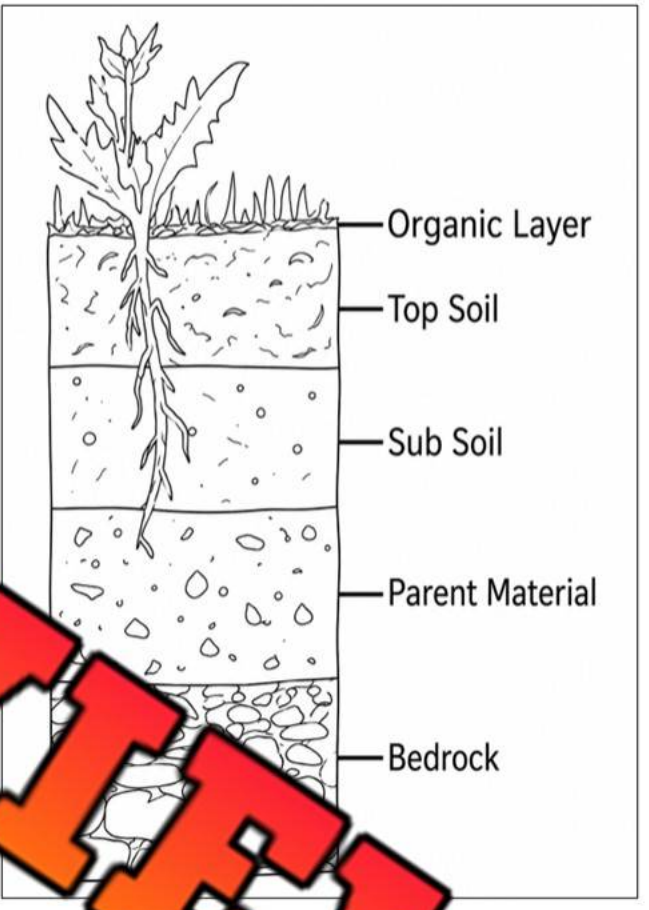
Curriculum Connection
E2.1

Layers of Soil

Layers of Soil

Soil has many layers below what we see from the surface. Each layer has different types of soil in it.



Organic [illegible] cm)

- [illegible]up of de[illegible]s, twigs, dead animals, l[illegible]ass
- The organic m[illegible]al ha[illegible] decomposed yet so[illegible] still se[illegible]

Topsoil (5 – 15 cm)

- Fairly thin layer where seeds begi[illegible] to grow into sprouts
- Made from organic matter like broken down plants and animals as well as tiny rock partic[illegible]

Subsoil (15 – 75 cm)

- Made from clay, iron, and organic materials

Parent Material (75 – 200 cm)

- Made of mostly large rocks. Very difficult to dig beyond this layer!

Bedrock (2 m – 1000+ m)

- Bottom layer that is made up of a large solid rock. This layer cannot be dug using a shovel. Instead, a drill is needed to dig through, like when a well is dug.

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Curriculum Connection
E2.1

Questions Answer the questions below using evidence from the text.

1) What are the different layers of soil made from?

_____

_____

_____

2) What c[illegible]ges would you have if you were digging a pool in your yard?

_____

_____

_____

PREVIEW

Draw Draw the th[illegible]wou[illegible]ach layer.

Organic Layer	
Topsoil	
Subsoil	
Parent Material	
Bedrock	

Curriculum Connection
E2.1

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark

Circle the correct answer.

1) Which layer has clay and iron in it?	Organic layer
	Subsoil
2) Which layer cannot be dug using a shovel.	Bedrock
	Topsoil
3) Which layer is made of large rocks?	Parent material
	Bedrock
4) Which layer is made up of dead plants?	Organic layer
	Topsoil
5) Which layer has tiny rock particles?	Subsoil
	Topsoil

Name: _____ Mark

Circle the correct answer.

1) Which layer has clay and iron in it?	Organic layer
	Subsoil
2) Which layer cannot be dug using a shovel.	Bedrock
	Topsoil
3) Which layer is made of large rocks?	Parent material
	Bedrock
4) Which layer is made up of dead plants?	Organic layer
	Topsoil
5) Which layer has tiny rock particles?	Subsoil
	Topsoil

Name: _____ Mark

Circle the correct answer.

1) Which layer has clay and iron in it?	Organic layer
	Subsoil
2) Which layer cannot be dug using a shovel.	Bedrock
	Topsoil
3) Which layer is made of large rocks?	Parent material
	Bedrock
4) Which layer is made up of dead plants?	Organic layer
	Topsoil
5) Which layer has tiny rock particles?	Subsoil
	Topsoil

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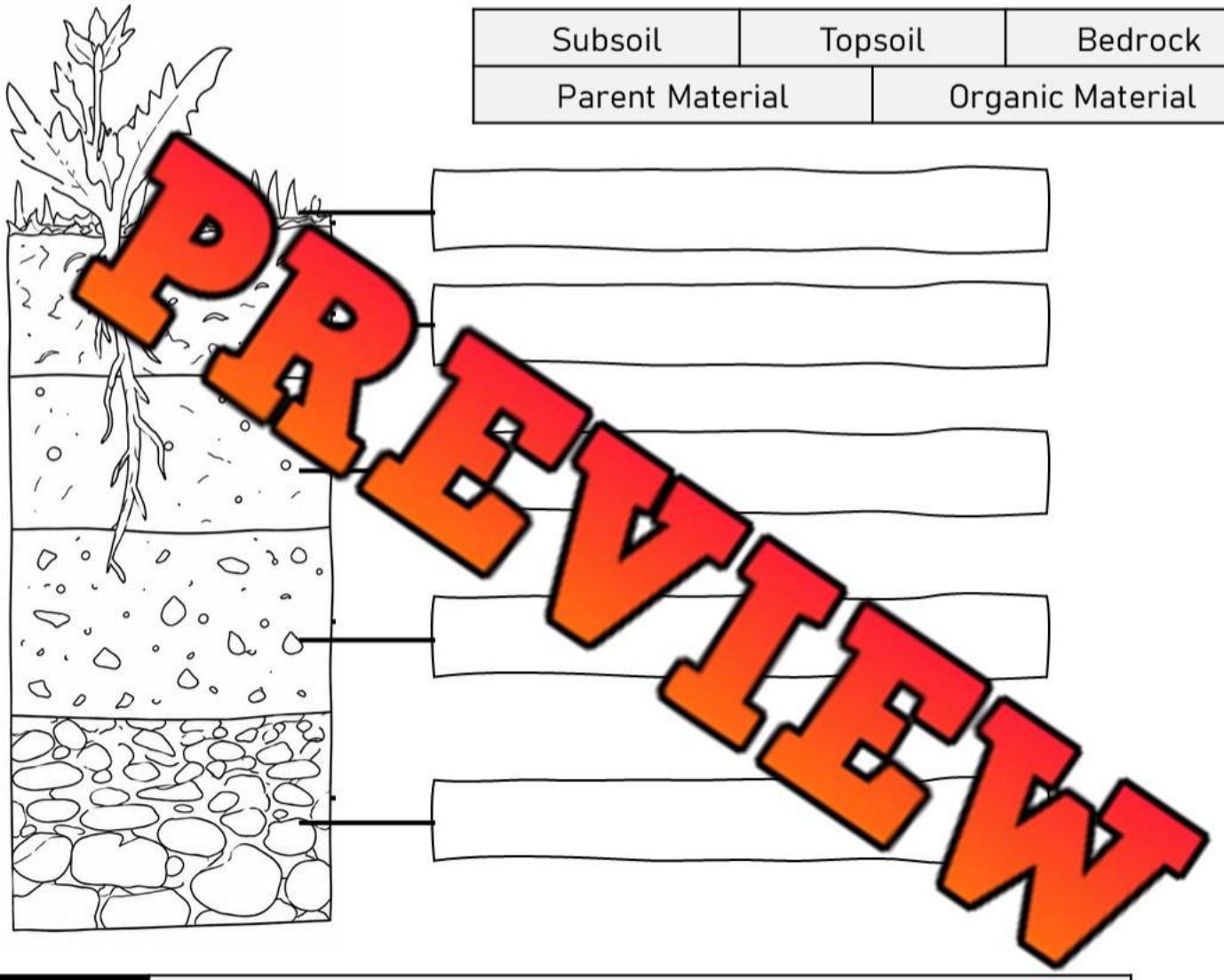
Curriculum Connection
E2.1

Layers of Soil

Questions Label the layers of soil below.



Subsoil	Topsoil	Bedrock
Parent Material	Organic Material	

PREVIEW

Matching Write the letter from the description beside the matching layer.

	Subsoil	a) Made up of large solid rock
	Topsoil	b) Made up of twigs, leaves and other organic matter
	Organic Layer	c) Made of mostly large rocks
	Bedrock	d) Made from clay, iron, and other organic material
	Parent Material	e) Made of organic matter – decomposed plants and animals as well as some small rocks

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Curriculum Connection
A1.3, A1.4, A1.5

Experiment – Layers of Soil Model

Background

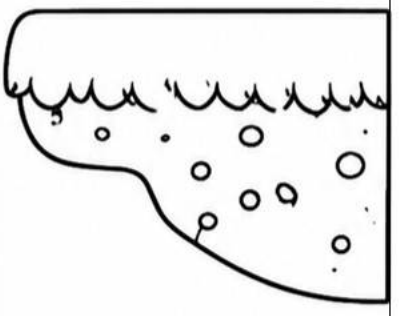
What is this experiment all about?

Soil is much more than just the dirt under our grass. Each layer is made-up of different particles and serves a specific purpose. Today we will be making a model representation of the layers of soil using yummy ingredients!

Material

What will you need for this experiment?

- Chocolate and butterscotch chips mixed
- Chocolate pudding
- Whole Oreos and crushed Oreos
- Gummy worms
- Shredded coconut mixed with green food colouring
- Clear cups or glasses to see the layers
- Spoons
- Tape, sticky-notes or labels



Method

How will you complete the experiment?

1) Drop an Oreo into the bottom to represent the bedrock
2) Put in a small handful of chocolate/butterscotch chips to represent the parent material
3) Spoon in the chocolate pudding to represent the subsoil
4) Toss in the crushed-up Oreos to portray the topsoil. Stick the gummy worms out of the topsoil
5) Sprinkle your coloured coconut on top, allowing the gummy worms to poke out.
6) Use tape, labels or sticky-notes to label each of the layers on the side of the cup.

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Name: _____ 32

Curriculum Connection
A1.3, A1.4, A1.5

Diagram Draw a diagram of your cup with each layer of soil. Label the diagram.



PREVIEW

Results Answer the questions belo

1) What did you learn about the different laye[illegible] soi[illegible]

_____

_____

_____

_____

2) If you were digging in your yard, which layer of soil would you struggle to dig through? Why?

_____

_____

_____

_____

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Curriculum Connection
E2.1

Maze Help Mr. Worm back up to the top from the starting point. Can you name all the layers in soil? Write the names in the blank labels.



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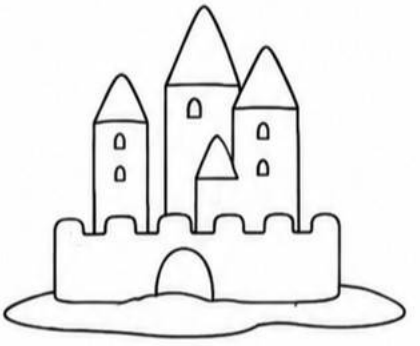
Curriculum Connection
E2.3

Sandy Soil



What is Sandy Soil?

Sandy soil is one of the types of soil that consists of small particles of weathered rock. It is also called **sand**.

We see sandy soil when we go to beaches all over Ontario. S oil has larger gritty particles that don't st e ll. This makes digging in sandy soil easy and fun when you want ake a s

Sandy Soil Disa ges

Sandy soil does not ho ery w th the large grains, there is a lot of space between each grain, me w n move through it easier. This makes it hard for a plant's roots to a water why you don't see many plants growing in sand along beaches.

Sand cannot hold water or nutrients ve ll. If you are using sand to grow a plant, you will need water it often. The plant will also need nutrients, so you'll need to add fertilizer too.



Sandy Soil Advantages

Sandy soil is good for water drainage. In areas where we need water to move, sand is used because it does not absorb water like other soils do. Many people add sand to the top of their lawn to help water drainage. If you have areas where water pools, you could add sand and grass to help the water drain into the ground.

Sandy soil is also easier to work with than other soils. It is light so it can be dug easily.

PREVIEW

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Curriculum Connection
E2.3

Advantages and Disadvantages Write some of the advantages and disadvantages of Sandy Soil below.

Advantages	
Disadvantages	

Questi Answ estions below using evidence from the text.

1) Why is sand build les with?

_____

_____

_____

2) What is sandy soil? What is it made of?

_____

_____

_____

PREVIEW

True or False Is the statement true or false?

1) Sandy soil has a lot of water in it.	True	False
2) Sandy soil has large grains of rock.	True	False
3) Sandy soil is easy to dig.	True	False
4) Sandy soil is made of small particles of weathered rock.	True	False
5) Plants grow well in sandy soil because it holds water and nutrients.	True	False

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Curriculum Connection
E2.3

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ | Mark

2 Truths and a Lie – Can you find the one that's not true?

	Sandy soil holds lots of water for a long time.
	Sandy soil has large gritty particles.
	Sandy soil helps water drain quickly.

Name: _____ | Mark

2 Truths and a Lie – Can you find the one that's not true?

	Sandy soil holds lots of water for a long time.
	Sandy soil has large gritty particles.
	Sandy soil helps water drain quickly.

Name: _____ | Mark

2 Truths and a Lie – Can you find the one that's not true?

	Sandy soil holds lots of water for a long time.
	Sandy soil has large gritty particles.
	Sandy soil helps water drain quickly.

PREVIEW

Name: _____ 41

Curriculum Connection
E2.3

Silt Soil

What is Silt Soil

Silt soil is soil that is made of small rock pieces that are smaller than sand particles but bigger than clay particles. Silt is dust-like, meaning the particles are too small to be seen.

Silt [illegible] better than sand for growing crops in because it holds water better. [illegible] drain through the small particles, but they do hold some water [illegible] the plant [illegible]rb. Air can also pass through the gaps between the silt particles.

When silt is [illegible]press[illegible]d together, it can form a rock. Thes[illegible]s are ca[illegible]stone.



[illegible]stone

About Silt Soil

- It is light and made of medium sized particl[illegible]
- Can be compacted easily to form siltston[illegible]
- Is easily washed away by the rain and can travel long distances in water
- Can also travel long distances through the air with the wind because it is so light
- It is formed when fine sediments like dust, organic matter, and debris are carried by water and then deposited
- Is commonly used to grow plants in



Silt Far[illegible]

PREVIEW

Name: _____ 42

Curriculum Connection
E2.3

Questions Answer the questions below using evidence from the text.

1) What is silt soil? Can plants grow in it?

2) What a[illegible] things you learned about silt soil?

PREVIEW

Questioning Write 2 [illegible]s yo[illegible]ut silt soil.

1)	
2)	

True or False Is the statement true or false?

1) Soil is alive because it has living things in it.	True	False
2) Soil is not very important to humans.	True	False
3) Nothing grows in sand.	True	False
4) The darker the soil, the better it is for growing plants.	True	False
5) Worms make soil better for plants.	True	False

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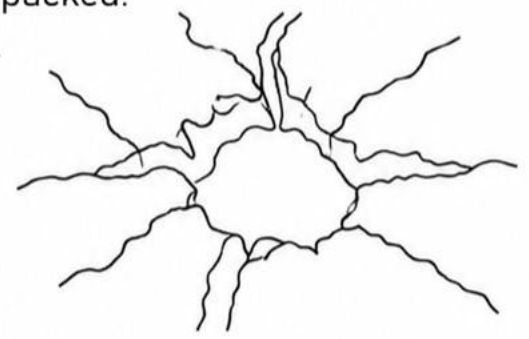
E2.3

Clay Soil

What is Clay?

Clay soil can be red or gray and is made up tiny pieces of rock that are packed very tightly together. This causes clay to hold water because the water cannot pass through the tiny rock pieces that are so tightly packed.



Clay is smaller than silt and much smaller than sand. You cannot see a single clay particle because they are so small.

Advantages of Clay Soil

- Clay soil holds lots of nutrients
- If you have sandy soil that doesn't hold water, you can add clay
- Plants with some clay soil will not wilt during a drought

Disadvantages of Clay Soil

- There is very little or no airspace between the particles of clay, so plants have no space to grow in
- During a heavy rainfall, the water in clay will not drain well and plants can become over-watered
- Clay is the heaviest soil because it holds water well and because it has almost no air inside.



Using Clay

Clay is very sticky to touch when it is wet, but it is smooth when it dries. Clay remains wet and cold in the winter, which makes it very sticky and dry in the summer. When clay dries, it is like a rock. Many artists use wet clay to mould sculptures. When they let it dry, they get a hard, and durable sculpture.

PREVIEW

Name: _____ 44

Curriculum Connection
E2.3

Questions

Answer the questions below using evidence from the text.

1) What is clay soil? What is it used for?

2) Why ca nts grow in clay?

PREVIEW

Visualizing

Draw what yo cturi ou were reading. Explain the picture.

True or False

Is the statement true or false?

1) Clay is the lightest soil because it holds water well.	True	False
2) Clay allows good airflow to the roots of a plant.	True	False
3) Plants cannot survive in clay.	True	False
4) Clay is made from tiny rock particles/pieces.	True	False
5) When clay dries, it becomes hard like a rock.	True	False

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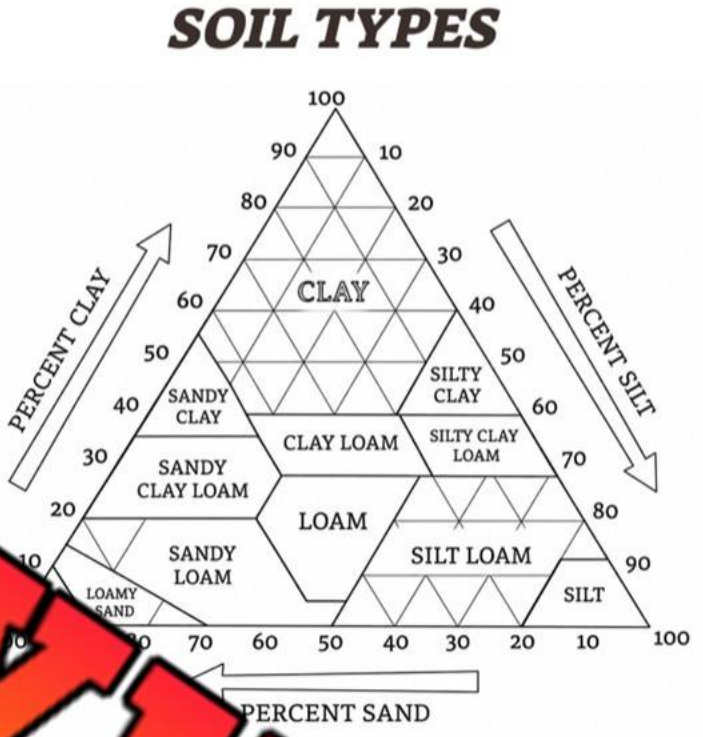
E2.3

Loamy Soil

What is Loamy Soil?

Loamy soil is soil that contains an equal amount of sand, silt, and clay. All of the benefits of those types of soil come together [illegible] loamy soil the best for gro[illegible]s



PREVIEW

Benefits of L[illegible]

- Allows wate[illegible]ain th[illegible] because of the sand[illegible]lt in it
- Holds water because of [illegible]ay in it
- The sand and silt allow air to reach the ro[illegible] the s[illegible]nts need air, which is why gardeners will aerate their garden[illegible] aw[illegible]les into the soil
- Loamy soil is the ideal soil for growing most plants in

Different Types of Loamy Soil

Plants have different needs. Some plants need more water than others. For these plants, a clay loam soil is best because the clay will hold more water than a regular loam soil.



By using different amounts of the three main types of soil, we can make a soil that is perfect for the plants we are growing. Sandy loam has more sand than silt and clay. Silt loam has more silt than clay and sand.

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E2.3

Questions

Answer the questions below using evidence from the text.

1) What is loamy soil made of?

2) What a[illegible]dvantages of using loamy soil in a garden?

PREVIEW

You Choose

Which typ[illegible]y s[illegible]ou use?

Plant needs wet soil	Plan[illegible]s dry	Regular plant

True or False

Is the statement true or false?

1) Loamy soil has an equal amount of sand, silt, and clay.	True	False
2) Loamy soil is ideal for growing plants.	True	False
3) Loamy soil does not absorb or retain water.	True	False
4) A loamy soil with a bit more sand is called sandy loam.	True	False
5) Loamy soil allows air to get to the roots of plants.	True	False

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Curriculum Connection
A1.2, A1.3

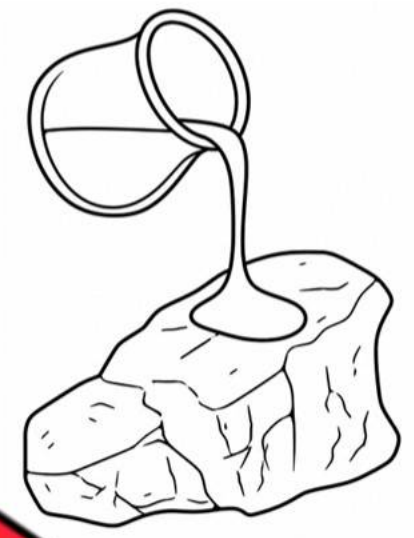
Experiment – Testing Water Absorption

Objective What are we learning about?

To understand how different types of soil absorb water differently.

Materials What will you need for the activity?

- T… co…s or cups
- Mea…uring c…
- Water
- Three types of s… (s…y), c… …y soil)
- Stopwatch or timer



Instructions How will you comple… …e acti…

1) Fill each container with a different type of … …for the water at the top of the container.
2) Measure and pour the same amount of water into each co…
3) Start the stopwatch or timer.
4) Observe how quickly each type of soil absorbs the water. You can determine this by seeing when there is no more water visible on the surface of the soil.
5) Record the time it took for each type of soil to absorb the water.
6) Optional: Repeat steps 2 to 5 again to get an average time for each soil type.
7) Using the data, fill in the table on the next page.
8) Use the data from the table to make a bar graph

PREVIEW

Name: _____ 48

Curriculum Connection
A1.2, A1.3

Data Fill in the table below with your results.

Soil Type	Sand	Loam	Clay
Time in Seconds (1)			
Time in Seconds (2)			
Aver (add … e by 2)			

PREVIEW

Graph Make … graph …

Title:

Sand	Loam	Clay

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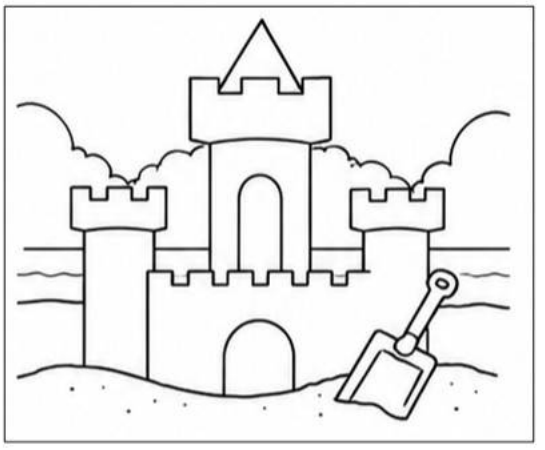
Curriculum Connection
E2.3

Water and Soil

Water Holding Capacity



The water holding capacity of a soil means how much water the soil can hold. Clay soil holds the most water because the particles in clay are so tiny th r moves slowly between them. This m ets stuck, so the clay holds the w longer.

Sandy le ter because the particles are large so there are many gaps betwe ch p e means the water can flow through these gaps easily. Loamy soil in both d clay, which means it holds an average amount of water, wh s go t.

PREVIEW

Effects of Water on Soil

Have you ever built a sandcastle? Well, if yo , y nted with the effect of water on soil. You probably noticed that w he sand , it will form a better castle, and it will hold its shape better.

If the sand is dry, the cohesion between the sand particl strong enough. **Cohesion** is the sticking together of particles. Sand is not very cohesive, as you probably noticed when your castle blew over in the wind.



Clay soils are very cohesive because the particles are so small. When the water between the small particles evaporates and dries, the clay becomes almost like cement. Therefore, the smaller the soil particle, the more cohesive it is.

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E2.3

Questions

Answer the questions below using evidence from the text.

1) Which soil holds the most amount of water? Why does it hold more?

2) What i[illegible]esion? Which soil is the most cohesive?

PREVIEW

Making Connections

What [illegible]is reading remind you of?

Wordsearch

Find the words from the word bank.

Word Bank	
Soil	Sand
Loam	Silt
Clay	Water
Cohesion	Sticky

K J J F B B H L Q K U L Z J Y I D
G K J A A K A I X R Z M J W S T S
C L A Y G M L G K L G X G C I D O
Q W Y F M Y O C W G H H R H L N I
S T I C K Y A P K C F O R R T A L
W A T E R S M C O H E S I O N S L
J E E Z E M G C E Q J T E P E I L

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Curriculum Connection
E2.3

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

Which soil holds the MOST water?	
	○ Clay soil
○ Dry soil	○ Rocky soil
Which soil lets water move through it the FASTEST?	
○ Sandy soil	
○ Clay soil	○ Wet soil

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

Which soil holds the MOST water?	
○ Sandy soil	○ Clay soil
○ Dry soil	○ Rocky soil
Which soil lets water move through it the FASTEST?	
○ Sandy soil	○ Loam soil
	○ Wet soil

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

Which soil holds the MOST water?	
○ Sandy soil	○ Clay soil
○ Dry soil	○ Rocky soil
Which soil lets water move through it the FASTEST?	
○ Sandy soil	○ Loam soil
○ Clay soil	○ Wet soil

Name: _____

Put a checkmark (✓) on the correct answer!

Mark

Which soil holds the MOST water?	
○ Sandy soil	○ Clay soil
○ Dry soil	○ Rocky soil
Which soil lets water move through it the FASTEST?	
○ Sandy soil	○ Loam soil
○ Clay soil	○ Wet soil

PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Experiment – Making A Water Filter

Research Questions

What are we learning about?

Can we filter dirty water using soil to make the water clean?

Materials

What do we need for our experiment?

- ❑ 2-lit[illegible]tle, emptied and clean
- ❑ D[illegible] (us[illegible]offee grounds, old cru[illegible]ed up [illegible]iny pieces of foam)
- ❑ Measuring [illegible]
- ❑ Spoon
- ❑ Stopwatch or any cl[illegible] sec[illegible]
- ❑ Filtering materials in soil[illegible]avel
- ❑ Coffee filter (old sock, napkin, pa[illegible]wer wi[illegible] work too)



PREVIEW

Method

How do we complete the experiment?

1) Cut the top off the 2-litre bottle and flip it over to fit it back[illegible]art of the bottle.
2) Place the coffee filter or paper towel into the bottom of the filte[illegible]
3) Add all your materials as layers into your filter. Do this strategically in terms of size of materials.
4) Record the order of your materials on the back of this page. Draw a diagram of the filter.
5) Stir the dirty water and measure a cup of it.
6) Pour the dirty water into the filter. Time how long it takes for the water to pass through the filter.
7) Carefully scoop out the filter materials. Make a note of which materials took what out of the water.

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Curriculum Connection
A1.3, A1.4, A1.5

Observations | What did you notice?

1) Which materials did you use for the layers in your filter?

2) Draw a diagram of the layers of your filter. Label each layer.

3) How long did it take fo ter t ough the filter?

4) When you took the materials out, d you not hic terials took out which parts of the dirty water?

5) How does soil in our environment help us have clean water to drink and use?

PREVIEW

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Curriculum Connection
E2.3

Plants Profiles – Types of Soil

Questions Answer the questions below.

1) The Bearded Iris flower plant grows well in soil that is dry, has a lot of air, and has good drainage.



a) Which type of soil would you use to grow this flower?

b) If your soil had a lot of clay and silt, what could you add to the soil to make it better for growing the Beaded Iris? Explain.

2) Hosta plants grow well in soil that has good drainage and less air.



a) Which type of soil would you use to grow this plant?

b) If your soil had a lot of clay and silt, what could you add to the soil to make it better for growing Hostas? Explain.

3) The Weeping Willow tree grows well in soil that has moderate drainage and air.



a) Which type of soil would you use to grow this plant?

b) If your soil had a lot of clay and sand, what could you add to the soil to make it better for growing Hostas? Explain.

PREVIEW

Name: _____ 63

Curriculum Connection
E2.3

Plant Profile – Cactus

Cactus Plant

A cactus plant is one of the few plants that can grow well in a desert. This is because a cactus can store water in its stems, roots, and leaves. Even if it doesn't rain for a long time, cacti still have water saved up to help them grow.



In fa a cactus plant can live for over a year without ra plants need regular rainfalls in order t

Growi Cactus

Cacti will gro that dy. This is because they do not need as much water to grow. They also and b se eed air flow in their roots. Sandy soil allows air to get deep into the s e plant.



When you water a cactu eeds If the water pools in the soil, the cactus can begin to rot. This happens because a cactus can o store so much water. So if it is full, the water w and

PREVIEW

Multiple Choice Circle the correct answer.

1) Cactus plants grow best in which type of soil?		and
2) Cactus plants can survive how many days without water?	100	1 Year
3) If you over water a cactus, it will get	Root Rot	Wet Roots
4) Cactus plants need what in their roots?	Air	Rocks

Question How do you grow a cactus plant?

_____

_____

_____

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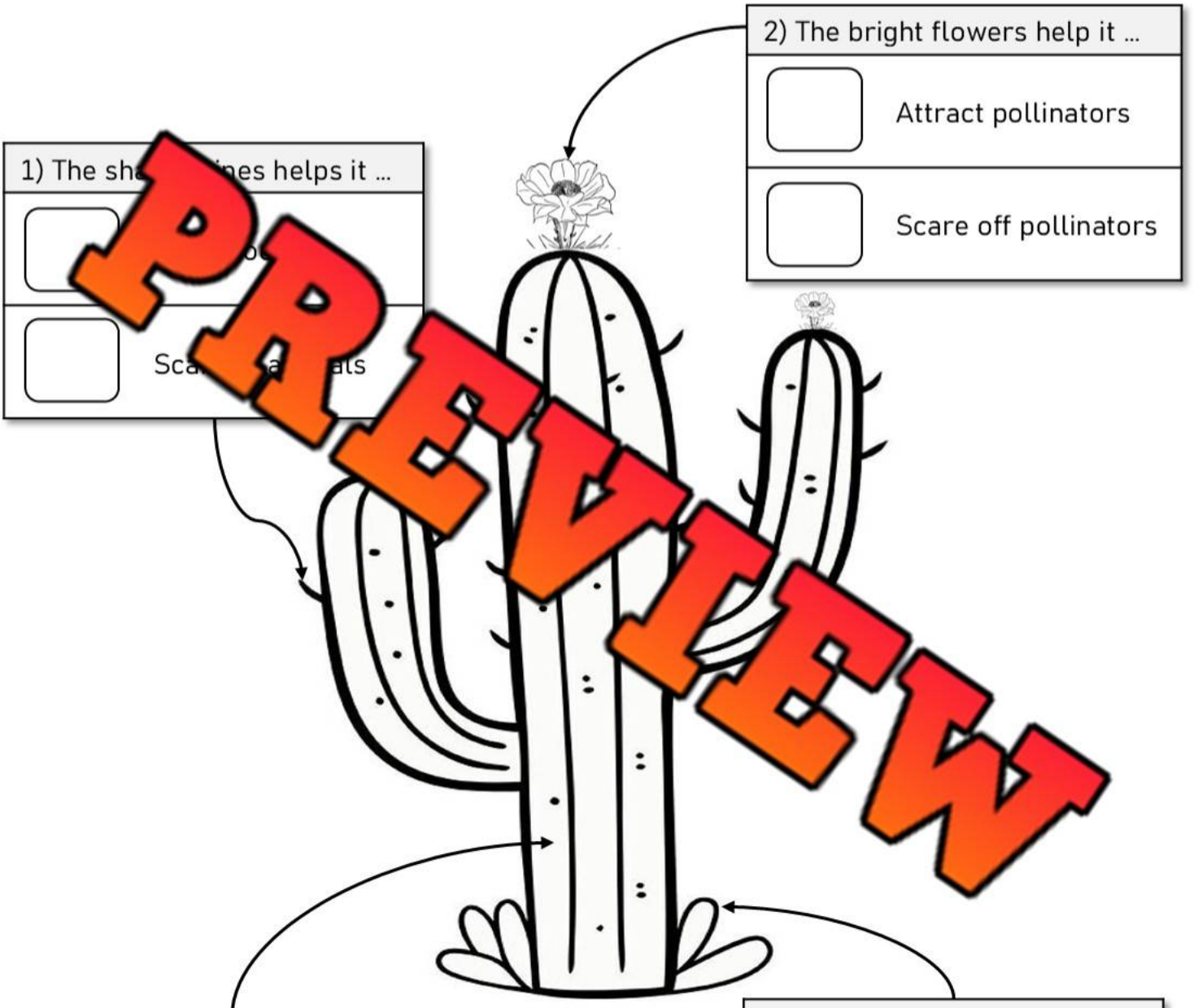
E2.3

Plant Profile – Cactus

Multiple Choice Circle the correct answer.



2) The bright flowers help it ...

- ☐ Attract pollinators
- ☐ Scare off pollinators

1) The sha[illegible]nes helps it ...

- ☐ [illegible]
- ☐ Sca[illegible]als

3) The thick stem help it ...

- ☐ Attract insects
- ☐ Store water

4) The wide roots help it ...

- ☐ Collect water from the surface
- ☐ Change its temperature

PREVIEW

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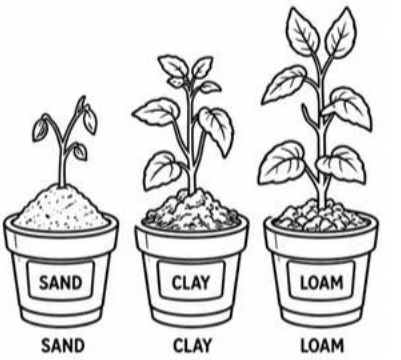
Curriculum Connection
E2.3

Activity – Plant Growth in Different Soils Experiment

Objective

What are we learning about?

To observe and compare how different types of soil affect plant growth, helping students understand the importance of choosing the right soil for healthy plant development.



Materials

What will you need for the activity?

- Th[illegible]mall p[illegible]ainers
- Soil types: [illegible]d l[illegible]
- Seedlings ([illegible], e.g., [illegible]nts)
- Water
- Ruler
- Notebook and pen for [illegible]ons

Instructions

How will you compl[illegible] activi[illegible]

1) Label each pot with the type of soil it will [illegible]: Sa[illegible]ay [illegible]oam
2) Fill each pot with one of the four soil types, about [illegible]rters
3) Plant one seedling in each pot at the same depth.
4) Water each pot with the same amount of water, keeping the soil moi[illegible]not overly wet.
5) Place all pots in a location where they can get equal amounts of sunlight.
6) Over a month, water the plants regularly, and use the ruler to measure the growth of each plant every week.
7) Record the height of each plant and any other observations (like leaf color and health) in the notebook.
8) Ensure to check the moisture level of each type of soil during watering, as different soils retain water differently.

PREVIEW

Name: _____ 66

Curriculum Connection
E2.3

Record Use this sheet to record the height of each plant and any other observations.

Weekly Growth Record			
Week	**Sand Soil Height (in centimeter)**	**Clay Soil Height (in centimeter)**	**Loam Soil Height (in centimeter)**
1			
2			
3			
4			

Observations				
Observations	**Week**	**[illegible]**	**Week 3**	**Week 4**
Sand Soil Observations				
Clay Soil Observations				
Loam Soil Observations				

PREVIEW

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Curriculum Connection
E2.3

Newspaper Article: Understanding Soils

Why Knowing About Soil is So Important

Publish Date: April 12, 2026

Understanding different types of soil is very important for many jobs, including farmers who grow food and engineers who build homes. Soil isn't just dirt—it's a mixture of minerals, water, air, and organic matter. There are mainly three types of soil: sandy, clay, and loam.

Dr. Emily Carter, a soil scientist at the University of Toronto, explains, "Knowing the type of soil can help farmers decide which plants will grow best. For example, sandy soil drains water quickly and is good for plants like cacti, while clay soil holds water and is better for rice."

Soil knowledge is not only crucial for farming but also for building safe buildings and roads. Engineers need to study the soil to make sure it is strong enough to support the structures built on it. "If the soil is too soft or has too much sand, it could make buildings sink or roads crack," says construction expert, Mr. Alan Cho.

In Ontario, where many of us live, the soil is sometimes heavy with clay. This is good for growing certain crops like flowers and canola but makes building tricky. It's important for engineers to test in other materials to make the soil stronger for construction projects.



Understanding soil helps professionals make smart choices that keep our food growing and our communities safe!

PREVIEW

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Curriculum Connection
E2.3

True or False

Is the statement true or false?

1) Farmers examine soil type to choose crops.	True	False
2) Engineers' work is unaffected by soil conditions.	True	False
3) Overly sandy soil can cause structural foundations to sink.	True	False
4) Ontario's clay soil simplifies construction projects.	True	False
5) Rice can grow well in sandy soil.	True	False

Question

Answer the questions below.

1) Write down three professionals who benefit from understanding soil types.

2) Why does knowing the type of soil is important before starting a construction project.

PREVIEW

Define

What do the terms below mean?

Minerals	
Soil Strength	
Construction Project	

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Curriculum Connection
E2.3

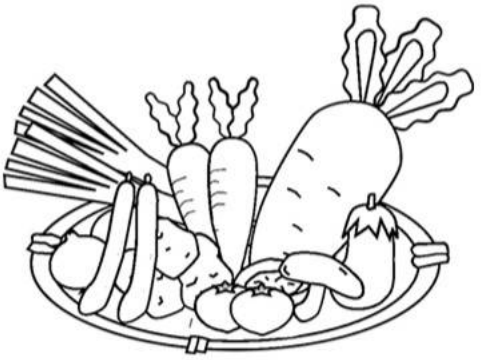
Soil and Its Super Powers in Food Production

Why Soil Matters for Growing Food

Soil is very important for growing food because it provides nutrients and support to plants. Depending on the type of soil, different kinds of crops can grow better or worse. The quality of soil affects how much food a plant can produce, which is why farmers p[illegible]t of attention to making their soil as healthy as possible.

PREVIEW

Diff[illegible]y[illegible] of[illegible]d What They Grow Best



1) **Sandy Soil:** [illegible]ns[illegible]ickly and best for growing ca[illegible]adishe[illegible]tatoes
2) **Clay Soil:** Sticky, [illegible]ly [illegible]t for rice and wheat
3) **Loamy Soil:** Soft and crumbly, w[illegible]nced[illegible]and best for growing most vegetables and fruits like tomatoes and ap[illegible]

How Soil Influences Food Around the World

The type of soil in a place can tell you what food will g[illegible]ere[illegible]For example:

- In places with a lot of sandy soil, like Egypt, people grow a lot o[illegible]t and barley because these crops can handle drier soil.
- In areas with more clay soil, like some parts of India, rice is a common crop because it needs lots of water, which clay soil holds well.

Cool Soil Facts

Soil has nutrients like nitrogen and potassium which plants need to grow.

About 95% of our food comes from the soil.

Good soil means more food, which helps everyone have enough to eat.

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Curriculum Connection
E2.3

Questions

Answer the questions below using evidence from the text.

1) Why do farmers care about soil health?

2) How d[illegible] type influence food production globally?

PREVIEW

Summarize

Write a pa[illegible]on [illegible]oil is important for growing food.

True or False

Circle whether the statement is true or false.

1) Clay soil is perfect for tomatoes and apples.	True	False
2) Nitrogen is a nutrient in soil.	True	False
3) Most of our food comes from the air.	True	False
4) Rice needs lots of water to grow.	True	False
5) Good soil can't help plants grow more food.	True	False

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Curriculum Connection
E1.2, E2.2

Pesticides – Benefits and Drawbacks

Pesticides

Many farmers use pesticides because they don't want to lose their crops to pests that eat them. When they lose their crops, they are losing money that they could be making if they sold their crops.

PREVIEW

Benefits of Pesticides

- Farmers get to keep more of their crops
- Prices on vegetables are lower because the supply of plants is higher as farmers aren't losing their supply to pests
- Prevention of disease because pesticides kill bacteria on plants

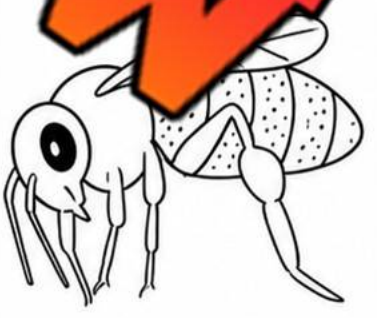


Negatives of Pesticides

- Damages soil and the environment because they are chemicals
- Kills animals regardless of whether they are pests
- It is not as healthy for humans to eat plants that have been sprayed with pesticides

Bad Effects of Pesticides

- Honeybee populations are plummeting in Canada. Without bees, one-third of the food we eat will be gone. Bee populations have dropped 30% since 2006.



- Pesticides are hurting the bat population. Scientists think it is because they have been exposed to pesticides, which has weakened their immune system. With less bats, bug populations are growing.



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Curriculum Connection
E1.2, E2.2

Questions Answer the questions below using evidence from the text.

1) Why do farmers use pesticides?

2) Do you think farmers should use pesticides? Explain.

PREVIEW

Questioning Write 2 questions you have about pesticides.

1)	
2)	

True or False Circle whether the statement is true or false.

1) Pesticides are only bad and have no benefits.	True	False
2) We need pesticides so we can have enough food and low prices.	True	False
3) Using pesticides has led to the bat and bee populations dying.	True	False
4) It is not healthy for humans to eat food with a lot of pesticides.	True	False
5) Pesticides kill diseases on plants.	True	False

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Curriculum Connection
E1.2, E2.2

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark

Circle the correct answer.

1) Why do many farmers use pesticides?	Keep crops safe
	Make plants blue
2) What is one BAD effect of pesticides?	Helps bees grow
	Hurts bees
3) Why are pesticides sprayed on plants?	To stop pests
	To dry the soil
4) Which animal is harmed by pesticides?	Honeybees
	Dolphins
5) What can pesticides damage?	Soil and environment
	Clouds

Name: _____ Mark

Circle the correct answer.

1) Why do many farmers use pesticides?	Keep crops safe
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	To dry the soil
4) Which animal is harmed by pesticides?	Honeybees
	Dolphins
5) What can pesticides damage?	Soil and environment
	Clouds

PREVIEW

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Curriculum Connection
A2.1, A2.2

Coding - Else Statements

An **else** statement works like an if statement. When an if statement is false, we can have another command, instead of nothing happening.

Is there a storm coming?

IF there is a storm coming → THEN stay inside

ELSE → Keep playing wherever

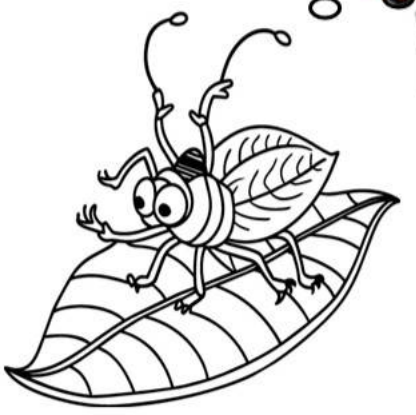
PREVIEW

Directions: ELSE commands below with your own ideas.

Are bugs eating the farmer's crops?

IF [illegible] crops → THEN

ELSE



Are the pesticides hurting healthy animals?

IF pesticides are harming animals → THEN

ELSE



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Curriculum Connection
A2.1, A2.2

Directions Fill in the ELSE commands below with your own ideas.

Are honeybees near the plants?

IF bees are near the plants

THEN

ELSE



Is the farmer spraying too many pesticides?

IF the farmer uses too many pesticides

THEN

ELSE

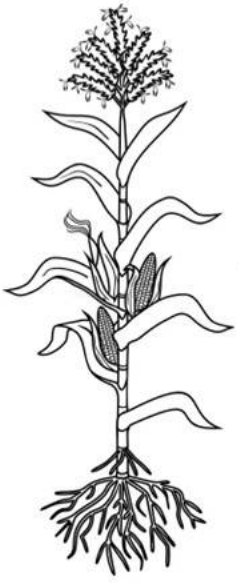


Are pests destroying the crops?

IF pests are destroying crops

THEN

ELSE



PREVIEW

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Name: _____ 86

Curriculum Connection
E1.2, E2.2

Organic Matter

What is Organic Matter?

Organic matter is anything that was once alive but has decayed to the point where you can't tell what it was. It is important that organic matter returns to the environment so that it can help new plants grow.

There are several types of organic matter that make up soil, such as compost and manure. Farmers use compost and manure to improve their soil and return the organic matter to the earth.

PREVIEW

Compost

When we eat fruits and vegetables, we have rotting plants. We can **compost** these rotting plants when we are done with them by putting them in a container.

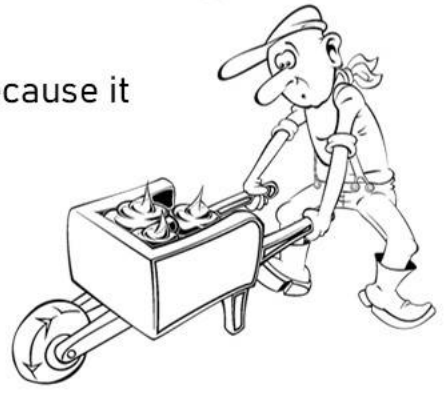


Over time, the organic waste is broken down by decomposers and becomes humus, which becomes a nutrient rich part of soil.

Compost is high in nitrogen, phosphorus, and potassium. Plants need these nutrients to grow. This makes soil with compost great for growing plants.

Manure

As animals eat, the waste they make is organic matter because it contains broken down foods. We call this waste **manure.**



Manure is used as a fertilizer to make soil richer in nutrients. Manure is like compost because it also has nitrogen, phosphorus, and potassium. Manure also has copper and zinc. Plants grow well in soils with these nutrients.

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Name: _____ 87

Curriculum Connection
E1.2, E2.2

Questions
Answer the questions below using evidence from the text.

1) Why is composting so important?

2) What is [illegible]re? Have you ever smelled manure from a farm?

PREVIEW

Define
What do the t[illegible]ow

Manure	
Compost	

Wordsearch
Find the words from the word bank.

Word Bank	
Soil	Compost
Manure	Zinc
Copper	Nitrogen
Plants	Grow

N I T R O G E N P L A N T S M G
K L G X G C Q W S O I L Y F M Y
C O M P O S T C W H H R G R O W
H P K C F O R R S L J E E Z E M
G C E Q J T E P E I L H S X T V
M A N U R E Z I N C O P P E R U

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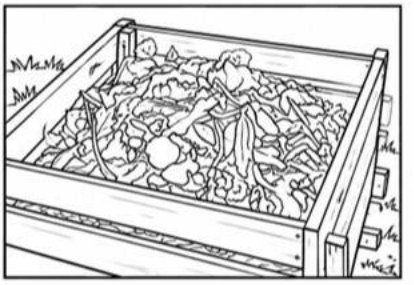
Curriculum Connection
E1.2, E2.5, E2.6

Composting

What is Compost?

Compost is decomposed organic material. This means that compost is broken down dead stuff! When something dies, like a plant, it will break down slowly into soil. The soil is actually compost, which is rich soil.



Dec

Decomposers a fungi, and other living organisms that eat dead plants and animals. k dow caying matter so that it turns into soil to be used by plants.

When they break do lead animals, they release nutrients and mineral salts that go into the so ake soil rich in nutrients for plants to grow. Examples of decompo rs are molds, fungi, and worms that reuse and rec materials that were formerly living.



Decomposers are alive. They get their energy from the nutrients in dead matter. Worms take in food through their mouths and pass a 'cast' through their rear end. The cast is very valuable fertilizer for the soil.

What to Compost

As a general rule, you can compost things that were once growing but are now dead. Some examples include fruits, vegetables, paper, coffee, tea, and eggshells. You shouldn't compost cheese, medicines, or glass.

When you compost the right things, decomposers will begin to break down the dead matter, so it turns into good soil!

PREVIEW

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Curriculum Connection
E1.2, E2.5, E2.6

Questions

Answer the questions below using evidence from the text.

1) What are decomposers? How do they help create compost?

2) What c[illegible]u compost and what shouldn't you compost?

PREVIEW

Making Connections

[illegible]oes thi[illegible]g remind you of?

Word Scramble

Unscramble the words below using the word bank.

Compost	Soil	Worms	Bacteria	Fungi	Decay	Break	Down

IETCARAB		SWMRO	
DACEY		EKARB	
LOIS		COTPSMO	
WNDO		NIFGU	

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Curriculum Connection
E1.2, E2.5, E2.6

Colour

Look at how the children are using the compost bin in the backyard. Colour the picture neatly and circle the things that CAN be composted. Cross out the things that SHOULD NOT go in the compost bin.



PREVIEW

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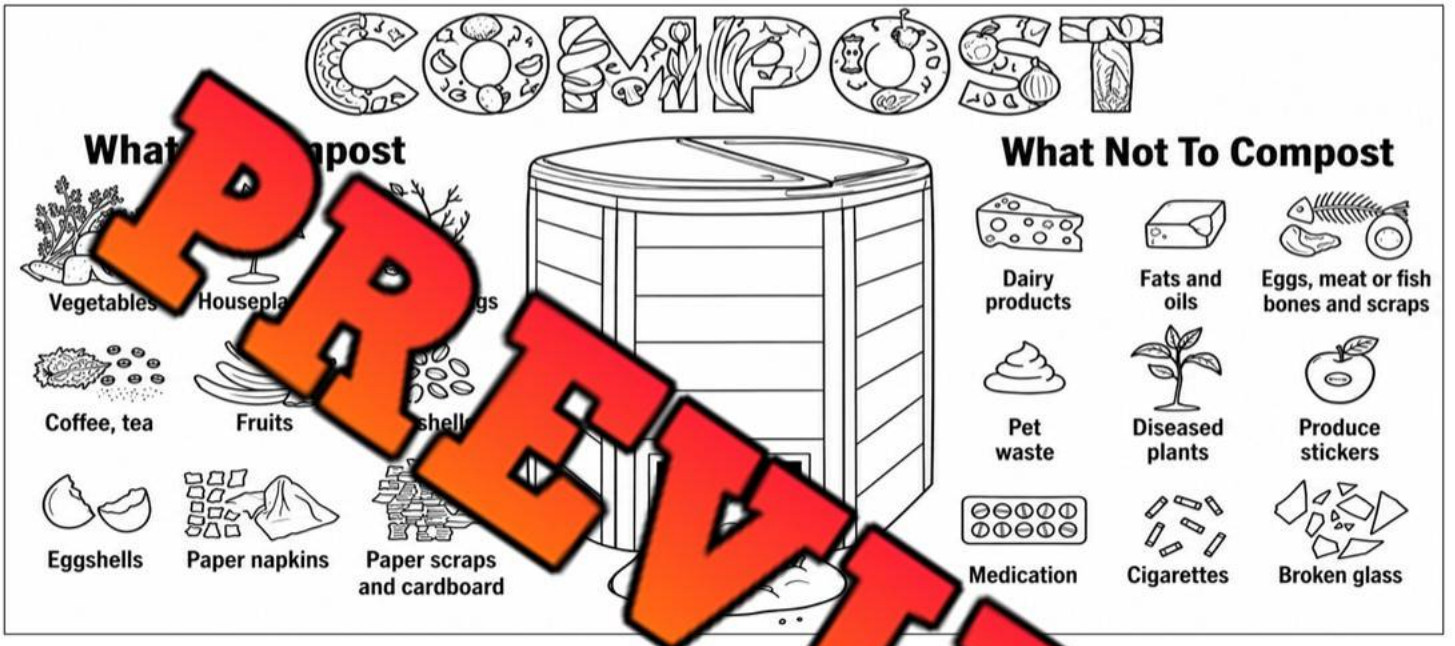
Curriculum Connection
E1.2, E2.6

Composting

Not all organic material can be composted. Check out the infographic below to learn more about the organic material that can be composted.



PREVIEW

Making Connections Share your experienc th co st ow.

1) Have you ever used a composter? If so, what do you co

_____

_____

_____

_____

2) What kinds of things can you not compost? Why do you think you can't compost those things?

_____

_____

_____

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Curriculum Connection
A2.1

Coding – Compost Maze

Instruction Help the worm get through the compost pile. Draw arrows on the maze to show which way the worm must go.

Directions:
The worm must only collect things that CAN be composted on the way.

Use arrows like this:
Move right ⇨ Move left ⇦
Move down ⇩ Move up ⇧



PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Pop Bottle Composter

Background — What is this experiment all about?

How is compost made? How long does it take for organic material to turn into compost? These are the questions we will answer after our experiment is complete!

Materials — What will you need for this experiment?

- Empty 2-litre soda bottle
- Soil
- Leaves, grass, [illegible] fruits or vegetables
- Anything else you would like to see composted

PREVIEW

Method — How will you complete the experiment?

1) Cut the top off the 2-litre soda bottle.
2) Remove the label so you can see inside the bottle.
3) Start with a layer of soil on the bottom.
4) Add a layer of compostable material.
5) Continue this process by alternating soil and organic material until the bottle is nearly full.
6) Add water to the bottle to start the composting. The water will help rot the organic material.
7) Put the composter in a place where it won't tip over and where it will get enough sun. The sunlight will also help rot the organic material.
8) Monitor the progress of the composter by checking it once a week. As an option, you could take a picture each week to record what is happening.



Name: _____ 95

Curriculum Connection
A1.3, A1.4, A1.5

Diagram Draw a diagram of your bottle with each layer. Label the diagram.



PREVIEW

Questions Answer the questions below.

1) Why won't the composter work if you don't add wa… …t it … sun?

2) What did you notice happened to the organic material you put in the composter? What happened to it over time? How long did it take for anything to decay?

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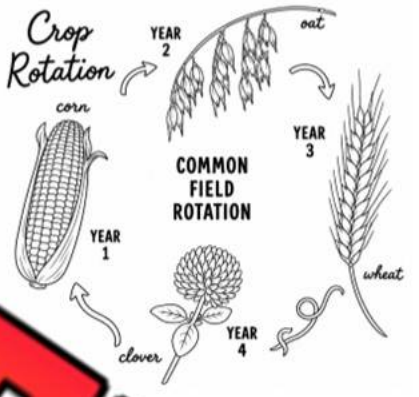
Curriculum Connection
E1.2, E2.5

Improving Soil – Crop Rotation

What is Crop Rotation?

Crop rotation is the planned order of growing different crops year after year to get better results. If you grow the same crop every year, you will have problems with:

- Weed[illegible]eds will grow out of control because their environment is stable
- Pes[illegible] locusts or Japanese beetles enjoy certain types of crops. If y[illegible]ntinue [illegible]he same crops, these pests will stay
- Disease – [illegible]e bl[illegible]spot or blight will survive in the soil ye[illegible]r yea[illegible]re not changed



Benefits of Crop Rotati[illegible]

If you use crop rotation, you [illegible]ave [illegible]s pests and diseases on your farmland.

Another benefit for using crop rotation i[illegible]ter s[illegible] When you grow a new crop, it has different nu[illegible]nts [illegible]s, those nutrients go into the soil, making the soil richer in [illegible]utri[illegible]f you only grow one type of crop for years and years, the soil will ha[illegible]e le[illegible]

Common Crop Rotation – Soybeans and Corn

Corn and soybeans are commonly rotated year after year. Corn needs lots of nutrients, especially nitrogen.



Corn following Soybeans



Corn following Corn

Adding nitrogen to the soil is expensive for farmers, so instead, they grow soybeans the year before growing corn. When soybeans decompose, they provide the soil with nitrogen, which then naturally fertilizes the soil for the corn the next year.

PREVIEW

Name: _____ 97

Curriculum Connection
E1.2, E2.5

Questions Use information from the text to support your answer.

1) What is crop rotation? Why is it used?

2) How d corn and soybean crop rotation work? How does it help corn?

PREVIEW

Summarize What is the m f th ? What are some supporting details?

True or False Circle whether the statement is true or false.

1) Crop rotation can help reduce pests, disease, and weeds.	True	False
2) Crop rotation using any crops is the best method.	True	False
3) The crops used last year will provide nutrients for the new crops.	True	False
4) Using crop rotation will improve the soil.	True	False
5) When corn decomposes, it provides nitrogen for soybeans to grow.	True	False

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Curriculum Connection
E1.2, E2.5

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark

Check the things that are true about crop rotation!

- ☐ Growing the same crop every year can cause more pests.
- ☐ Crop rotation can help improve soil nutrients.
- ☐ Soybeans can help add nitrogen to the soil.
- ☐ Crop rotation causes more diseases in the soil.
- ☐ Corn needs many nutrients from the soil.
- ☐ Weeds disappear forever when farmers grow the same crop every year.

Name: _____ Mark

Check the things that are true about crop rotation!

- ☐ Growing the same crop every year can cause more pests.
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Name: _____ Mark

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- ☐ Crop rotation causes more diseases in the soil.
- ☐ Corn needs many nutrients from the soil.
- ☐ Weeds disappear forever when farmers grow the same crop every year.

PREVIEW

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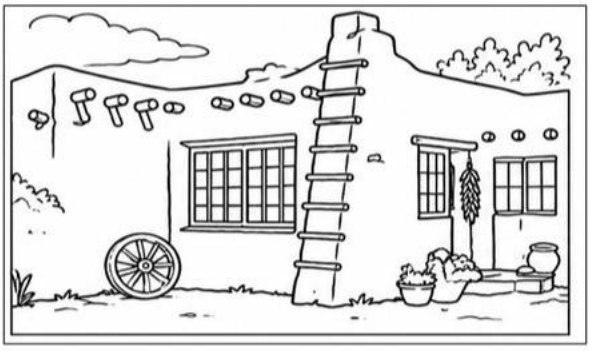
Curriculum Connection
E1.1

Different Uses of Earth's Materials

How Different Cultures Use Earth Materials

Earth materials are used to make many different things around the world. In some cultures, clay is still used to make houses, In other cultures, houses are made from sod. Read below to learn more about the different uses of Earth's materials around th[illegible]rld.

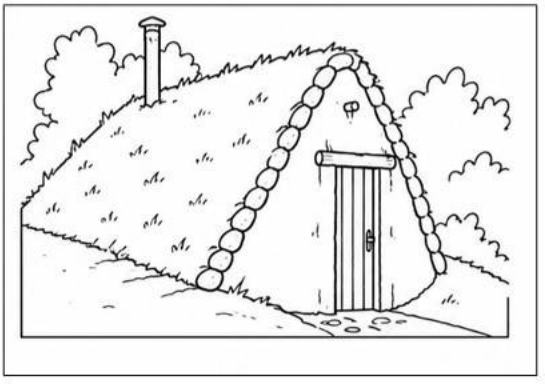


Adobe H[illegible]

Whe[illegible] mu[illegible]aw together, it will dry and beco[illegible]ck[illegible] material that is called **a**[illegible]dobe [illegible] are used to build hou[illegible]arts [illegible]th America, such as Texas, Mexico, and Arizona.

Sod Houses

Soddies are houses that are made of blocks of [illegible]ss an[illegible]magine taking a shovel and [illegible]ing [illegible]rass to build a house with. The [illegible]neat[illegible] grass is held together by the g[illegible]s's [illegible]ere built in the Prairies in the 18[illegible] the settlers did not have access to oth[illegible] building materials.



Clay Pots



Clay is used for pottery and construction projects around the world. When clay dries, it becomes hard like cement. This means it can be molded and shaped into pots or bricks that will become hard when dried. Pottery has been around for over 20,000 years!

PREVIEW

Name: _____ 100

Curriculum Connection
E1.1

Draw and Write Draw the structures and write which Earth materials you would use.

Adobe House	Soddie – Sod House	Clay Pot

PREVIEW

True or False Circle whether the statement is true or false.

1) Adobe houses are made from clay.	True	False
2) Clay pots have been around for over 20,000 years.	True	False
3) Sod houses are made from grass and soil.	True	False
4) Clay can be used for pottery or bricks.	True	False
5) Sod houses are still used often in Canada.	True	False

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Curriculum Connection
E1.1

Exit Cards

Cut Out Cut out the exit cards below and have students complete them at the end of class.

Name: _____ Mark

Circle the correct answer.

1) Which house is made of mud?	
Sod houses	Adobe houses
2) Which is used for pottery work?	
Adobe	Clay
3) Which becomes hard when dried?	
Clay	Sod
4) Pottery has been around for _____.	
20 000 years	30 000 years
5) Mixing straw and mud makes...	
Sod	Adobe

Name: _____ Mark

Circle the correct answer.

1) Which house is made of mud?	
Sod houses	Adobe houses
2) Which is used for pottery work?	
Adobe	Clay
3) Which becomes hard when dried?	
Clay	Sod
4) Pottery has been around for _____.	
20 000 years	30 000 years
5) Mixing straw and mud makes...	
Sod	Adobe

Name: _____ Mark

Circle the correct answer.

1) Which house is made of mud?	
Sod houses	Adobe houses
2) Which is used for pottery work?	
Adobe	Clay
3) Which becomes hard when dried?	
Clay	Sod
4) Pottery has been around for _____.	
20 000 years	30 000 years
5) Mixing straw and mud makes...	
Sod	Adobe

PREVIEW

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Name: _____ 104

Curriculum Connection
E1.2, E2.4

Erosion

Erosion



When soil and rock are moved from one place to another, it is called **erosion**. Erosion happens when heavy rains and water run[illegible]ur over soil. The soil often flows i[illegible]ther bodies of water. [illegible] natur[illegible], but it is made worse when humans cut down trees, plants, and sh[illegible]pla[illegible]p the soil strong because their roots hold the soil together. Far[illegible]make [illegible]se when they have too many animals. These animals eat most of the [illegible]which w[illegible] the soil.

When soil is lost into w[illegible] the [illegible]s polluted. Also, farmers need soil to plant their crops in. If farmers [illegible]oo mu[illegible] they can't grow the food we need to survive.

Wind is also a force that can cause erosi[illegible]he[illegible]rees on farmlands, there is nothing to block heavy winds fro[illegible] soil

PREVIEW

Slowing Down Erosion

We can reduce erosion by having plants to cover the soil. Shrubs hav[illegible]oots that grow in all directions in the soil. They help keep the soil strong. Shrubs and trees also block the wind from causing erosion.



Using a cover crop also slows down erosion. A **cover crop** is a fast-growing crop that grows between other crops or when the other crops have been harvested. Cover crops are used to make the soil stronger because their roots stop the soil from erosion.

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Curriculum Connection
E1.2, E2.4

Questions Answer the questions below using evidence from the text.

1) What is erosion?

2) How a[illegible]ans causing erosion?

Visualizing Draw what yo[illegible]ou were reading. Explain the picture.

Reaction If you were a farmer trying to stop erosion, what would you do?

PREVIEW

Name: _____ 106

Curriculum Connection
A1.3, A1.4, A1.5

Experiment – Soil Erosion Model

Research Questions
What are we learning about?

Is soil erosion worse in soil that has plants growing in it or in soil that has no plants?

Materials
What do we need for our experiment?

- ✓ 3 [illegible] the same size – 2L bottles w[illegible]ell
- ✓ Soil
- ✓ Mulch or [illegible]es/stic
- ✓ Sod or grass
- ✓ 3 clear cups
- ✓ Blocks to support yo[illegible]
- ✓ Scissors or utility knife
- ✓ Watering can
- ✓ Tape to help fasten the materials







Method
How do we complete the experiment?

1) Cut off one side of each bottle – cut it lengthwise so it still has a bottom and spout.
2) Fill one bottle with sod (or soil and plant grass seed and wait for it to sprout).
3) Fill one bottle with just soil.
4) Fill the last bottle with mostly soil but add mulch or dead leaves/sticks on the top.
5) Top the bottles so they are resting on the blocks with the spout angled down.
6) Put the cups under the end of the bottles so they can catch the water from the spout.
7) Pour water on the different types of soil. Observe what is landing in the cups.

PREVIEW

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Curriculum Connection
A1.3, A1.4, A1.5

Observations

What did you notice?

Soil Types	What Happened?
Just Soil	
Sod – S Gr	
Soil with Mulch	

PREVIEW

Results

Answer the questions below.

1) What is soil erosion?

2) Which soil had the least amount of soil erosion?

3) Why does soil with grass or plants growing have less erosion?

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Curriculum Connection
E1.2, E2.4

Weathering Rocks = Soil Formation

Weathering

The term **weathering** means that rocks are broken down into smaller rocks that make up our soil. The weathering process is very slow and is a result of temperature changes, abrasion, chemical reactions, and interactions with living things.

PREVIEW

Temperature Changes – As the temperature changes from warm to freezing cold, rocks break apart because water gets into the cracks in rocks. When the water freezes it gets bigger as it changes into ice. As it gets bigger, it cracks open the rock.



Abrasion – Abrasion happens when rocks collide or rub against each other and break down. This happens a lot to rocks at the bottom of a river. The water moves the rocks so they bump into other rocks. This makes the rocks smoother as the corners of rocks are chipped off.



Chemical Reactions – Rocks will breakdown when they react with water, air, or other chemicals. Acids from rain or chemicals humans add to water can also weather rocks.

Living Things – Plants and animals affect rocks and can break them down. For example, plant roots can grow into the cracks of rocks, making them split. Some animals burrow into rocks, scratching and digging into a rock's weakest point.

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Name: _____ 109

Curriculum Connection
E1.2, E2.4

Visualizing Draw what you were picturing while you were reading. Explain the picture.

	_____ _____ _____ _____ _____

True or False Write whether the statement is true or false.

1) Soil is made fr eath r	True	False
2) Soil is made from ma f nt th luding rocks.	True	False
3) Weathering rocks means ro fall Sk h rain.	True	False
4) Weathering rocks means they bre own an sm r.	True	False
5) Plants can grow inside the cracks of roc split n.	True	False

Questions Answer the questions below using evide th t.

1) What does weathering mean?

_____

_____

_____

2) How does the weathering of rocks lead to soil formation?

_____

_____

_____

PREVIEW

Name: _____ 113

Curriculum Connection
E1.2, E2.4

Controlling Soil Erosion

What is Soil Erosion

Soil erosion is the washing or blowing away of the top layer of soil. This happens in three ways - through the movement of water, from strong winds and from gravity. Water erosion happens when heavy rain forces soil to travel with the water int ams and eventually larger bodies of water.

Wi n is the natural process that moves soil from one location to anot p trong winds can cause a lot of soil particles to lift into the air and ca ms



Soil erosi gra s when farm fields are on a hillsid a 25 e angle and there is little veg to il in place. Heavy rainfall can cause th to become very heavy and slide down the hill. Thi cau ndslide.

Controlling Soil Erosion

Soil erosion can be controlled using the following

- **Windbreaks** – A windbreak is a line of plants that are ante all that stops or slows the wind. Farmers will use a row of thi t to a field of plants to stop the wind from blowing the soil away.



- **Terracing** – Terrace farming means the farmer builds "steps" or terraces that are built into the side of a mountain or hill. They do this so that when it rains, the nutrients get washed down to the next level of crops.
- **Reforestation** – Replanting in an area that lost its plants is called reforestation. If a forest burned down, reforestation would mean to replant the trees.

PREVIEW

Name: _____ 114

Curriculum Connection
E1.2, E2.4

True or False

Circle whether the statement is true or false.

1) Soil erosion means that soil washes or is blown away.	True	False
2) Soil erosion hurts farmers the most.	True	False
3) Windbreaks are steps in the side of a mountain.	True	False
4) Reforestation means you plant trees that were lost.	True	False
5) Wind c[illegible]se erosion by blowing soil to new locations.	True	False

Questi[illegible]

Use i[illegible]n from the text to support your answer.

1) What is a wi[illegible]? How [illegible]elp stop soil erosion?

_____

_____

_____

2) What is terracing? How does it help stop [illegible]osion

_____

_____

_____

PREVIEW

Making Connections

What does this reading remind you of in your life?

_____

_____

_____

_____

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Name: _____ 115

Curriculum Connection
A2.1

If Then Conditional Statements – Activity

Directions Follow the if/then statements to migrate the butterfly to warmer weather.

1)	If sand particles are bigger than silt	then	Move ↓ 4 spots
2)	If silt particles are smaller than clay	then	Move → 2 spots
3)	If [illegible]ticides are good for soil	then	Move ↓ 3 spots
4)	If [illegible]clean dirty water	then	Move → 4 spots
5)	[illegible] soil [illegible]lay, silt, and sand	then	Move ↓ 2 spots
6)	If worm[illegible]rs	then	Move → 2 spots
7)	If decom[illegible] hurt	then	Move → 3 spots
8)	If soil erosion [illegible] soil	then	Move ↓ 1 spots
9)	If sand holds a lot of [illegible]	then	Move → 3 spots
10)	If clay holds a lot of water		Move → 2 spots

PREVIEW





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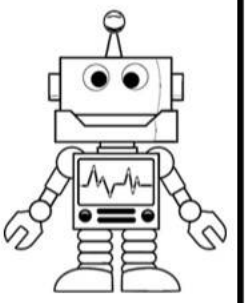
Name: _____ 116

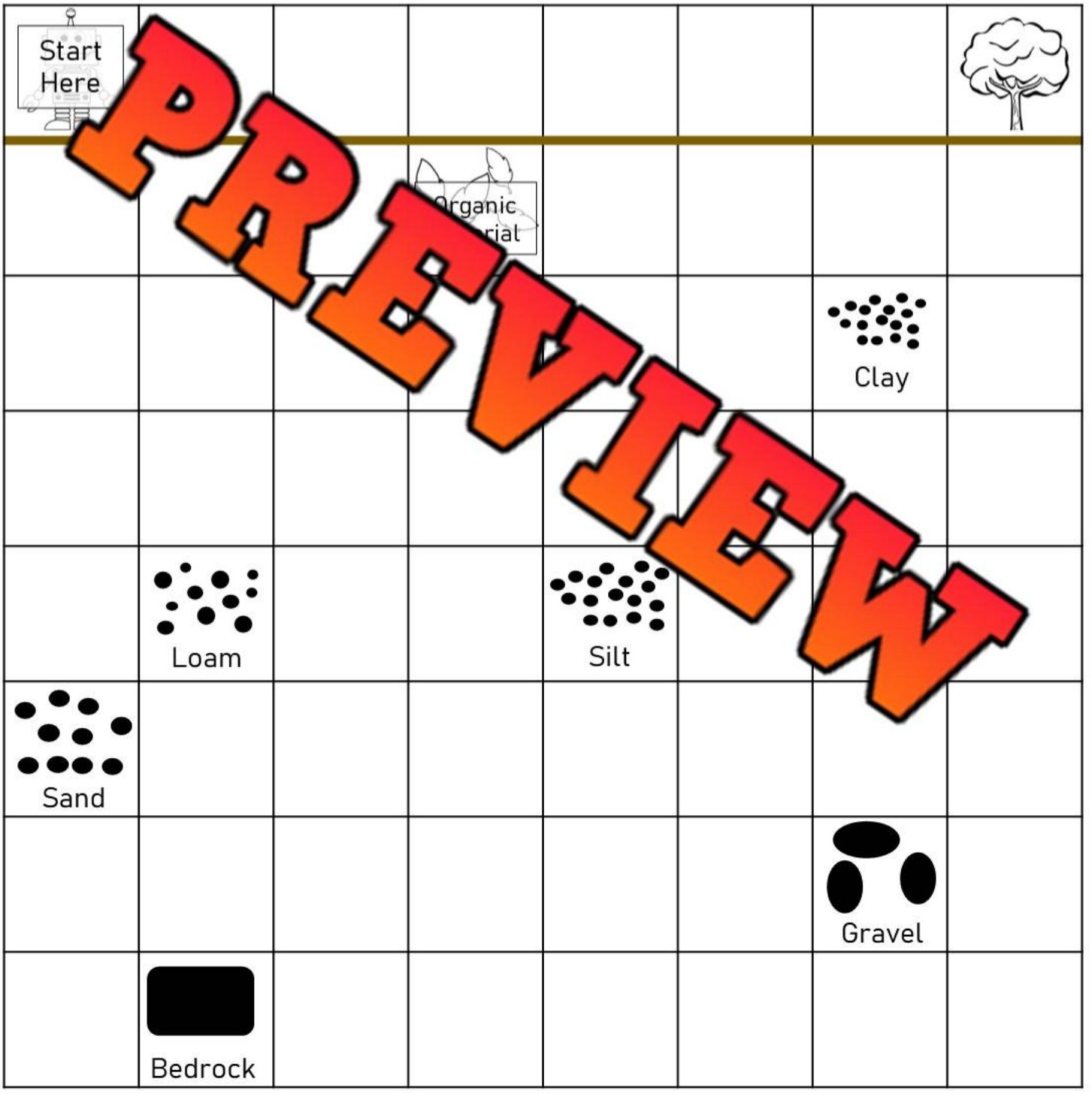
Curriculum Connection
A2.1

Writing Code – Soil Types



Tobor is a robot that is digging through soil. Help Tobor find the different soil types below by writing code that directs him.

Soil Use the map to write code on the next page.



PREVIEW

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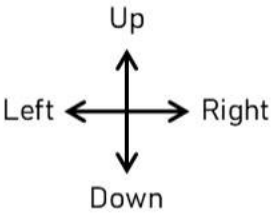
Name: _____ 117

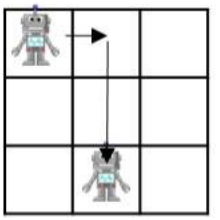
Curriculum Connection
A2.1

Writing Code – Soil Types



Commands – Use the example below to learn the code

Move 1 right
Move 2 down



Soil Tell Tobor where to dig so that he gets to all the materials.

1) Find [illegible]aterial and gravel.

2) Find the clay and sand.

3) Find the loam, bedrock, and gravel.

PREVIEW

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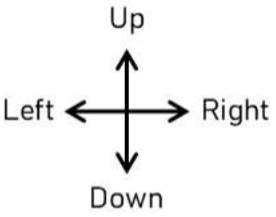
Name: _____ 118

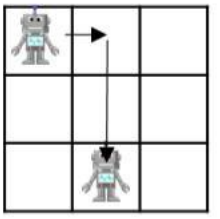
Curriculum Connection
A2.1

Writing Code – Soil Types



Commands – Use the example below to learn the code

Move 1 right
Move 2 down



Soil Tell Tobor where to dig. He always starts in his robot station.

4) In an[illegible] the loam, bedrock, and silt. Use the least number of lines to writ[illegible]

5) In any order, find the gravel, bedrock, clay, and loa[illegible] the [illegible]st [illegible]r of lines to write your code.

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Curriculum Connection
A2.2, A3.1, A3.2, A3.3

STEM – Testing Soil

Changing Technologies

In the past, farmers had to send their soil to science laboratories to test the quality of their soil. The process was time-consuming and cost a lot of money.

Today, farmers can use something called an AgroPad to test their soil quality. To run the test, you take the AgroPad (a card about the size of a bank card), and put soil on top of it. In less than 10 seconds, the card will change colours. A legend on the card tells the farmer what the colours mean. For example, if the colour is red, the pH in the soil might be too acidic. If it is blue, the pH could be too basic.

The AgroPad was made by Microsoft. It is helping farmers around the world. Farmers can test their soil, they can add the nutrients it needs to be healthy. Healthy soil means better crops and more food for everybody.



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Multiple Choice

Circle the correct answer.

1) The AgroPad is made by		Microsoft
2) Testing soil is now _____ for farmers.	C	Expensive
3) The AgroPad tests soil _____.		ly
4) Better soil means more _____.		oblems
5) The _____ change on the card to show the soil quality.	Pictu	Colours

Question

How is technology helping farmers around the world?

_____

_____

_____

_____

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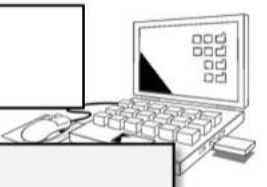
Curriculum Connection
A1.1, A2.2, A3.1, A3.2, A3.3

STEM Assignment – Soil Testing Machine

Create your own invention that tests the quality of soil and add nutrients to make the soil quality better. Use the legend below to know what to add.



Test Results	What to Add
Too much sand and clay	Add silt
Too much silt and sand	Add clay
much clay and silt	Add sand
re too high	Add sulfur
o low	Add limestone

PREVIEW

IF/THEN ite co ur invention.



If there is too much sil and is high

THEN

If there is too much clay and silt and the pH is

THEN

If there is too much sand and clay and the pH is high

THEN

If there is too much sand and silt and the pH is low

THEN

If there is too much clay and sand and the pH is low

THEN

If there is too much silt and clay and the pH is high

THEN

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Curriculum Connection
A1.1, A2.2, A3.1, A3.2, A3.3

STEM Assignment – Soil Testing Machine

Questions Answer the questions about your machine.

1) How does your soil testing machine work?

2) How does your machine use code? Write one example line of code for the machine to proce

3) How much does it cost to make your mac

4) Who will you sell your machine to?

5) How much will you sell it for?

6) If you sell 3 machines today, how much money will you make? Remember to subtract how much the machine costs to make!

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Curriculum Connection
A1.1, A2.2, A3.1, A3.2, A3.3

Scenarios | Circle if the type of soil is sandy, clay, silt, peaty or loam.

#	Scenario Description	Soil Type	
1	Water drains quickly and doesn't stay for long.	Clay	Sandy
2	The soil feels smooth to the touch and holds water well.	Silt	Loam
3	You can make a strong ball that holds its shape when wet.	Sandy	Clay
4	Plan[illegible] really well with a balance of drainage and nutrients.	Silt	Loam
5	Th[illegible]at for cacti because it doesn't hold moisture.	Sandy	Clay
6	Yo[illegible]an see[illegible] very fine particles and it's dense.	Sandy	Clay
7	This soil fe[illegible] and d[illegible]k together easily.	Sandy	Loam
8	It's often used fo[illegible]ause [illegible]dable.	Silt	Clay
9	This soil is dark in colo[illegible]ts l[illegible]onge.	Peaty	Sandy
10	After a rainstorm, water tends to [illegible]op in[illegible]f soaking in.	Loam	Clay
11	It has a good mix of particle sizes and is ide[illegible] most plants.	Loam	Peaty
12	It's commonly found by rivers and is excellen[illegible]e gardens.	[illegible]t	Sandy
13	It can feel almost like powder when dry and is not stick[illegible]		Silt
14	This soil warms up quickly in the spring, helping seeds sprout faster.		Peaty
15	You find this soil in bogs and it can retain a lot of dead plant material.	Loam	Peaty
16	When you pour water on it, the water becomes very clear because it doesn't hold many nutrients.	Sandy	Silt
17	Often found in flower pots because it has good drainage and nutrient content.	Loam	Clay
18	It can be compact and hard to dig, and water stays on the surface for a long time.	Sandy	Clay
19	This soil is ideal for plants that need a lot of water because it doesn't drain well.	Clay	Loam
20	It's perfect for carrots and radishes because it's deep and rich but not too heavy.	Clay	Loam

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Unit Test – Soil

Multiple Choice /6

1) Which of the following is an additive used to make soil richer in nutrients? a) Pesticides b) Fertilizer c) Poison d) Weed kil	2) True or False: Soil is alive- it contains many living organisms. a) True b) False
3) Which t cannot grow plants becaus so close together. a) Si b) Sandy c) Clay d) Loamy	4) Which type of soil is made of larger gritty particles that do not hold water well. a) Silt b) Sandy c) Clay d) Loamy
5) Which type of soil is mad fferen types of soil and is the best cho growing. a) Silt b) Sandy c) Clay d) Loamy	h type of soil is easily compacted, light, ashed away by the rain. a) Silt b) c) d) Loamy

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Definitions (1 marks each) /3

Term	Definition (what does it mean)
Soil	
Decaying Matter	
Fertilizer	

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Diagram

Label the layers of soil below.



Subsoil	Topsoil	Bedrock
Parent Material	Organic Material	

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Matching

Write the letter from the description beside [illegible] layer.

	Subsoil	a) Made up of large solid rocks
	Topsoil	b) Made up of twigs, leaves and other organic matter
	Organic Layer	c) Made of mostly large and medium sized rocks
	Bedrock	d) Made from clay, iron, and other organic material
	Parent Material	e) Made of organic matter – decomposed plants and animals as well as some small rocks

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Short Answer Questions (2 marks each) **/6**

1) What is the difference between a fertilizer and a pesticide?

2) What is compost? How does a composter work?

3) If you were dig[illegible] a poo[illegible] llenges would you have when digging through the layers o[illegible]oil?

Long Answer Questions **/5**

Why is soil so important? Why do humans need it? Why do plan[illegible] do all living things need it?

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