

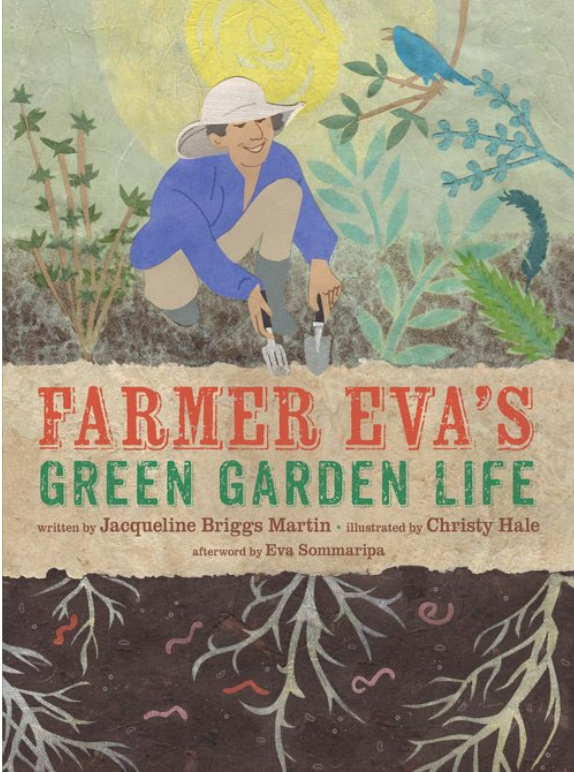


# The Book Planter



## Ag in the Classroom

Post Office Box 27766 | Raleigh, NC 27611 | (919) 782-1705  
ncagintheclassroom.com



**March 2025**

### *Farmer Eva's Green Garden Life*

**Written by: Jacqueline Briggs Martin**

**Illustrated by: Christy Hale**

Farmer Eva Sommaripa founded Eva's Garden in South Dartmouth, Massachusetts, a place "so close to the ocean, she can smell the sea, so close to woods she can talk to trees." More than 50 years later she has grown a big green garden life of friends and neighbors, creatures that crawl, fly and slither, even microbes that create rich soil in the brown underground. Meet farmer Eva, and share the magic, beauty, and science of life on the farm and caring for the land.

### Discussion Questions

1. Why did Eva want to become a farmer?
2. What are some of the first things Eva grew?
3. What did Eva do when she had more herbs than her family could eat?
4. What types of organisms live in Eva's Brown Underground?
5. How do organisms and microbes survive underground?
6. What is the author referring to when she says "café?"
7. What does Eva add to the café menu?
8. What is the Salamander Brigade? Why do you think this is important to Farmer Eva?
9. When do you think the Longest Day Summer Potluck happens? What date specifically?
10. Investigate some of the plants and foods mentioned in the book that you might not know about: nasturtiums, purple shiso, pink sorrel, and black garlic.

**Vermicomposting** – Students will create a worm bin which will serve as a basis for investigations about ecosystems, life and nutrient cycles, and decomposition.

### Engage

1. Ask the students what the word recycling means. Make a list of items they have recycled before.
2. Ask the students if food can be recycled. Tell them to imagine they are in the cafeteria at their school. Have them try to think of ways they can use the leftover food being thrown away to make something else. (This questions will probably bring interesting responses.)
3. Ask the students what happens to leaves in the forest during the winter. (*They fall to the ground.*) Ask them why the leaves that fall from the trees every year don't just pile up higher and higher. (*They break down/decompose and become part of the soil.*) Explain that food can be recycled the same way plants are recycled in the environment. Tell them that they will recycle their leftovers into a special soil that will help give plants the nutrients they need. The secret is worms.
4. Tell the students that they are going to build a worm bin to serve as a home for worms that will be kept in the classroom to observe and study.
5. Show them the worms that will be added to the bin, and allow them to find a worm and look at it closely. Tell the group that these are red wiggler worms, and they are especially suited for composting food scraps inside an indoor bin.

### **Activity 1: Setting up a Vermicomposting Bin<sup>1</sup>**

#### Materials

- Recycled styrofoam cooler (Styrofoam coolers are used to ship medicine that needs to stay cold. Many doctors, dentists, and veterinarians receive several coolers each month. The coolers are often thrown away after the shipment is received. Consider asking a local medical office to save one for your classroom.)
- Drill with a large bit
- Shredded paper
- 2-3 full pages of paper
- Soil
- Spray bottle filled with water
- Vegetable scraps
- Red wiggler worms

#### Procedure

1. Prior to class, drill ventilation holes in the cooler lid. Have a vacuum cleaner handy—this can be messy.
2. Ask the students what kind of environment they think worms need to be comfortable and healthy. (They will probably say worms need soil to live in.) Explain that the worms you have are a special kind that don't burrow deep into the soil. Red wiggler worms prefer to live near the surface of the soil where they have lots of organic matter to eat. They need protection from the sunlight but don't like to be deep in heavy soil. Explain to the students that they will be making them a home out of newspaper strips.

3. Have the students rip newspaper into inch-wide strips to use as bedding for the worms.
4. As the students are ripping the newspaper, discuss the importance of moisture, air, and temperature in the worm bin.
5. Fill the cooler about half full with shredded paper. Wet the shredded paper until it is uniformly damp but not dripping. It should feel like a well wrung-out towel. Explain to the students that worms breathe through their moist skin. If they dry out, they can't breathe. However, if the bin gets too wet there may not be enough oxygen for the worms.
6. Mix the soil with the shredded paper. A couple of scoops with a trowel is plenty. The soil should be moist, but not muddy. Explain to the students that worms don't have teeth. The hard mineral particles in the soil will help break down food in the worm's gut. Soil also contains microorganisms that will help jump-start the composting process.
7. Add the red wiggler worms on top, and watch as they burrow down to get away from the light.
8. Add vegetable scraps as food for the worms. Begin with one cup or less. It will take the worms some time to acclimate to their new home and develop an appetite. Feed the worms as needed. Worms can survive on paper alone but will readily devour many other foods. Discuss with the students the kinds of foods that worms like to eat. They like newspaper, but the glossy pages aren't good for them. They like most food scraps, especially from fruits, vegetables, and grains. They also like coffee grounds and filters, tea bags, fallen leaves, eggshells, weeds, and lawn clippings. It is best not to feed them meat, dairy, or foods that contain a lot of fat. Avoid overfeeding to prevent odors. As the population begins to grow, the worms will eat more.
9. Place full pages of paper on top of the soil and spritz with water until the paper is damp. Place the lid on top, and store the bin where it won't get too hot or too cold. Check the moisture level regularly. The top sheets of paper will help keep the bin contents moist; when they get dry, spritz the upper layer of the bin with water. The worms need moisture to live, but the bin may begin to stink if it gets too wet. If this happens, simply add shredded paper to absorb the excess moisture.
10. Discuss the important things that worms do to keep the soil healthy:
  - Worms burrow in the soil. The burrows and trails that they leave help the soil absorb and hold water. This is important for plants that need water to grow. The burrows and trails also make it easy for plant roots to grow into the soil. When the soil is full of worm burrows and plant roots, it is less likely to wash away or erode when it rains.
  - Worms eat organic matter like dead leaves. The castings that come out the back end of a worm after it has digested its food are full of nutrients and microorganisms that are good for plants and for the soil. Worms eat dead plants and other waste and turn them into food for living plants. Worms act as nature's recyclers and make the soil fertile.
11. Discuss the importance of soil as a natural resource that is necessary for the production of our food. Almost everything that we eat, much of what we wear, and many of the tools that we use originate from plants grown in soil on a farm. See the lesson plan [The Soil Chain](#) for hands-on activities to teach about the importance of soil.

## Activity 2: Worm Investigations

The worms and castings from your worm bin can be used to engage students in a wide variety of investigations. A few possibilities are described below. While worms are out of the bin, keep a spray bottle handy to prevent the worms from drying out.

1. Observe the effect worms have on soil.
  - Gather the following materials: two jars, lids with holes, dark soil, light sandy soil, water, vegetable scraps, two pieces of dark paper, and tape.
  - In the bottom of each jar, put a layer of dark soil about one inch thick. On top of this, place a one-inch thick layer of light sandy soil. Keep adding dark, then light layers until the jar is half-full.
  - Slightly moisten the soil in both jars with water.
  - Place two worms in one jar, and then add some vegetable scraps to the top of both jars.
  - Put a lid on each jar. Label the jar with the worms as “Worms” and label the other jar “No Worms.”
  - Take the dark pieces of paper and wrap around each jar. Tape tightly. Put the jars aside.
  - Have each student write down their predictions about what they think will happen in each jar.
  - After three days unwrap the jars. What do you observe?
2. Observe the characteristics of living worms.
  - Divide the students into cooperative groups.
  - Place a few worms on a tray covered in damp newspaper for each group.
  - Allow the students to observe their worms moving around on the tray.
  - Have the students sketch a worm, measure how long it is, record how it moves and any kind of noise made as it moves.
  - Have the students discuss which end is the head and which is the tail. Have them give observable evidence to justify their reasoning.
  - Encourage the students to gently pick up a worm and describe what it feels like on their hands.
  - After allowing the students to make their initial observations, gather the trays, and return the worms to the bin or continue with more of the following investigations.
3. Investigate worms’ responses to light and touch stimuli.
  - Have the students predict the worms’ responses to light from a flashlight and to being gently touched with a chenille stem. Have them justify their predictions.
  - Put the worms on trays and give one to each group.
  - Shine a flashlight directly onto the worms and observe their behaviors.
  - Gently touch the worms with a chenille stem that has a small loop at that end and observe their behaviors.

- Allow 5-10 minutes for the students to observe the worms' behaviors. Have the students record their observations with an explanation for the worms' behaviors.
4. Investigate worms' response to barrier stimuli.
    - Give each group several items to act as barriers (a pencil, a clothespin, a block of wood, a crumbled piece of paper or a pile of soil, etc.).
    - Have the students predict the worms' responses to these barriers. Will they initially go around a barrier? Crawl over it? Burrow underneath it? Try to keep going forward? Go backwards? Will their responses differ for different barriers? Have the students justify their predictions.
    - Give each group a tray and have the students arrange three or four barriers on it.
    - Place several worms on the tray.
    - Allow 5-10 minutes for the students to observe the worms' behaviors. Have the students record their observations with an explanation for the worms' behaviors.
  5. Investigate worms' responses to temperature stimuli.
    - The day before this activity, place several slightly damp paper towels in a freezer. Place layers of waxed paper in between the damp paper towels for easy separation.
    - Prior to this activity, slightly moisten several paper towels and leave them at room temperature.
    - Just before this activity, place several slightly damp paper towels in a microwave to heat them.
    - Have the students predict how the worms will react to a cold surface, a room-temperature surface, and a hot surface and then justify their predictions.
    - Give each group a tray and a cold, a hot, and a room-temperature paper towel.
    - Place several worms on each paper towel.
    - Allow 5-10 minutes for the students to observe the worms' behaviors. Have the students record their observations with an explanation for the worms' behaviors.
  6. Investigate the effect of the vermicompost on plant growth.
    - Depending on the resources available, try growing seeds with differing amounts of vermicompost added or adding different amounts of compost to plants growing in the garden.
    - Have the students predict which amounts of compost will produce the best results.
    - Observe changes in the plants for two to four weeks and have the students use tape measures to record growth.

### Elaborate

1. There are many different ways to build a successful worm bin. These resources provide a variety of ideas for bin construction as well as additional classroom activities and information about harvesting finished vermicompost.
  - [Outdoor Classroom: Worm Bins & Vermiculture](#)
  - [The Adventures of Herman. The Autobiography of Squirmin' Herman the Worm.](#)
  - [Vermicomposting: A Starter's Guide for Teachers](#)
  - [Vermicomposting for Schools](#)



2. View the [Worms at Work video](#) to see a 20-day time lapse of the inside of a vermicomposting bin.

**The Soil Chain<sup>2</sup>** - Students recognize their relationship to soil and model the connections between common objects and the soil.

### Engage

1. Ask your students the following essential questions:
  - What's the difference between soil and dirt?
  - Why is soil important in your life?
  - Why is soil an important resource for farmers?

### **Soil Activity 1: My Soil Family**

1. Show the students the list of 30 objects on the [Soil Flow Chart](#) handout. For a variation, you may ask students to help you make a list of 30 common objects they use every day.
2. Ask students to pick five of the objects (or more) to create a flow chart that links the objects back to the soil like the one on the bottom of the *Soil Flow Chart* handout. The flow chart should illustrate the relationships or direction of flow between an object, its intermediaries, and the soil.
3. Many of the objects will be easily linked back to the soil, but some may not. That's okay. The charts on the handout depict two of the more difficult objects that students may try to link to soil.
4. After the students have completed their flow charts, have them select one object (or pick a new one) to create a soil chain.
5. Instruct students to cut out strips of paper that will become links in a chain, and label each link as one of the "connections" showing the object's relationship to the soil.
6. Staple or glue the ends of the links together, interconnecting them to form a chain. Consider challenging students to create the longest chain or the shortest chain possible.

### **Soil Activity 2: The Yarn Web Game**

1. Ask each student to pick one of the items from their soil chain and write the item's name on a half sheet of paper or on an index card. They should write the name as large as possible, preferably with marker or crayon. You may want to assign the students their "parts" so you don't get ten cows and ten wheat plants. Then, using a piece of yarn and a hole-punch, make a necklace to hang the sign around each student's neck. One student or the teacher must wear a sign that says *SOIL*.
2. Pick any student to begin by tossing a ball of yarn to someone else that they are related to in the food web. If they are not related to any one of the other items, the yarn can always be tossed to the person wearing the *SOIL* sign. An intricate web should be woven. Several students should receive the yarn more than once. When everyone has been included in the web, take a look at how they are all connected to the soil.

### **Soil Activity 3: Ranking the Importance of Soil**

1. Display the statements on the [Ranking the Importance of Soil](#) handout. Ask students to rank the statements in order of importance.
2. Form groups of five or six students, and ask the groups to rank the statements. Ask them to be prepared to explain why they ranked them in that order.
3. Next, display the [What Does Soil Mean to a...](#) handout. Working in their groups, ask students to discuss the different roles that soil plays in the lives of people, plants, and animals.
4. Discuss what students have concluded about the role that soils plays in our lives and its importance to agriculture. What would life be like without soil?

#### Sources

1. <https://agclassroom.org/matrix/lesson/510/>
2. <https://agclassroom.org/matrix/lesson/144/>

#### K-5 Subject Areas: English Language Arts, Science, and Social Studies

##### English Language Arts

- RL.K.1 With guidance and support, identify a detail in a familiar text.
- RL.K.2 With guidance and support, identify the main topic of a familiar text.
- RL.1.1 Identify details in a familiar text.
- RL.1.2 Identify the main topic and retell key details of a text.
- RL.2.2 Identify the main topic of text.
- RL.2.4 Identify words that relate to the topic of a text.
- RL.3.2 Identify the main topic and retell key details of a text.
- RL.3.4 Identify key words that complete sentences in a text.
- RL.3.5 Locate key facts or information in a familiar text.
- RL.4.1 Identify explicit details in an informational text.
- RL.4.4 Determine the meaning of words in a text.
- RL.5.1 Identify words in the text to answer a question about explicit information.

##### Science

- PS.K.1 Understand how objects are described based on their physical properties and how they are used.
- PS.K.2 Understand the positions and motions of objects and organisms observed in the environment.
- LS.K.1 Understand the characteristics of living organisms and nonliving things.
- LS.K.2 Understand characteristics of organisms that make them alike and different.
- LS.1.1 Understand the basic needs of a variety of plants and animals in different ecosystems.
- ESS.1.2 Understand the physical properties of Earth materials.
- ESS.1.3 Understand that natural resources are important to humans.
- LS.2.1 Understand animal lifecycles.
- LS.2.2 Understand that organisms differ from or are similar to their parents and other offspring based on characteristics of the organism.
- LS.3.3 Understand how environmental factors aid in the survival of plants.
- LS.4.1 Understand the effects of environmental changes, adaptations, and behaviors that enable organisms to survive in changing habitats.
- LS.5.2 Understand the interdependence of plants and animals within their ecosystem.

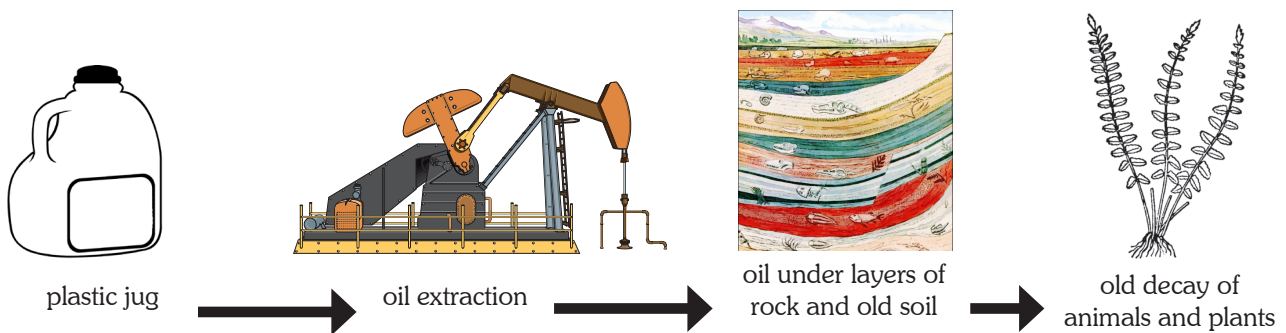
##### Social Studies

- K.G.1 Apply simple geographic representations, tools, and terms to describe surroundings.
- 1.C&G.1 Understand how people engage with and participate in the community.
- 1.G.1 Apply geographic representations, tools, and terms to describe surroundings.
- 2.E.1 Understand how the availability of resources impacts economic decisions.
- 3.E.1 Understand how economic decisions and resources affect the local economy.

# Soil Flow Chart

Draw a flow chart back to the soil for...

- butter
- wool blanket
- ice cream
- leather shoes
- electricity
- vegetable oil
- farmer's bank account
- well water
- chocolate cake
- glass plate
- plastic cup
- book
- brick house
- skateboard
- toothbrush
- turkey sandwich
- egg
- blue jeans
- candy bar
- bicycle
- table
- bubble gum
- baseball
- pickle
- cereal
- rope
- road
- apple
- soda pop
- pencil





# Ranking the Importance of Soil

*Rank the following statements in order of their importance. Be prepared to explain why you ranked them in that order.*

## **Soil is important to me (or us)...**

- \_\_\_\_\_ a) to grow plants for food, oxygen, paper, and many other things.
- \_\_\_\_\_ b) to filter out pollutants that may contaminate drinking water.
- \_\_\_\_\_ c) to provide income for farmers, food companies, clothing companies, and grocers, to name a few.
- \_\_\_\_\_ d) as a surface for building roads, sidewalks, and the places where we live.
- \_\_\_\_\_ e) to provide food for livestock.
- \_\_\_\_\_ f) to walk on.
- \_\_\_\_\_ g) to provide wildlife and insect habitat
- \_\_\_\_\_ h) ... make up your own!

## **What Does Soil Mean to a . . .**

Soil means something different for each of us. What do you think soil means to a:

- a) farmer?
- b) construction worker?
- c) civil engineer?
- d) geologist?
- e) earthworm?
- f) owner of a dry cleaning business?
- g) bird?
- h) hydrologist?
- i) maple tree?
- j) you?