

From Farm to Feast and Back Again!

The story of our food with Wendell the Worm



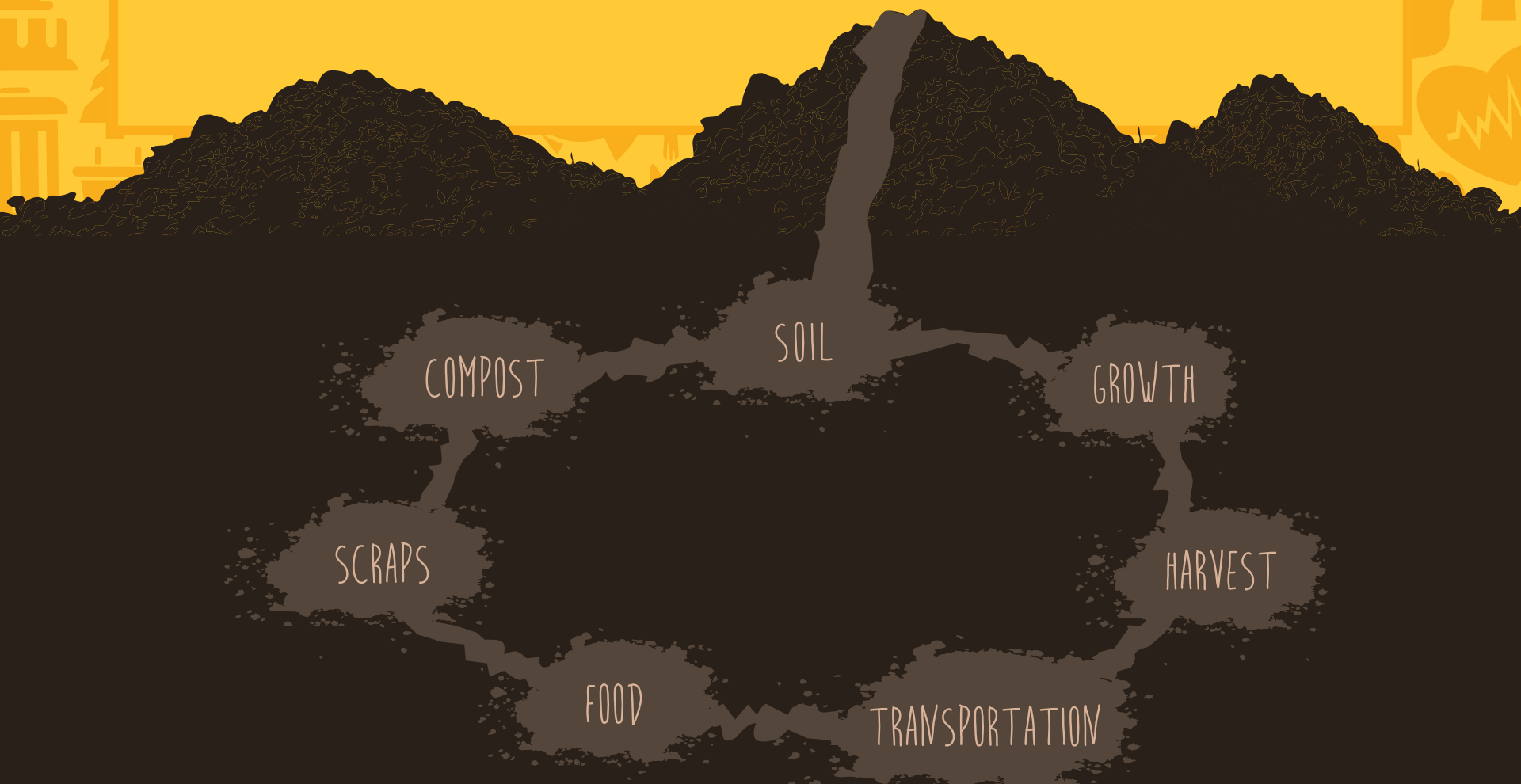


Hi there! I'm Wendell the Worm.

This book is all about the food you eat – where it comes from, how it gets there and what happens to it in the end.

These steps are all part of what scientists call the product life cycle. Scientists and engineers study the life cycle of our food to learn how to make this system more efficient so that we have enough food for everyone – now and in the future.

Follow my burrow below to learn all the parts of the life cycle of your food and the roles I and my family play!



Let's start with soil...

Healthy soil is the key to producing food for every person on the planet. Most of the food you eat started in the soil of a farm or garden. Fruits, grains and vegetables are all grown in soil. Even meat, eggs and dairy come from animals that eat food that is grown in the soil just like yours. In fact, most of the crops grown in the United States are actually used to feed livestock. So no matter what you eat, soil is essential in growing your food.

Soil has many important jobs to do:


- Soil is a safe place for plants to grow. Good soil is soft enough for seeds to sprout and take root, but firm enough to keep a plant from blowing away or falling over.
- Soil gives growing plants important minerals and nutrients they need.
- Soil is like a sponge that holds water the plants need to stay alive.

Soil has to be used carefully. When it isn't taken care of it can lose many of the nutrients plants need. Soil can be washed away by rain or blown away in the wind. As plants grow they take nutrients like nitrogen and phosphorus out of the soil. These nutrients have to be put back into the soil if more plants are going to grow.

Luckily, there's a way to replace those missing nutrients and keep soil healthy that's so easy you can even do it in your kitchen at home! Just compost food scraps instead of throwing them away and you will help return nutrients to soil and make it last for years to come.

Keep reading to learn more about how this works – starring ME,

Wendell the Worm!



Did you know that worms love soil? It's where we live!

Some scientists estimate that as many as one million worms live in every acre of healthy soil. Some worms make burrows near the surface as they search for food on the ground. Others make long, deep burrows where they sleep during the day, coming above ground at night to eat dead leaves and other plant materials.

All this digging keeps the soil soft and full of holes, which makes soil act like a sponge, absorbing and holding onto water when it rains. Without help from worms soil can become too hard and dry for growing crops.



Did you know?

The fruits and vegetables we eat begin as **seeds**. Inside each seed is a baby plant waiting to **grow**. When a seed is planted in healthy **soil**, it gets everything it needs to produce the food we eat. Plants and people need nutrients to live and grow. The most important are **nitrogen** and **phosphorus**. Every time you eat fresh fruits or vegetables, you take in these nutrients too. When a seed sprouts it produces a root. The root digs into the soil and spreads in all directions to absorb **water** and **nutrients** to make the plant strong. The seed also grows a shoot up and out of the soil. When it reaches **sunlight**, the shoot grows leaves. Leaves are how the plant makes its own food. Leaves absorb sunlight using a special green pigment. The energy from the sunlight combines with **carbon dioxide** from the air and water from the soil to make sugars. These sugars combine with other nutrients to make the plant's body, flowers and fruit. Many of the plant foods we eat are fruits, such as tomatoes, melons, squash and bananas. In order to produce fruit, most plants must be visited by **insects**, like bees. These helpful bugs **pollinate** the plant by carrying pollen from flower to flower. Without insects many of our favorite foods would disappear.

Fun fact from "Ways to Save the Earth" Yarrow, 2007

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Find the 12 words below in the word search:

CARBON DIOXIDE	POLLINATE
GROW	POTASSIUM
INSECTS	SEEDS
NITROGEN	SOIL
NUTRIENTS	SUNLIGHT
PHOSPHORUS	WATER



Odd shapes and colors do not impact the flavor of your fruits and vegetables. Eat a nutritious diet including a variety of shapes and colors!

To find out how you and your family can be a part of the solution at home visit:

sustainabilitysolutions.asu.edu/change



Worms play a special role in helping plants grow because we poop - A LOT!

And that's a good thing, because worm poop (called castings) is excellent fertilizer. It contains three important elements that all plants need to grow: nitrogen, phosphorus and potassium. In fact, worm poop is so good for plants it's sold to gardeners around the world!

After plants are done growing it's time to harvest what you eat.

When you work in your own garden you probably do it all by hand, but what about the food you get from the store? Farmworkers carefully select crops that are ready to eat, leaving the rest to ripen. Leafy greens like lettuce are picked, packaged and boxed right in the field. So are soft fruits like strawberries and blueberries. Apples, pears and oranges are picked from the tree and put into large containers. They are transported to large warehouses where they are washed, packaged and shipped to your store. Grains like wheat and oats have seeds that grow at the tops of long stems. These are harvested using machines called combines. The combine cuts the stem and removes the shells from the seeds. If this were done by hand, harvesting a field of corn would take 20 people up to 10 hours. A combine can finish the job in less than 30 minutes. No matter how it's done, the harvest is a crucial part of getting food from farm to feast.

Match the food with the part of the plant it came from.



Stem



Bark



Leaves



Root



Flower



Fruit



Seeds



Sap



After crops are harvested

parts of the plants that can't be used are left in the field. For example, when wheat is harvested, the grain is collected by the combine, but most of the plant is left in the field. Sounds like a problem, right? No way – this is where me and my Wormies come in! We love to eat the stems, leaves, roots and other plant parts that humans don't.

When these parts are left behind in the field, worms have a feast! By eating this stuff, worms play an important role in the soil ecosystem. We work with other organisms like fungi and bacteria to return nutrients to the soil. Fields that support a healthy population of worms have richer, healthier soil than fields without worms. This means healthier plants and more food!



Do you know where in the world your food comes from?

You might be surprised to know that many of the fruits and vegetables you eat were grown far away from where you live. Each year almost four million tons of food is transported around the world. Some foods travel as far as 10,000 miles before they get to your local grocery store.

Many foods like potatoes, strawberries or wheat, which is used to make bread and cereal, are grown in the United States. Others such as rice, bananas or tomatoes come from countries far away like China, India or New Zealand. Depending on what it is, where it comes from and where it is going, your food might travel here by plane, train, ship or truck!

The next time you eat a fresh, delicious apple take a few minutes to think about where it came from and how it might have made its voyage to you.



The map to the right shows where foods are produced around the world. How far did your food travel to get to you?





Before it gets to your plate,

your food has gone through a complex system of preparation and processing. For example, fruits and vegetables can be peeled, sliced, mashed or juiced in food processing factories around the world. Grains are ground into flour to make breads, cereals and cakes. A lot of the crops produced in the U.S. is used to feed livestock, which then give us eggs, dairy and meat. All of these foods are important ingredients in meals you eat every day.



And don't forget all the people who helped to make your food. At home, your breakfast might be prepared by a family member. Your lunch might include bread made by workers at a local bakery. Your afternoon snack probably came from a grocery store where people stock the shelves, ring up your purchases and will even help you to your car. At a restaurant, teams of cooks and servers prepare delicious meals for your family's dinner. Whether you eat at home, or in a fancy restaurant, many people worked hard to prepare your food.



Did you know that about 40 percent of the food produced in the United States is wasted?

This adds up to about 20 pounds of wasted food for every person in the U.S. every month! Food is thrown out for many reasons. Let's look at some of those reasons AND what we can do about it!

Sometimes food looks a little funny when it's picked at the farm. Grocery stores know that people won't buy apples that aren't perfectly round, or carrots with extra "legs," so funny looking fruits and veggies get left in the field to rot! But funny looking food tastes just as good!

Ever order too much food at your favorite restaurant? Those perfectly good food scraps that are left on your plate just get thrown in the garbage! You can reduce waste by ordering only as much food as you will eat, or sharing a dish or bringing leftovers home in re-usable containers to eat later.

What about when food goes bad in your fridge? Lots of fresh food gets wasted just because we forget to eat it. You can help cut down on wasted food by buying only the food you know you will eat in the next two or three days. You can also add an "Eat Me First!" bin to your refrigerator so you can prioritize your snacking.

Sometimes, no matter how hard we try, food goes bad anyway or there are parts of food that we just don't eat – like banana peels. But you don't have to waste them! You can turn these food scraps into rich compost for your garden or lawn, as you'll see on the next page!

Sam's order came with more food than he could ever eat!



Sara cleaned out the fridge and found a whole head of lettuce was wilted!



These carrots have some extra legs!



What happens to food that goes into the garbage?

It ends up in your local landfill.

A landfill is a large pit where garbage from families and businesses is dumped and then covered by dirt. People send so much garbage to landfills every day that eventually they get full. When that happens we have to find a new place to send our garbage. It's a real mess. That's why it's important to throw away less garbage. You've heard of recycling, right? Recycling is a smart way to turn waste into resources. And guess what? Food is 100% recyclable!



The next time you have leftover food scraps, give them to the worms!

They might look like garbage, but those leftover tomatoes on your plate contain valuable nutrients. When food gets thrown in the garbage it ends up in the landfill and its nutrients are never used again. So what should you do with food you're not going to eat or food you can't eat, like peels, stems and seeds?

You can help! Just put all those things in a compost bin where the food can break down, or decompose, naturally. A compost bin isn't just filled with a pile of rotting food. It's a community of hard working organisms like worms who turn food scraps into a fertilizer that makes more good food for you.

Worms and other tiny creatures are the first team to tackle your leftovers in the compost bin as they cut and tear big pieces of food into tiny bits. They also burrow into the compost pile, churning the waste and mixing it with water and oxygen from the air. They also poop... a lot! Worm poop is a great fertilizer for plants because it contains nitrogen and phosphorus, two elements plants need.

Next, fungi consume the tiny bits of food that bigger organisms like worms leave behind. As it grows, a fungus spreads a thin web of fibers through the soil. Not only does this help to hold the soil together but these fibers act like pipes allowing nutrients and water to flow from place to place. These fibers connect with the roots of plants, helping plants get the water and nutrients they need.

Finally, bacteria take care of whatever food is left. For example, bacteria can break down tough plant fibers that animals can't digest. They also play a critical role by turning nitrogen in the air and soil into chemical compounds the plants can use.

A pile of compost contains millions of organisms from thousands of different species, each playing an important role in the recycling of nutrients from your food. That means that compost is one of the best ways to make rich, healthy soil for growing crops. It contains all the nutrients plants need to grow – and it's one of my favorite things!

Food is 100% recyclable!

Does rotting food make you squirmy?

Give it to a little wormy!

You can easily make a compost bin for your home, school or community. Here's how!



1 All you need is a five gallon bucket with a lid, or similar container.



2 Drill several 1 inch holes in the bottom of the bucket. These holes will let earthworms reach the compost and allow liquids to drain out.



3

Drill 15 to 20 1/4 inch holes in the sides of the bucket. These holes allow air to reach the compost so the organisms that break it down can breathe.



4

Place the bucket in the shade and make sure the bucket sits. Start with a couple handfuls of moistened, shredded paper. This will attract worms.



5

Add your food scraps every day.



6

Put the compost on your garden and watch your food grow! Food is 100% recyclable!



To learn more about composting and to check your activity answers, go to: sustainabilitysolutions.asu.edu/wendell

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