

# Plants & Animals...

## Providing Food, Fiber, & Energy

Look around your classroom. Do you see anything made from plants or animals? Almost everything is! Book shelves, pencils and paper came from trees grown for wood and pulp. The jeans and t-shirts you are wearing were once plants, too. They are made from cotton plants. Can you list others?



Wood, paper, and cotton are pretty obvious. If you take a deeper look, you will find many more things made from plants and animals.

Fat from animals is used in crayons, soap, and paint. Corn starch makes glue and paint thick. Leather shoes, belts, and footballs are made from cattle hide. The carpet that covers the floor likely contains corn or soybeans, too. **Byproducts** are what is left over from making the main product, such as meat or oil. Instead of throwing these things away, scientists and engineers created new uses for them.

### RENEWABLE & NON-RENEWABLE Resources

Everything is made from something. Food, clothes, building supplies, and energy sources are made from natural resources. They are classified into two groups: renewable and non-renewable. **Renewable resources** are replenished over a short period of time. Some examples are plants, wind, and solar energy. **Non-renewable resources** are not easily replenished by the earth. Oil and minerals are non-renewable resources. They can take thousands of years to replenish.

#### THINK & DISCUSS:

What kinds of things can be grown or made in just a few years? What kinds of things take many years to be made? What's the difference?





# Beef Stewardship

Most cattle live outside. Cattle can eat lots of grass. Because of this, many farmers let their cattle live on **pastures**, or large, grassy areas. The cattle eat the grass and may get extra feed made from corn and soybeans. Vitamins and minerals are also added to complete a healthy diet.

In the 1930s, many pastures were **overgrazed**. Animals ate too much grass and didn't give it enough time to grow back. This caused **erosion** and other issues. Since then, farmers have learned ways to keep their land healthy and productive for years to come.

Sometimes, farmers **rotate** their cattle. Their large pastures might be divided into smaller areas called **paddocks**. These paddocks give the cattle enough grass to eat for a short amount of time. They can then move to fresh grass regularly. This system helps grass grow better. Healthy grass keeps soil in place and keeps weeds from taking over.

# What Pigs Need

Pigs, like all animals, need a few basic things to stay healthy. One of the things all animals need is a healthy, balanced diet! Pigs get their food mixed together in a **feed ration**. A pig's feed can have corn, soybeans, vitamins, and minerals. Pigs also drink a lot of water.

Many pig farmers raise their animals in barns. Barns help keep pigs safe from **predators**, disease, and extreme weather like blizzards!

Like other animals, pigs can get sick. Farmers work closely with animal doctors, called **veterinarians**, to help sick animals. Sometimes sick animals need medicines or **antibiotics** to get better. Farmers and veterinarians can also **vaccinate** pigs so they don't get certain diseases.



# Plant Food

Plants need food, too. The food that plants need are called **nutrients**. The main nutrients they need are nitrogen, phosphorus, and potassium. These are called **macronutrients**.

Plants need these nutrients to grow. They use their roots to pull nutrients from the soil. Over time, the soil starts to run low on nutrients. Farmers put **fertilizer** on their fields to add nutrients back to the soil.



Plants also need other things, like sun and water. With nutrients, sun, and water, a plant can grow its best!

# Fiber from Farms

## Wool

Wool comes from sheep. But how do we get the wool? How does it grow? Why do people like to use it?

Wool is the fluffy fur that grows on sheep. Wool never stops growing! That means that if the sheep never got **sheared**, or got their wool cut off, they would look like giant wooly blobs with legs!

Even though this seems funny, it can be dangerous for sheep. If their wool, or **fleece**, gets too long, it can get full of dirt or rocks that can make it very heavy and weigh them down. Some bugs can also live in fleece and irritate or hurt the sheep. Shearing sheep gives people a high quality fiber that they can make clothes and other materials out of. It also gives the sheep a nice haircut that helps keep them happy and healthy!



## Cotton

Are you wearing any cotton today? If you're wearing blue jeans or a T-shirt, chances are that you are wearing cotton!

Cotton grows on a plant in small puffs called **bolts**. Cotton needs long summers, warm weather, lots of sunshine, and not a lot of rain to grow. In the U.S., this means cotton is grown primarily in the southern states. Texas produces more cotton than any other state. Farmers in drier areas may need to **irrigate** their cotton to make sure it grows well.

One acre of land, which is about the size of a football field, can produce about 700 pounds of cotton! That can make over 1,774 t-shirts!



## Corn, Soybeans, and More

Did you know corn can make fiber, too? It's true! There's corn yarn and even corn fiber carpet! Corn fiber is very soft, and can more easily decompose in a landfill compared to other **synthetic**, or man-made, materials.

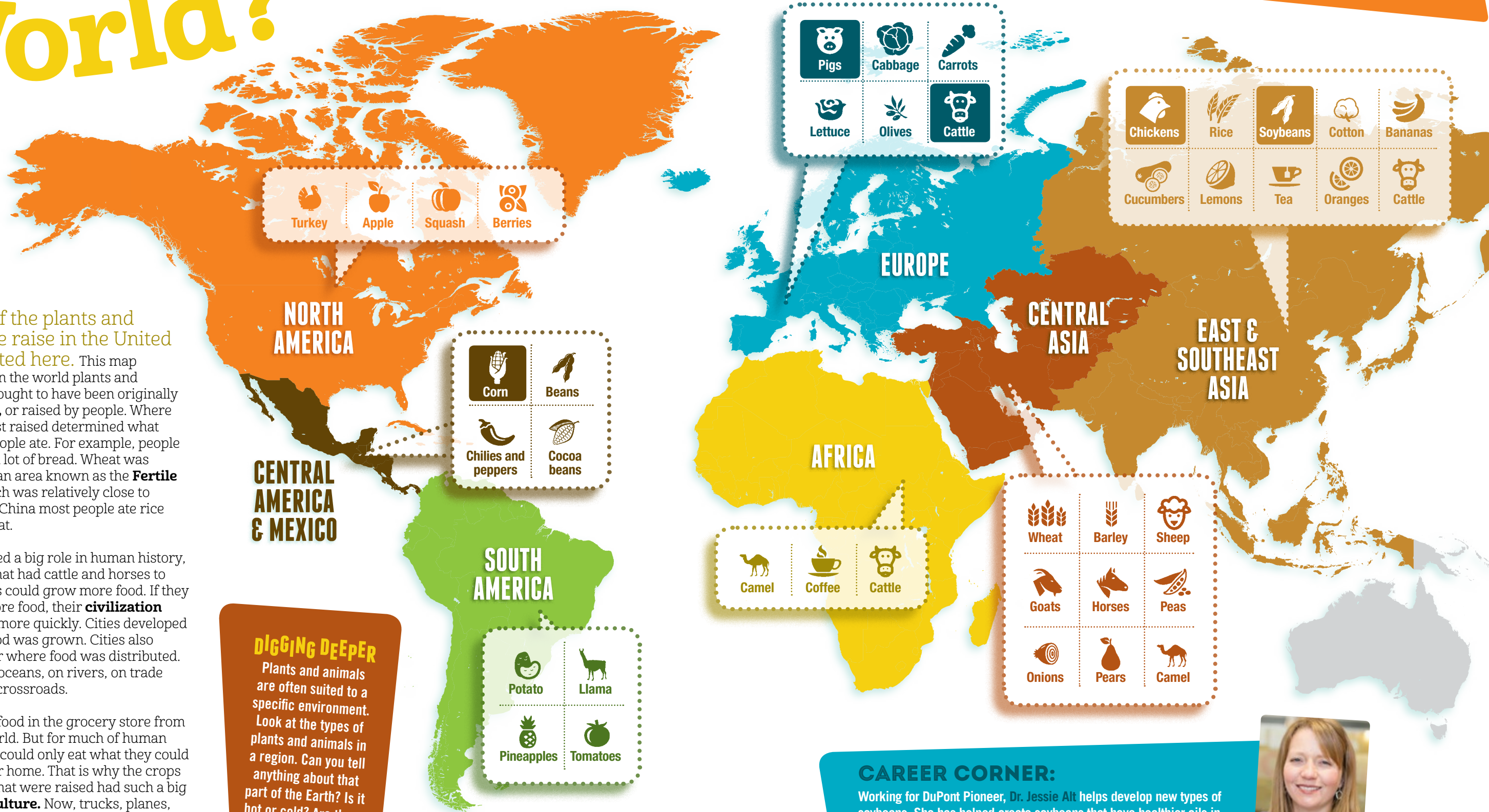
Soybeans can also make cool things! Think about the foam cushioning in the seats of your parents' car. There's a chance it was made from soybeans! Other plants, like bamboo, can make products comparable to plastic. They are more sustainable than plastic too!





# Where in the World?

**THINK & DISCUSS:**  
Iowa grows a lot of corn and soybeans. Iowa also raises a lot of pigs, chickens, and cattle. Where in the world were these crops and livestock originally from? What is similar or different between those places and Iowa?



Very few of the plants and animals we raise in the United States started here. This map shows where in the world plants and animals are thought to have been originally **domesticated**, or raised by people. Where crops were first raised determined what kind of food people ate. For example, people in Europe ate a lot of bread. Wheat was first grown in an area known as the **Fertile Crescent** which was relatively close to Europe. But in China most people ate rice instead of wheat.

Livestock played a big role in human history, too. Cultures that had cattle and horses to help pull plows could grow more food. If they could grow more food, their **civilization** could develop more quickly. Cities developed near where food was grown. Cities also developed near where food was distributed. This was near oceans, on rivers, on trade routes, and at crossroads.

Today we find food in the grocery store from all over the world. But for much of human history people could only eat what they could raise near their home. That is why the crops and livestock that were raised had such a big influence on **culture**. Now, trucks, planes, trains, and ships allow us to send crops and livestock all over the world.

**DIGGING DEEPER**  
Plants and animals are often suited to a specific environment. Look at the types of plants and animals in a region. Can you tell anything about that part of the Earth? Is it hot or cold? Are there mountains? Jungle? Grasslands?

**CAREER CORNER:**  
Working for DuPont Pioneer, Dr. Jessie Alt helps develop new types of soybeans. She has helped create soybeans that have healthier oils in them. These oils can then make the food we cook healthier to eat. Alt grew up on a farm and learned to love science from her mom. She says that it takes seven years to produce a new variety of soybeans to sell to farmers. She encourages students to stay curious.







THINK & DISCUSS:  
What are some examples  
of biotechnology?

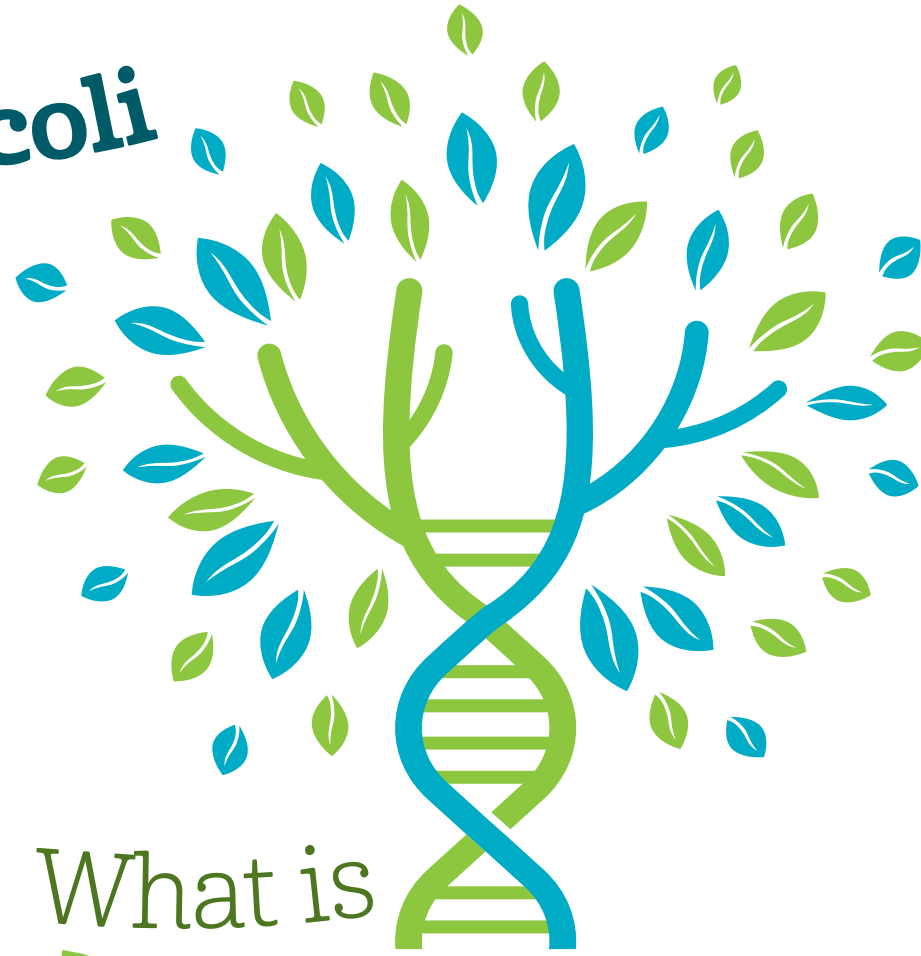
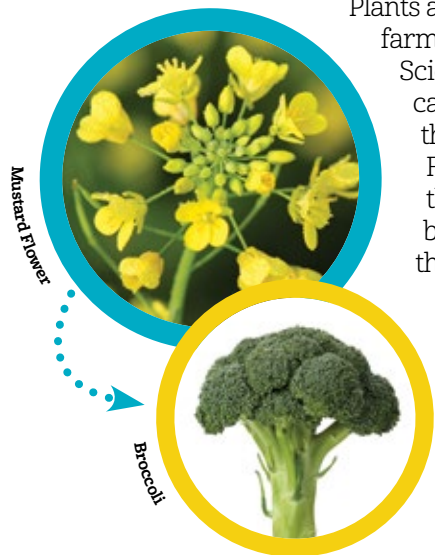
# From Mustard to Broccoli

Sometimes when we cross plants or animals, the resulting offspring is better than either of the parents. This is called **hybrid vigor**. In the 1950s, scientists researched two types of wheat. The first had a head with a lot of seeds on it that could make a lot of bread flour. But the stalk was so tall that the wheat fell over and could not be harvested. The second was a short variety. It was sturdy, but did not produce many seeds. When scientists cross-pollinated the two types of wheat, the result was a short stalk with many seeds.

Farmers and scientists can also select for desired traits. Hundreds of years ago farmers started to grow mustard plants. They noticed that some of the mustard plants had big leaves that stayed tightly curled. They saved those seeds and grew more of them. They repeated this process many times. After many growing cycles, those plants became what we now know as **cabbage**. This process is known as **selective breeding**. Farmers took that same mustard plant and also developed **broccoli**, **Brussels sprouts**, **kohlrabi**, **kale**, and **cauliflower**.

Farmers have been making plants better for thousands of years. The corn we grow in Iowa today can be traced back thousands of years to Mexico. The grass called **teosinte** had 8 to 16 seeds on its head. Farmers saw its potential. They selected plants that had the most seeds to save and replant. Today corn has around 800 seeds per ear.

Plants aren't the only thing farmers have improved. Scientists think modern cattle came from the **wild aurochs** that roamed Europe. Farmers domesticated them. They selected the best meat producers and those became modern day Angus and Hereford breeds. They selected the best milk producers and those became modern day Holstein and Jersey breeds.



## What is BIOTECHNOLOGY?

Crossbreeding and selective breeding laid the groundwork of **biotechnology**. Bio means life or living. So, biotechnology is technology applied to living organisms. Karl Ereky is known as the father of biotechnology and says it is "using living things to make other things."

We have to understand how living things work. Traits are passed from one generation to the next generation. By modifying or changing these traits, scientists can make future plants and animals better.

Biotechnology can make plants healthier and resist diseases or insects. Biotechnology can help develop medicines. Biotechnology can make food taste better or last longer. Biotechnology can help farmers grow more food to feed a growing world population.

# Energy

Energy is all around us. It provides the power we need to do what we want to do. Energy powers computer and phones. We use energy to cook. Energy provides light and heat for our homes. Energy fuels cars and school buses to take us where we want to go.

There are many sources of energy. Energy is made from natural resources like coal, oil, water, plants and the sun. Energy can be renewable or non-renewable. Non-renewable energy sources include coal and oil. They take thousands of years to form.

Renewable energy sources include wind, water, sunlight, and plants. **Biofuel** is a renewable energy made from plants. **Ethanol** is a type of biofuel that can be made from plants like corn. It can be used in cars and trucks with gas engines. **Biodiesel** is a type of biofuel made from seeds like soybeans. It can be used in buses and semi-trucks.

Sources of renewable energy are all around us. What and how much varies from place to place, though. Some places are too windy or not windy enough for wind turbines. **Hydropower** is produced near large rivers, lakes, and oceans. Some places are well-suited for growing crops to make biofuels. Others are not. All states in the U.S. produce and use renewable energy. But what they produce depends on the resources they have.

Iowa farmers grow more corn than farmers in any other state. Iowa is also the top ethanol producing state. Nearly every gas station in Iowa sells ethanol. This makes sense, right? It is smart to use what you have.



courtesy of the Iowa Corn Growers Association

**DIGGING DEEPER**  
Ethanol can be made from sugar cane & sugar beets too. What places grow these crops? Is ethanol made there?





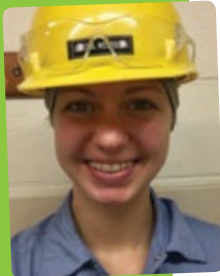
# Look at Your School Lunch Tray

Did you know that all of the foods you eat were grown or raised on a farm? It's true!

The **milk** you drink comes from dairy cows. These cows walk up to milking machines 2-3 times a day. While they are being milked, they can eat snacks and socialize with the other cows! Don't forget - the chocolate is added later, after the cow is milked!

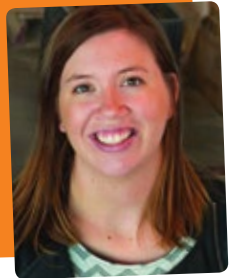
## CAREER CORNER:

Abigail Wehrbein is an Operations Associate Supervisor at Cargill Beef. Abigail oversees food safety, quality of meat products, and employee safety. Her plant brings in cattle from across the Midwest and turns it into delicious hamburger and steaks that are sent all over the world. Maybe you've eaten beef from Abigail's plant! Would you like a job ensuring that people's food is safe and tasty?



## CAREER CORNER:

Ellen Walsh-Rosmann is the owner of FarmTable Procurement and Delivery. The idea for her business came from a challenge she had as a farmer. She wanted to sell vegetables to schools and businesses. But finding new customers and delivering to them was time consuming. She needed to spend her time working on the farm. There wasn't a company that would help her sell her produce. So she started her own. Ellen now works with over 40 farmers. She finds schools and restaurants that want food products and delivers to them. Maybe you can turn a problem into a business too!



Farmers use machines to help grow and harvest the **veggies** you eat. Did you know that there are special tractors that help farmers grow potatoes? And that there are combine harvesters just for peas?

**Fruit** grows on many different types of plants. Apples, bananas, peaches, and oranges grow on trees. Fruits like blueberries and raspberries grow on bushes. Some others grow on small plants, like strawberries, or on vines, like grapes!

The bun on your sandwich is from agriculture, too! **Wheat** is important in making bread. Wheat is a grain. It can be ground into flour to make breads, rolls, and even cake!

The **meat** on your sandwich comes from livestock. Chickens raised for meat live in big open barns. They are free to run around and eat and drink as they like. Pigs are also raised inside to keep them safe, healthy, and warm. Most cattle live outside and eat a mixture of corn, soybeans, and grasses.

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