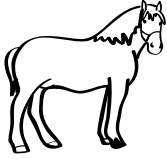


## 1900 Horse-powered Farm

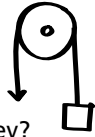
**8 Horses:** By 1900, most farmers were using large draft horses to pull their machines instead of oxen. These horses were bigger than riding horses so they would have more power to pull wagons and machines in the field. Horses are measured in "hands". This was measured by putting a man's fist on top of the other from the ground to the top of the horse's shoulders. A hand is about 4 inches. Draft horses are usually 16 to 19 hands tall.



On the horse pasture fence, there is a measuring post for you to find out how many hands tall you are!

**9 Even More Farm Machines:** In 1900, farmers still used simple machines to do their work. Look around the farm for these simple machines!

**A Pulley** is a rope wrapped around a spinning wheel which helps to lift things. Farmers often had pulleys to lift hay. Can you find a pulley?



**A wheel** is a circle with an axle through it which spins. Wheels make it easier to pull or move things. Can you find a wheel that makes hauling goods easier? How about a wheel that helps turn a pump?

In 1900, many simple machines were combined to make complex machines. Check out the corn sheller in the corn crib and the farm machines in the machine shed. See if you can identify the simple machines that combine to make the more complex machines!



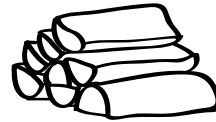
**10 Egg Money:** By 1900, farm families raised chickens for themselves, but also to sell the eggs in nearby towns.



Depending on the breed, chickens can lay 5-7 eggs a week. Count the hens at the 1900 farm. Look in the hen house and in the farm yard. If each hen laid one egg a day for a week, how many eggs would the farmer have?

**\*More Math:** A dozen eggs is twelve eggs in all. How many dozen eggs would a farmer have if all the hens were laying an egg every week? In 1900, a dozen eggs cost 9 cents each. How much money could the farmer's wife make?

**11 Wood by the Cord:** The 1900 House is heated by a wood burning stove. Farmers would also use the stove to heat water to wash people, dishes, and laundry. They also cooked their food in the stove. That meant a lot of wood! Firewood is measured in cords. One cord is four feet wide, four feet high, and eight feet long. One family might use at least 20 to 25 cords a year, depending on the winter! The 1900 farmers have started a stack of wood next to the fence. How many pieces of wood do you think it will take to fill an entire cord? Count how many pieces are in two rows across, then estimate how many rows it will take to get to the top.



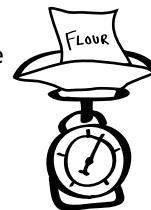
**\*More Math:** On average, a full cord of hardwood contains 15.3 million BTUs of heat. BTUs, British Thermal Units, are a measure of how much heat a fuel will produce. How many BTUs are in 25 cords of wood? A cubic foot of natural gas produces 1,050 BTUs. How many cubic feet of natural gas would we need to equal 25 cords of wood?



**12 Farm Chemistry:** We think of chemicals being used in laboratories. But farm families used chemistry for lots of every day things! A chemical is really any type of substance or ingredient. Explore the 1900 house and look for everyday chemicals! Ask the 1900 farm interpreters to help you name them. How about the chemical in the lamp above the dining table? What chemical in the kitchen makes bread rise? What chemical in the pantry helps get laundry and people clean?

**\*More Chemistry:** Whole milk right from a cow is made of fats and proteins in water. A farmer could separate some of the fats from the whole milk by letting it sit in a cool place. The fat or cream will float to the top. What chemical reaction could a farmer do with this fat or cream by putting it in a container and shaking it or using a paddle to mix it around?

**13 Weights and Measures:** We've learned that not all measures are familiar. In the past, not everyone measured in the same size cup or the same size teaspoon. For flour and sugar, some people prefer to weigh those ingredients in pounds and ounces. Remember learning about volume in the bushel baskets? Well, one pound of flour and one pound of salt do not take up the same amount of space. Check out the food scale in the 1900 pantry and compare how a volume of flour and other ingredients stack up on the scale!



Living History Farms'  
Visitor Guide for  
Kids in 4th-6th Grade

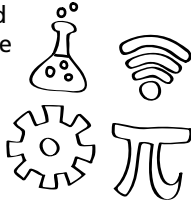
# Science of Farm Life

LIVING  
HISTORY FARMS

## We all study math and science in books, but do those things help us in real life?

Yes! The ways we cook, travel, work and play depend on scientific tools and mathematic rules. Let's start our science adventure with a visit to the working farm sites.

Board a tractor cart at the green tractor cart pickup in Walnut Hill. This will take you to the beginning of the 300 year walking trail.



**2 Engineer a tool!** The loway engineered tools for farming from bones, woods, and stones. They learned which materials were strong, which could be shaped and carved, and which could be sharpened. Ask an interpreter where the tool making pile is at the loway farm. Find a material or piece that would make a good tool for scraping away weeds. How about a good material for making a digging tool? What about a rake or a something to cut grass and plants?

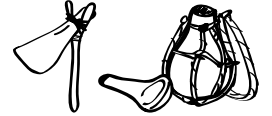
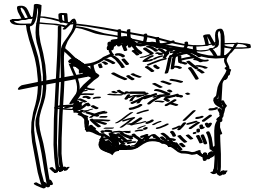


**3 loway Garden:** The loway were very clever farmers, using scientific observation to understand how plants grew together. In the loway garden, women planted three things—corn, beans and squash. These plants, called the three sisters of life, grow well together; bean plants vine up and put nutrients in the soil. Corn plants grow tall and support the vines. Squash have big leaves that spread out and help keep weeds from choking out the other plants. Can you find each of these plants in the loway garden? Is the three plant system working?

## 1700 loway Farm: The loway nation were some of Iowa's first farmers--and they were great chemists, engineers, and agronomists.

**1 Making Leather --Natural Chemistry!** Look for the hide drying rack at the 1700 loway Farm! The loway used chemistry to turn animal hides into soft leather for making clothes, bags, and shelter covers. This is called tanning leather. An animal hide will get really stinky and rot if it is not tanned.

Native American tribes used natural chemicals to change the proteins in the hide so they would not rot and would stay soft. Feel the skin hanging on the hide rack. Has it been tanned or not? Ask an interpreter for more info about how a hide was tanned!



## 1850 Pioneer Farm: Pioneer farmers used their math skills to measure fields and count costs. Some 1850 Farm measures sound strange to us today, while others we still use. Let's use your math and measuring skills to explore the pioneer farm!

**4 Areas of Land:** Farmers measure land in acres. One acre is about the size of a football field without the end zones or 43,460 square feet.

Let's measure the 1850 wheat field. An adult step (from the back heel of one foot to the front heel of the other foot) is just under 36 inches or 1 yard. We can use this to estimate! Count the number of steps it takes an adult to get to the top of the 1850 wheat field. This is how many yards wide the field is. Now walk the length of the field counting steps. This is the number of yards long the field is.



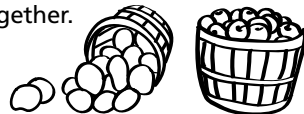
\*More Math. Let's do some math! If we multiply the width and the length, it will tell us the area or how many square feet the wheat field is!

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

width                      length                      area

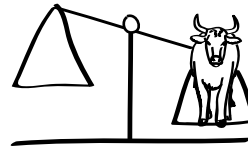
**5 Bushels of Money:** Pioneer farmers came to Iowa to raise crops to sell. Crops were measured by the bushel. A bushel is actually a measure of volume--how much of something will fit in a certain space.

Small things like kernels of wheat take up less space and more will fit in a bushel. Look in the barn for the bushel basket. Will more corn or more wheat fit in the basket? Would more apples or more potatoes fit in a bushel? Think about the shape of each thing and how it stacks together.



\*More Math: In the 1850s, an acre of land could grow 40 bushels of corn or 30 bushels of wheat. Each bushel of corn could be sold for 24 cents. Each bushel of wheat could be sold for 57 cents. Which makes more money for the farmer?

**6 Hundred-weight:** Cows and hogs are measured in pounds, like people. When they are sold at a market, they are valued at a hundred-weight. A farmer would make a certain amount of money for every 100 pounds of animal. Which animals at the 1850 Farm do you think weigh the most? The oxen are each about 2,000 pounds. The milk cows are about 1,000 pounds. The hogs get to be about 100 to 200 pounds when they are full grown. Can you add up how much weight all of the cows, oxen, and hogs would weigh all together?



\*More Math: In 1850, hogs were sold at around \$2.75 per hundred-weight. How much money would a farmer get for a 200 pound hog at a market?

**7 Pioneer Machines:** Simple science tools, called simple machines, helped make work easier for the Pioneer farmer. Look on the walls inside the barn and see if you can find these tools!



**A wedge** has a slanted side and a sharp point. Small metal wedges were pounded into trees to split them into pieces. Axes are also wedges! Saws are also wedges! Find the slanted sides and points—but don't touch, they're sharp!



**A lever** is a board or pole that helps lift heavy things. Think of a see-saw or a crowbar. Shovels and digging forks are levers that help the farmer pry items out of the dirt. How could a hammer become a lever?



**An inclined plane** is a slanted ramp or surface that makes it easier to go up a slope. Look for the ladder to the barn loft. It's pretty steep. Would a slanted ladder make the climb easier? Would it make it longer?



**A screw** is a tiny inclined plane or ramp wrapped around a pole. Look for the auger on the wall. It looks like a big screw with handles! The point is a wedge and the screw twists into wood making it easier to drill a hole!