Name _____ Date_____

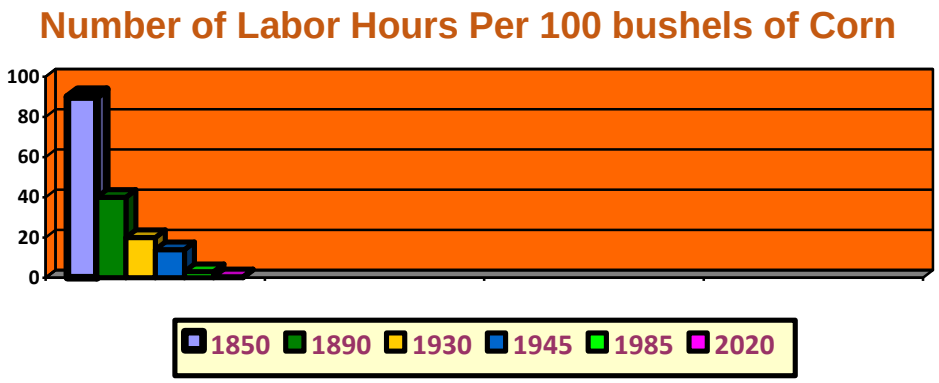
Futuristic Farming

Imagine you are going to visit a farm. What do you expect to see? Sure, you can expect to see some crops growing in the field, a barn, some animals. How about robots, driverless tractors, drones, and GPS tracking devices? Like so many other industries, technology has completely transformed agriculture!

How Have Agricultural Technology and Tools Improved Production?

Throughout history, humans had to provide for themselves by finding food. The ***nomadic*** lifestyle of the hunter-gatherer was often unreliable, and families began to settle in one location. This allowed them to ***domesticate*** some plants and animals; enough to sustain their families and possibly some extra to sell or trade for other needs. All the planting, harvesting, watering, feeding, milking, egg gathering, was done by hand with simple tools.

As time went on, tools were updated, and farmers began to use horses or oxen to help with the heavy work. The more advanced the tools became; the less labor was needed to produce the same amount of product. In the 1850s, about 90 labor hours were needed to produce 100 bushels of corn. By 1890, that number dropped to 40. In the 1930s, only 20 hours, and today, 100 bushels of corn takes only about ½ hour to produce!



What Tools do Farmers use Today?

Up through the 1800s and into the 1900s, a cow was milked by the original farming tool, the hand, 2 or 3 times a day. Each milking session took about 15 minutes. Dairy farmers today have robotic milking machines! The technology that they can use now keeps the farmers, and the cows happy. Each cow wears a device that can keep track of how many times it has been milked, how much it had to eat and drink, and other information that lets the farmer know it is healthy. The cows can go to the robot milkers whenever they want to be milked. Some cows prefer to be milked more frequently, sometimes 5 or 6 times a day. On some dairy farms, cows are milked at specific times throughout the day, guided by the farmer, but the process is still done mostly by machines. The robotic milkers complete the milking process in about 5 minutes.

Robots are also replacing humans when it comes to picking some crops. The robot can be programmed to pick the fruit that is ripe, while leaving the unripe fruit alone. They can

also sort and package fruits to prepare them for delivery to stores and restaurants. This makes the process much faster, guaranteeing that they are as fresh as possible when they reach the consumer.

Image from Fruit Picking Robots | Into Robotics

Drones are another handy tool that farmers use today. By flying a drone through the fields, a farmer can quickly identify any areas that may be lacking in water, or in need of a specific pesticide treatment. Because the drone can fly close to the ground, it can pinpoint specific plants that need intervention, without treating the entire field. Some drones can carry and spray necessary nutrients. This saves money since only the plants that need the spray get it. Many farmers have this same technology in their tractors.

A ***driverless tractor*** is a real game changer for many farmers. These amazing machines can be programmed using ***GPS trackers***. The GPS (Global Positioning System) can tell the tractor exactly where to go to complete its work. They can identify when crops are ready to be picked, whether the soil is low in nutrients or moisture, and overall health of the fields. The farmer can monitor the tractor from their computer without having to go out into the field.

As the world population continues to climb, and the amount of farmland decreases, we must continue to develop ways to produce more food in less space. Technology is the future of farming!

Image from How Agricultural Drone Technology is Making Farming Smarter - IndustryWired

Image from Agriculture Technology Spotlight: Self-Driving Tractors – First Furrow

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Futuristic Farming – Reading Passage
Directions: Read each question and fill in the best answer.

1. What does **domesticate** mean in the context of this article?

- O A. Sell
- O B. Gather
- O C. Grow
- O D. Buy

2. How many hours of labor did it take to produce 100 bushels of corn in 1945?

- O A. About 100
- O B. About 40
- O C. About 20
- O D. About 15

3. How long does milking a cow by hand take to complete?

- O A. About 15 minutes
- O B. About 5 minutes
- O C. About 30 minutes
- O D. About 10 minutes

4. What jobs are robots used for according to this article? Choose ALL that apply.

- O A. Milking cows
- O B. Picking fruit
- O C. Eating fruit
- O D. Packaging fruit

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5. Why are drones a good idea for farmers?

- O A. They save money
- O B. They look cool
- O C. They spray too much pesticide
- O D. They are fun toys

6. What is the main role of a farmer on a high-tech farm?

- O A. Driving the tractor
- O B. Picking the crops
- O C. Milking the cows
- O D. Programming and monitoring the devices to run the farm.

Extended Response: Use details from your own experience and information from the article in your response.

You and your partner have inherited 1000 acres of farmland. Your partner wants to sell the land and start a high-tech business in the city. Write a letter to your partner convincing them why you should keep it and use their technology skills to run the farm.

Futuristic Farming Facts

A robotic weeder can decrease the use of herbicides by up to 90%.

By the year 2050, the population of the Earth is expected to reach about 9.7 billion. To feed everyone, we must rely on and develop technology to sustainably produce enough food.

A single strawberry robot can pick 25 acres of fruit in 3 days, the equivalent of 30 farm workers.

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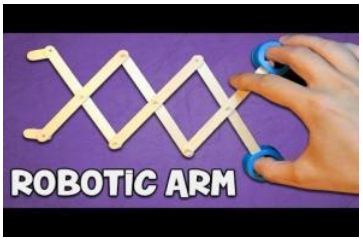
Try this at home! Robotic Grabber Arm

(Ask an Adult First!)

You'll need: 7 popsicle sticks, 2 bottle caps, toothpicks or a wooden skewer, a small drill or screwdriver, scissors or knife, glue.



1. Cut about 1 inch from each end of **one** popsicle stick for the grabber tips.
2. Stack the sticks together and make a hole in each end and one in the center.
3. Break the toothpicks or wooden dowel into about ½ inch pieces.
4. Put 2 popsicle sticks together to make an **X** using the small piece of toothpick through the holes to secure it.
5. Add the other sticks at the top and bottom of each stick until you have 3 connected as shown.
6. Connect the grabber tips to one end, and the caps to the other end.
7. Practice picking up objects with your robot arm! Where could farmers use a tool like this?

Check Out These Books:

Drones & Flying Robots

by Mary Lindeen

A look at the many unique types of work that drones and flying robots are able to do. Because they are easily moved into difficult spaces, they are the technology of the future.

Bots!

by Cathy Ceceri

Learn all about the history of robots, the things they can do, and how to create and engineer your own. .