



1790

4 million Americans
90% lived on farms

1850

23 million Americans
64% lived on farms

1950

151 million Americans
12.2% lived on farms

2010

315.5 million Americans
1.8% live on farms

A-"Maize"-ing Corn



Corn is the number one field crop in the United States. Nearly 99% of this crop is grain corn (also called dry corn, field corn, or yellow dent corn). It is used for animal feed, ethanol, corn starch, corn syrup, corn oil, cereal, and hundreds of by-products. Washington leads the nation in yield per acre at 215 bushels. Sweet corn is what we eat fresh, canned, or frozen. It is one of the few crops grown in all 50 states.

6000 B.C.

Parent of corn, a grass called teosinte is farmed in Mexico.

1492

Columbus discovers corn in Cuba, and brings some samples back to Spain.

1621

Native Americans show English settlers how to grow maize.

1779

Seeds of sweet corn are taken from the Iroquois.

1880

62 million acres of corn are grown in US.

1912

US production averages 20 bushels/acre.

1917

US corn acreage reaches peak of 111 million acres.

1930

First mechanical harvester is developed by Gleaner Corp.

1940

Hybrid corn seed becomes readily available to farmers.

1954

The number of tractors on farms exceeds the number of horses and mules.

1966

High fructose corn syrup is patented. The syrup quickly replaces sugar in soft drinks.



1995

US Environmental Protection Agency approves first genetically modified corn for commercial planting.

2006

Ethanol production yields 4.9 billion gallons of renewable fuel.

2006

Walmart begins to switch packaging from petroleum-based to corn-based plastic.



2012

US production averages 152.8 bushels/acre.

2013

On a global scale, the United States produces 32% of the world's supply. GMO varieties account for 90% of the total.



Early corn harvester

From food and feed to fiber and fuel, corn connects us all!

Today's Children... Tomorrow's Leaders

tech•nol•o•gy (tek nol 'ə jē), n. using scientific knowledge to find a better way of doing something.



AGRICULTURE IN A CHANGING WORLD

Man has always found better ways of doing things. When people apply what they have learned about science, that's technology!

No industry has made better use of technology than agriculture. Improvements to agriculture have changed America from an **agrarian** to an **urban** society.

Less than 2% of our people now work the land. This allows everyone else to live in cities and work in other careers. This means more doctors, more teachers, and more scientists.

Even though less than 2% of the US lives on farms, 17% of our total workforce is employed in agriculture. Growers produce the raw products and others turn them into things we eat and use.

Historically, the early 20th century mechanical revolution put tractors, combines, and other specialized machinery in use rather than horses and mules. Then in the mid-20th century, agriculture experienced a revolution in chemical and genetic knowledge that allowed **high-yield agriculture**. In the late 20th century, agriculture benefited from the electronic revolution, using computers and satellites.

Prior to 1900, nearly all increases in food production came about because more land was brought into production. Now in the 21st century almost all increases must come from higher yields and be based on science and technology.

Think & Discuss

Did You Know?

Hybrid seed corn is produced by crossing two different varieties of corn. To see how this is done go to:

www.youtube.com/watch?v=fkkHvsYXens

hybrid corn miracle

<http://maize.uga.edu/index.php?loc=diversity>

diversity



Horses to Horsepower

For nearly 200 _____, animals (horses, oxen, and mules) provided the "horsepower" on farms. In 1920 two humans and eight horses were needed to care for a 160 acre farm and it took 40 days to do the plowing. One fourth of the acreage of every farm was used just to grow _____ for the horses.

Harvesting 100 bushels of wheat in 1925 required 15 man-hours of labor and a machine pulled by 32 _____. Today, one man and a self-propelled combine can harvest 100 bushels of wheat in 15 _____ or less.

Precision Farming



precision farming method requires technologies like GPS (Global Positioning System). Networks of satellites orbiting the _____ transmit exact locations to the GPS on the ground. GPS can automatically guide huge farm machines to stay along a track hundreds of meters long with only a few centimeters of difference.

Precision farming allows small areas of land within a field to be managed separately so that the best possible crop yield will be reached using the exact amount of _____, fertilizer, and chemical for each small area. This



More Efficient Irrigation

The modern center pivot irrigation system has come a long way from just flooding fields with water. The system uses a long water _____ that is mounted on motorized wheels and has one end connected to the water line at the center of the field. When operating, the irrigation system swings in a _____, sprinkling water as it rotates.

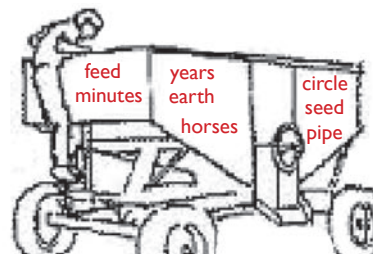


These systems

are computer controlled using GIS (Geographic Information System) and can even be operated from the farmer's cell phone. Irrigation is the reason our farmers lead the nation in the yield/acre of corn and potatoes.

Word Bank

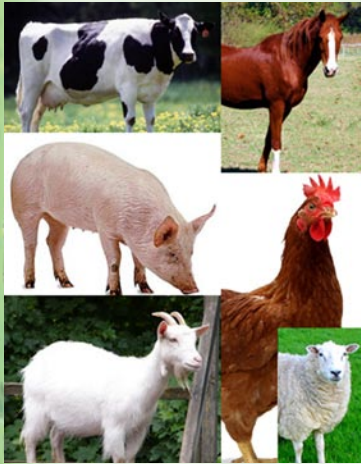
Please use these words inside the grain cart to complete the information above.



Livestock: An Important Part of Agriculture

Cattle, sheep and goats play a very important role in converting solar energy to human food.

- Livestock graze on land that is not useful for growing crops, including forest land.
- Livestock are great recyclers. They eat waste for



food processing that would otherwise be thrown away. They can turn sugar beet pulp, corncoobs, culled potatoes, cottonseed and even apple cores into meat, milk and fertilizer!

- Grazing improves grass by promoting new growth of the plants, controlling brush, and fertilizing with animal manure.

Chickens

Chickens are different from other farm animals. They have airsacs to help them breathe instead of lungs. They also walk upright on two legs, have no teeth, and have a very high body temperature.



Chickens begin laying eggs at about 23 weeks of age and usually lay one egg per day until they are 65 weeks old. If a hen doesn't miss a day, how many eggs would she lay in that time?

Fryers are raised only for their meat. They are usually marketed at an average weight of 5 pounds at about 8 or 9 weeks of age. If all the market weight fryers in Washington crossed the road at the same time, how much weight would the road need to hold? (Remember that there are six 0's in a million!)

Beef Cattle

Americans eat a lot of beef. Hamburgers and steaks are some of the favorites. Beef is an excellent source of Zinc, Iron, and Protein.

It takes about 280 days to prepare a calf for market. When calves are first weaned, no longer needing milk from the mother, they weight about 350-450 pounds. To be sold at market they need to weigh 1200 pounds or more.

Farmers take great pride in how they care for their cattle. They spend a lot time and money to provide the cattle with a nutritional diet and a healthy environment for them to grow.



Pigs

It would be easy to "pig out" on pig because it is a popular protein for every meal of the day. Bacon for breakfast to pork chops for dinner. Pork is the most widely eaten type of meat at 40% of the world's meat consumption.

Corn and soybeans are important ingredients in a pig's diet. Feed makes up more than half of the cost of raising the animal. There's a lot of science and research that goes into making sure that pigs get a well-balanced diet.

Pigs provide more than just the protein in our meals.



There are more than 500 other products that come from pigs. Leather, glue, plastics, and crayons are just a few ways that pigs are used in our everyday lives.



Activity

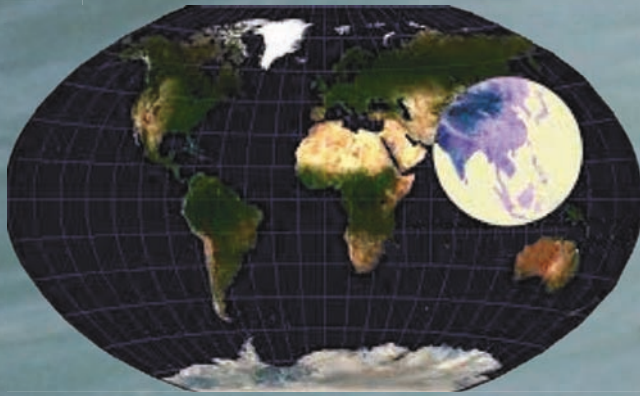
Circle 10 nouns ○

Underline 10 verbs _____

Put a star next to the idiom on this page ☆

Put a check mark next to any words that have a prefix or suffix ✓

Washington - A Pacific



Thanks to our location on the Pacific Rim, Washington has a favorable about two days closer to Asian markets than California's ports. Our because **there are more people living inside the circle on the** populations—36.5% of the world total. The US has only 4.45% of the

How do we increase exports?

Trade is not always a simple process. Countries can impose **tariffs** (taxes on imported products). If consumers want to buy the imported products they must pay a higher price to cover the cost of the tariff. Tariffs and other trade barriers can be used to protect producers within a country from foreign competition. Tariffs can lead to trade wars as exporting countries retaliate with their own tariffs on imported goods.

One method of increasing trade is to make trade agreements between countries. **Free Trade Agreements** (FTAs) have proven to be one of the best ways to open up foreign markets to U.S. exports. We currently have agreements with 20 countries (out of approximately 200 nations in the world).

Can you find US FTA partners on the map above?

(Australia, Bahrain, Chili, Columbia, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua, Israel, Jordan, Morocco, Canada, Mexico, Oman, Korea, Panama, Peru, and Singapore)



Our Next Challenge

A regional Free Trade Agreement called the Trans-Pacific Partnership is being negotiated. This would be a pact between 12 countries of the Pacific Rim. The US already has FTA's with six of the countries, but this new agreement will open many markets to producers in all 12 countries.



Pacific Rim Powerhouse

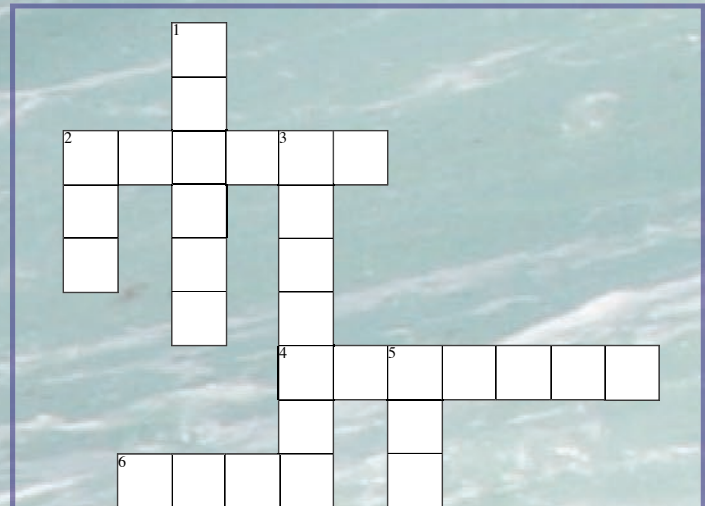
international trade advantage. By ship, our ports are a trade advantage to Asian markets is especially important **map than live outside it!** China and India have huge world population.



Trade Is Washington's Heritage

Our tradition as a trade state began back in the early nineteenth century with the fur trading activities of Hudson's Bay Company and the Canadian North West Company. Seattle became a major seaport during the Klondike gold rush by selling provisions to miners and transporting prospectors to the Alaskan gold fields. In 1916, William Boeing started building wooden airplanes in a small red barn. Today Boeing Company is the country's largest exporter.

Global demand for the things we produce helped to build our state and drives our economy today. More than 40% of all Washington jobs are linked to trade. The value of Washington exports, per resident, is more than twice the national average. More than \$15 billion in food and agricultural products were exported through Washington ports in 2011, the third largest total in the U.S.



Across:

2. How many countries do we have Free Trade Agreements with?
4. How many billions of dollars of agricultural products were exported in 2011?
6. 40% of this in Washington is linked to trade.

Down:

1. This company is the largest exporter.
2. Our ports are _____ days closer to Asia than California's.
3. A tax put on imported products.
5. The traditions of trade started with this type of trading activity.

Activity

1. What is the Pacific Rim?
2. On the map, put an "X" on Washington
3. Are bananas for your lunch an import or an export?
4. Which two countries would be important trade partners? Hint - they have the largest populations

From Hen to Home—It's High Tech!



Hens are fed a healthy diet of specially mixed grain, balanced with vitamins, minerals, and protein. Feeding is computer-controlled to distribute fresh feed evenly. In a modern henhouse computers also control the temperature, humidity levels, and the lighting which triggers egg laying.

Eggs are dropped automatically from the hens' cages to a conveyor belt below. The belt transports eggs out of the house either to the egg processing facility or to a storage cooler. Most eggs are collected within a few hours of being laid.

To clean and sanitize the eggs, a machine washes them in hot water with a special cleaning solution. Once the eggs are washed, they're rotated as they pass by cameras that look for dirt spots. A computer analyzes the images and, if an egg is dirty, the egg is routed back to the washer.

The inside of the egg is examined without having to crack the shell. In the **candling** process, eggs are mechanically rotated several times over a bright light to examine the internal quality of the egg and to find possible cracks. In modern operations, to detect shell cracks, eggs are checked sonically (with sound). In a matter of seconds, tiny probes tap each egg 16 times and 'listen' for the sound it makes. An intact egg has a high pitched ring but a thud indicates a crack in the egg.



Eggs are graded Grade A, AA, or B based on the quality of the shell, white and yolk, and the size of the air cell. Beyond regular grading of each egg, cartons of eggs are pulled randomly to make sure that the eggs meet standards. Eggs are checked for cracks, dirt, and weighed.

Computer-controlled sensors weigh each egg over 60 times in less than a second. Eggs are sorted according to minimum weight per dozen. There is only a three-ounce difference per dozen between the sizes of eggs, so weight accuracy is important.



Machines sort eggs into separate lines by grade and size. Eggs are then packed in fiber or foam cartons to minimize breakage. Once packaged, labels for expiration or sell-by dates are put onto each carton. Robotic arms then pick up the cartons on each line, turn them, and fill a case.

In a warehouse, pallets containing packed cases of eggs are refrigerated. To maintain egg quality, the temperature of the eggs is lowered to 45 degrees Fahrenheit. From there, eggs are loaded into refrigerated trucks to be delivered to stores. Most eggs reach stores a few days after being laid.



What do you call a mischievous egg?

A practical yolk!

From www.incredibleegg.org/egg-facts/basic-egg-facts/egg-production/laying

HAND MILKING TO HIGH TECH

When the first dairy cow arrived in Washington more than 75% of the US population lived on farms and most of them had a cow or two for fresh milk. Milking was done by hand into a metal bucket. Without refrigeration excess milk had to be sold or traded quickly to neighbors.



Mechanical milking machines were developed around 1930 but even then the average herd size was only 11 cows. The most modern dairies at the time could only milk 30 cows per hour and there was still much hand labor involved. Average yearly production was only 718 gallons per cow.

Today, technology has dramatically changed the dairy industry. Milk is never touched by human hands nor is it exposed to open air. Closed systems transfer milk directly from the cow through pipes to cooling tanks. Then tank trucks deliver the milk to processing plants. Modern dairies can milk 300 cows per hour and computers record each cow's production. (In fact the largest rotary parlor can milk nearly 700 cows per hour as they take a nine minute ride around the carousel). Advances in animal nutrition and health have increased average production per cow to 2500 gallons per year.



FUN FACTS

- In _____, French scientist Louis Pasteur discovered that heating liquids to high temperatures kills bacteria. This process is called pasteurization, and it protects the purity and flavors of milk.
- The best sources of calcium are milk, yogurt, and cheese. About _____% of the calcium in the U.S. food supply comes from dairy foods.
- Children ages 9-18 need _____ servings of dairy products daily.
- U.S. cows give an average of 6-1/2 gallons of milk per day. That's over _____ glasses of milk -- enough
- Americans eat about _____ slices of pizza per second, or almost _____ billion pizzas per year. That's a whole lot of cheese!
- _____ percent of all U.S. households purchase milk. The average American consumes almost _____ gallons of milk a year ... that's _____ glasses!

Answer Choices: 100, 72, 400, 3, 1856, 99, 3, 25



Hello, my name is Janis DeJager and I live on a 180 cow dairy farm in Everson, WA. I love working on our dairy farm with my family. Every day I get to do so many different chores like feeding the baby calves, cleaning calf pens, milking cows, driving tractors, and much more! I have been involved in 4-H since I was nine and in high school I joined FFA. Being involved in these clubs I have been able to show dairy animals at many fairs and also gain skills and experience in leadership and public speaking.

The dairy industry has representatives who inform the public about the dairy industry and dairy products. This year I am currently serving our state's dairy farmers as the Washington State Dairy Ambassador. I will attend various events across the state representing the Dairy Farmers of Washington, educating the public about the dairy industry, and the importance of including dairy in a healthy diet.

I love educating the public about the industry that I love, and hope one day to have my own dairy farm.





STAYING HEALTHY

Eat whole pieces of **FRUIT**

DAIRY milk, cheese, yogurt

Choose colorful **VEGETABLES**; they have more nutrients



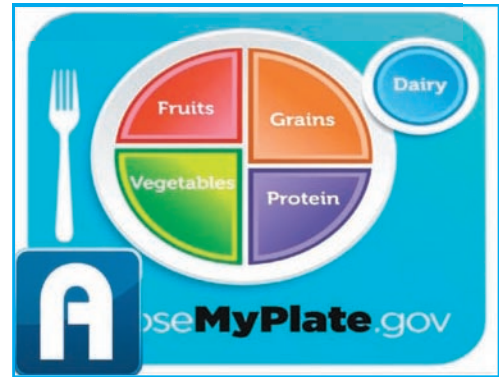
GRAINS
corn, wheat, rice, bread, pasta, tortillas

Drink more **WATER!**

Avoid sugary drinks

PROTEIN meat, fish eggs, dry beans, nuts

My Washington Plate

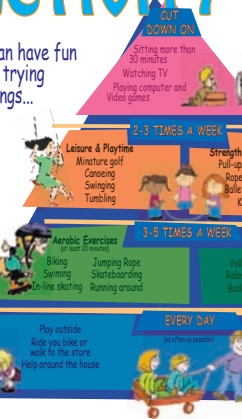


THE kid's ACTIVITY PYRAMID

Each week you can have fun and be active by trying the following things...

With Friends

- Dance to music
- Play games like tag and hopscotch
- Join a sports team at school or the park



With Family

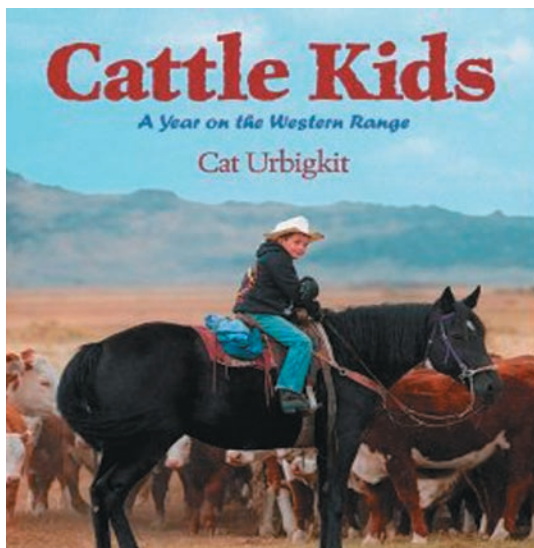
- Take a walk together
- Turn off the TV for a day
- Play at the park

By Yourself

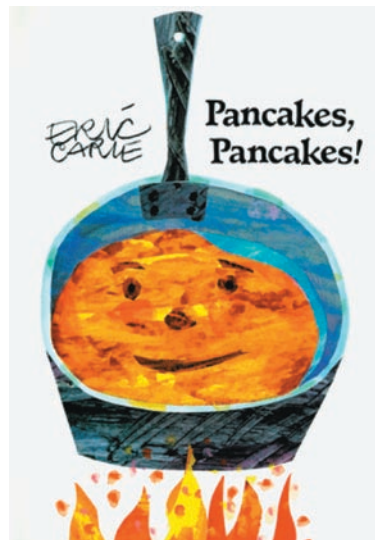
- Do cartwheels, somersaults or jumping jacks
- Fly a kite
- Practice sports skills

Have more fun by thinking up your own activities!

LIBRARY CORNER Check these out...



Cat Urbigkit uses beautiful photography to take you through a year on a cattle ranch. You will see life on the ranch through the eyes of the children that help to work on it. This is a wonderful introduction to learn what life is like on the ranch.



This is the story of Jack, who wants a giant pancake for breakfast. His busy mother says he must gather the ingredients that are located in several different places around the farm. Jack has to spend a lot of time gathering ingredients. This story will really make you think about how important farming is to every meal.

Visit Washington Ag in the Classroom:

www.waic.net

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<http://www.facebook.com/MaxtheFarmDog>