

Ag@School

Volume 15, Issue 2 2015/2016

Published by Washington Agriculture in the Classroom

Agriculture in a Changing World



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

People continually find 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.



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 chemicals 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.

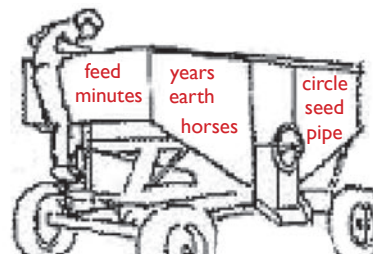


These systems are computer controlled using GIS (Geographic Information System) and can even be operated from the farmer's cell phone. Irrigation is the reason our farmers lead the nation in the yield/acre of corn and potatoes.



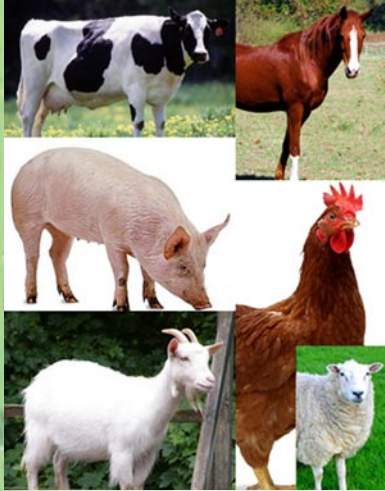
Word Bank

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 from food processing that would otherwise be thrown away. They can turn sugar beet pulp, corn-cobs, 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 weigh 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 in which 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. By weight 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. In Washington barley and canola are used in pig feed. 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.



Today's American farmer feeds about 155 people worldwide. In 1960, that number was 25.8

Activity

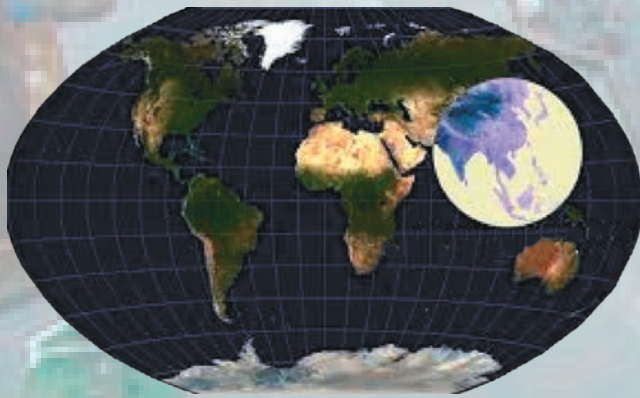
Circle 10 nouns ○

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 Trade Is Booming



Washington's location on the **Pacific Rim** allows for advantageous international trade. The United States and the Korean Republic are the top 5 countries Washington exports to. Ports closer to Washington than California ports are to the Asian Markets. Agriculture and manufacturing are major exports from Washington. Washington exports account for 13% of the total US exports.

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



THE DEFINITION OF EXPORT IS:
to send to another country for trade or sale

Our Next Challenge

A Regional Free Trade Agreement called the Trans-Pacific Partnership has been approved by the 12 countries and is waiting for approval from US Congress. 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.

osted By The Pacific Rim

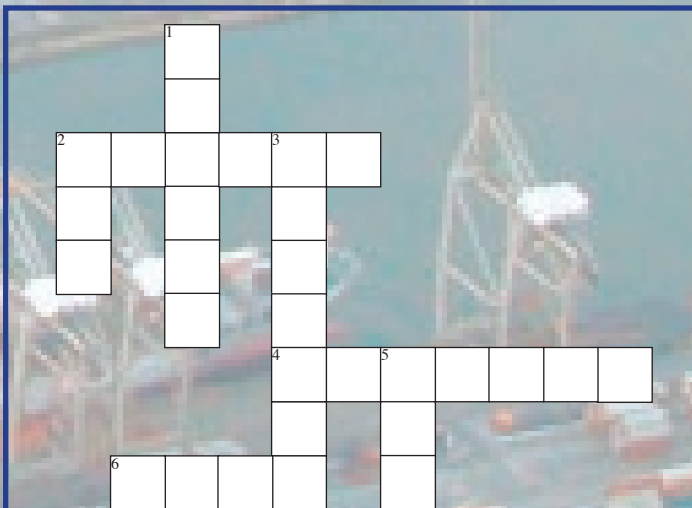
International trade. China, Japan, Canada, The Philippines, to. By ship, Washington ports are just about two days food exports total 28% of everything that is exported S exports.



Trade – A Heritage In Washington

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 2013.



Across:

2. How many countries do we have Free Trade Agreements with?
4. How many billions of dollars of agricultural products were exported in 2013?
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.

THE DEFINITION OF IMPORT IS:

to bring in from another country for trade or sale

Activity

1. What is the Pacific Rim?
2. On the map, put an "X" on Washington
3. Locate on the map the top five countries that Washington exports to.
4. Tell about one item that you use daily that is exported and one that is imported.
5. Tell where your items in #4 were possibly imported from and exported to.

Who Knew Carrots Were Not Just Orange?



Have you ever seen a colored carrot? Is there a difference between them besides the color? Is this something new? The original carrots are thought to have come from Turkey and were black in color. In 900AD people in Afghanistan were eating purple and yellow carrots. Yellow carrots were the choice of many until the yellow was bred out of them. It was about 400 years ago that the orange, "Bugs Bunny", carrot that we are most familiar with today began to be cultivated.



The difference in the color of the carrots has more to do with culture and less to do with taste. The coloring in the orange carrot comes from the large amounts of **beta-carotene** in it.



The different pigments in the carrots provide different health benefits. The white carrot is known to be high in fiber which is good for digestive health. The white carrot has also been found to aid in the prevention of macular degeneration. The orange carrot contains large amounts of Vitamin A which is essential in keeping the eyes and immune system healthy. The antioxidants in the purple carrot are believed to help with heart health and prevent strokes. The red carrot is thought to aid in the prevention of some cancers.

Carrots are a good example of a root vegetable, meaning we eat the plant part that grows in the soil. Can you name other root vegetables? Carrots grow best in cooler temperatures. The cool nights of late summer and early fall in Washington help keep the sugar levels up to produce sweet carrots.

The colors in the carrots are also used as natural dyes. Stamps on meat that say "USDA" are required by law to be made of natural products not manmade dyes. Many juices, pigments for wool and paints, and hair dyes also use carrot pigment or carrot juice to add the desired color. Who knew that carrots were different colored and not just for eating?



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.

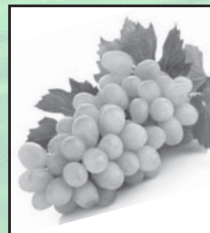
Today, technology has dramatically changed the dairy industry. Milk is never touched by human hands nor is it exposed to open air. Closed systems transfer milk directly from the cow through pipes to cooling tanks. Then tank trucks deliver the milk to processing plants. Modern dairies can milk 300 cows 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.
 - 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

Identify And Color These Washington Grown Products



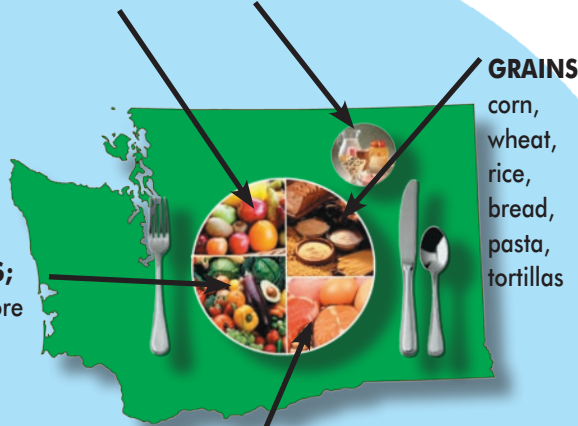


STAYING HEALTHY

Eat whole pieces of **FRUIT** **DAIRY** milk, cheese, yogurt

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

Drink more **WATER!**
Avoid sugary drinks



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

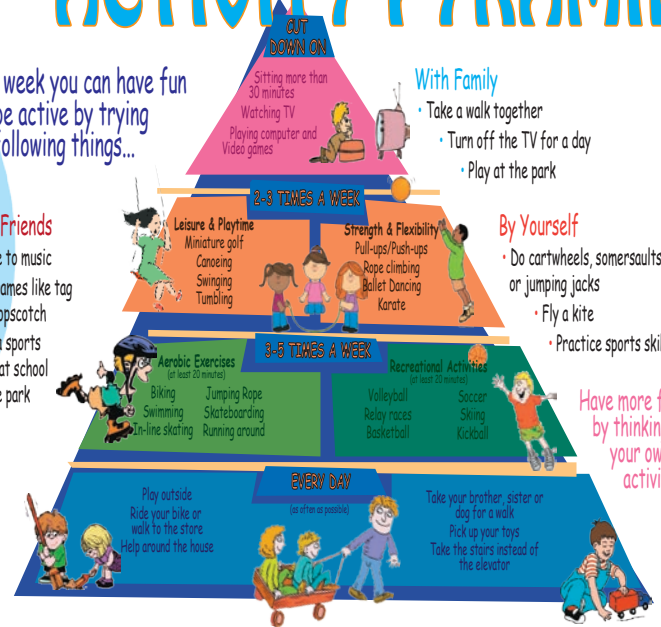
With Family

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

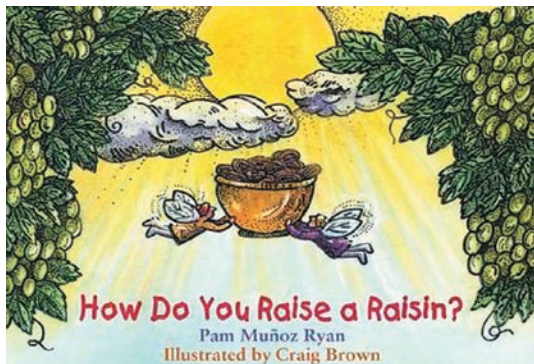
By Yourself

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

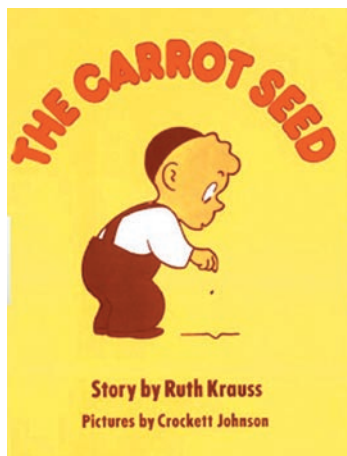
Have more fun by thinking up your own activities!



LIBRARY CORNER Check these out...

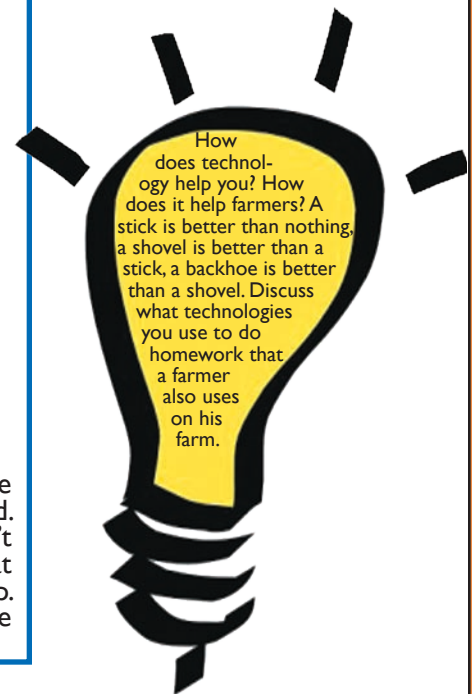


Learn how yummy grapes become raisins. Learn how seedless grapes came to be. Learn the many uses for raisins.



A classic book about a little boy who plants a carrot seed. Everyone tells him it won't grow. The little boy knows that one day a carrot will come up. He waters his seed, pulls the weeds, and he waits...

Think and Discuss



How does technology help you? How does it help farmers? A stick is better than nothing, a shovel is better than a stick, a backhoe is better than a shovel. Discuss what technologies you use to do homework that a farmer also uses on his farm.

Visit Washington Ag in the Classroom:
www.waic.net
<http://www.facebook.com/WashingtonAgInTheClassroom>
<http://www.facebook.com/MaxtheFarmDog>