

Ag@School

Volume 16 Issue 1 2016/2017

Published by Washington Agriculture in the Classroom

FOOD – NEEDED FOR LIFE Brought to you by...AGRICULTURE

Food comes from farms. Farmers and ranchers grow crops and animals to feed you and many others around the world. In the USA we enjoy the safest, most abundant, least expensive food supply in the world. Washington State ranks 11th in total value of agricultural products in the United States.



Today's Children...**Tomorrow's Leaders**

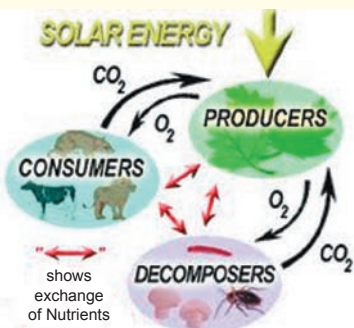
ag•ri•cul•ture (ag' rə' kul' chər), n. growing plants and animals for food and other uses



AGRICULTURE IS EVERYWHERE

Agriculture starts with the growing and harvesting of food, fibers, forests, and flowers. **Agriculture is important to each of us because we all eat food.** Not only do farms and ranches produce the food we eat, but also the cotton t-shirts and jeans we wear, leather shoes, and important ingredients for the fuel for our cars, soap, glue, many medicines, tires, books, and thousands of other things we use in our daily lives. Much of agriculture is growing and harvesting plants. **We cannot live without plants.** They provide all the food we eat—either directly as crops, or indirectly as food for animals. They also make the oxygen we breathe, clean carbon dioxide from the air, cool our surroundings, and prevent soil from eroding. People in agriculture grow all sorts of plants, raise animals, and manage forests--- all things humans use for food, clothing, shelter, even fuel.

IT'S ALL RELATED



Food Web

Agriculture is Science and Technology

Agriculture is the nation's largest industry. It is everywhere, and so are more than 250 different ag careers. The ag industry consists of about 24 million people who produce, process, transport, sell, and trade the nation's food and fiber. Fewer than 2 million people are actually farmers. America's farmers are the world's most productive. They produce 16% of the total world food production on just 10% of the world's land. US farmers grow more food using fewer resources than ever before. Growers produce the raw products and other people turn them into the things we eat and use every day. Consider all the jobs from farm to your table, closet, or fuel tank. Explore Ag careers at www.agriculture.purdue.edu/USDA/careers

The Agriculture Cycle

AGRICULTURAL JOBS ARE EVERYWHERE

The Agricultural Cycle employs millions of people in many different kinds of jobs. Follow the cycle below. At each step list two jobs taken from the word bank below.

PRODUCTION:

growing and harvesting food, fiber, forests and flowers



Harvesting wheat From Fields

PROCESSING:

changing food or fiber raw products into things we can use



Filling Bags Of Flour At Flour Mill

TRANSPORTATION:

Moving crops and food products around the state and world



Loading Pallets For Shipping

MARKETING:

selling the food and finished products to you



Shelves With Bakery Goods For Sale

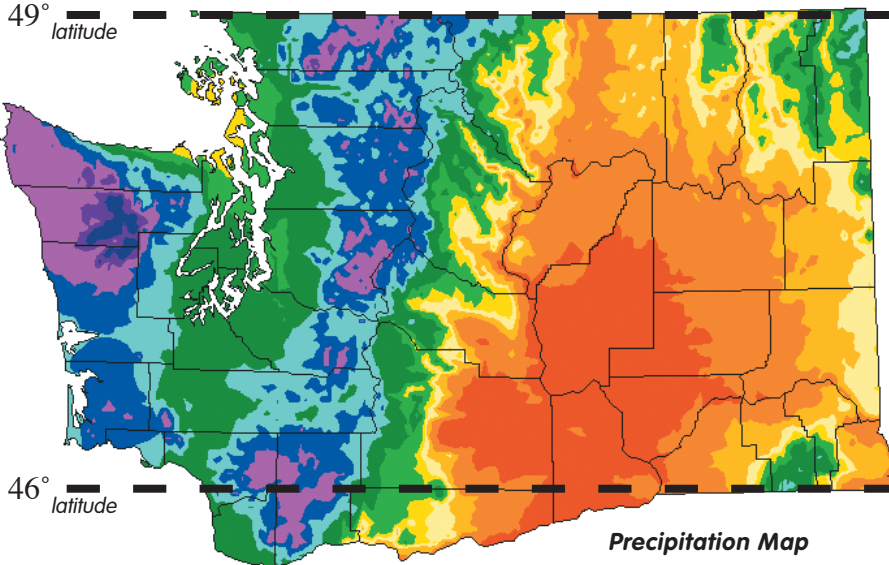
AGRICULTURAL JOB BANK

- | | | |
|-------------|----------------|------------------------|
| Baker | Bale Loader | Logging Engineer |
| Cashier | Horticulturist | Fork Lift Driver |
| Mechanic | Accountant | Refrigeration Mechanic |
| Chef | Longshoreman | Advertising Executive |
| Butcher | Food Chemist | Computer Technician |
| Forester | Tractor Driver | Irrigation Specialist |
| Electrician | Agronomist | Produce Manager |

AG DEPENDS ON CLIMATE

Climate depends mainly on **latitude**. Latitude governs the angle of the sun's rays, length of day, and even prevailing winds. Washington lies between 45° North and 49° North. That puts it in the temperate climate zones (between 30° and 60° latitude). Our basic zones are Maritime and Steppe. Maritime is generally along coasts and has large amounts of rainfall and moderate temperatures. The Steppe Zone is located inland with an average rainfall of 10 - 20 inches. It has hot summers and cold winters. Within the Steppe Zone, Washington has two other zones: Desert, which has less than 10 inches

of rainfall, and the Highlands. The Highlands Zone is found in any mountainous area and temperature and precipitation vary with elevation, not latitude. **Our different climate areas are a main reason our state produces such a wide variety of crops.** Use the **precipitation** map to help answer the questions.



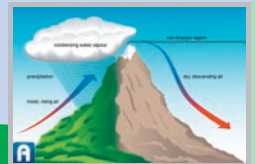
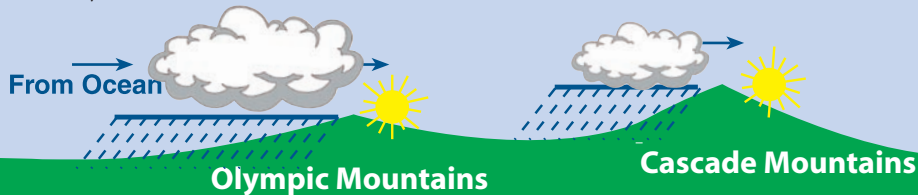
1. Outline Washington's wettest area. It is really a rain forest!
2. Which side of the Cascade Mountains gets the most rain? West or East?
3. Where is the Maritime Zone? Where is the Steppe Zone?
4. Most of the wheat is grown in Eastern Washington. Does that crop need a lot of rain?
5. Draw a circle around the desert. Why is this area our most productive agricultural region in the state? Hint: take a peek at page 4
6. Does this precipitation map give clues about where the Highland Zones are located?

Legend (inches of rain per year)

Less than 10	25 to 30	80 to 100
10 to 15	30 to 40	100 to 140
15 to 20	40 to 60	140 to 180
20 to 25	60 to 80	more than 180

The Rain Shadow

Some parts of Washington receive over 100 inches of rain each year. As moist air from the ocean blows east it must rise over our mountain ranges. The air cools as it rises. Cold air cannot hold as much moisture so the clouds must release their moisture in the form of precipitation (rain, sleet, snow, or hail). This results in an area that receives less precipitation on the other side of the mountains (the rain shadow). Where are the rain shadow areas West of the Cascades?



Washington's Top Five

Hints:

- Roundish, crispy fruit, red, green or yellow
- Beverage produced by cows
- Grain most often consumed by humans
- Vegetable that grows underground; mashed-baked-fried-chipped
- Animals that produce steaks and burgers

A E X J A E A S
 P L N D N O E U
 P T C L I O W B
 L T O K T T X I
 E A R A P A T S
 S C T D P E S D
 Y O A F O H G Y
 P K L I M W I U



My Washington Plate

Draw a line from the hint to the food group on My Washington Plate where it belongs. **WOW** – Each of Washington's top five are represented in a food group!!

Grown In W

PUGET SOUND LOWLANDS

Most of our urban population is concentrated in this region. There is rich soil in these lowlands that stretches from the Puget Sound to the base of the Cascades. This area is perfect for that fabulous milk maker, the dairy cow, as well as for raspberries, vegetable seed, produce, tulips, nursery products, and shellfish.



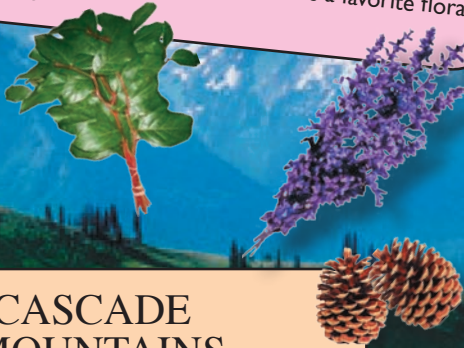
The climate, physical features, and geography change as you cross Washington, dividing our state into distinct regions.

How many regions are there?

How many counties does our state have?

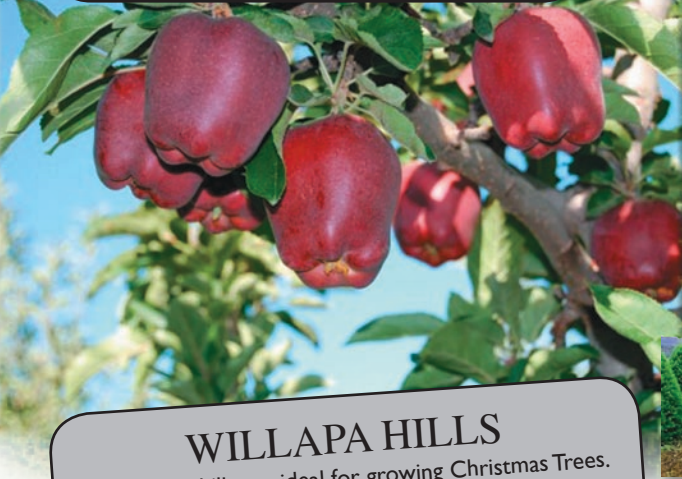
We also have deep-water ports. Place the ports of Seattle, Tacoma, Vancouver, Longview, Grays Harbor, and Port Angeles on the map below.

OLYMPIC PENINSULA
The Olympic Mountains provide timber and recreation. Forest products like an evergreen shrub named salal, are collected and shipped nationwide to florists. Lavender is a favorite floral crop from this region.



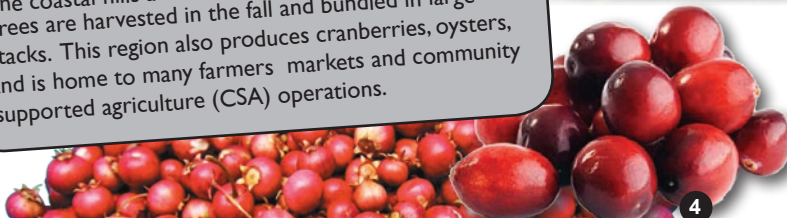
CASCADE MOUNTAINS

The Cascades have spectacular peaks and lots of timber and recreation areas. The lower elevations provide grazing areas for cattle as well as land that grows timothy hay and apples.



WILLAPA HILLS

The coastal hills are ideal for growing Christmas Trees. Trees are harvested in the fall and bundled in large stacks. This region also produces cranberries, oysters, and is home to many farmers markets and community supported agriculture (CSA) operations.



COLUMBIA BASIN

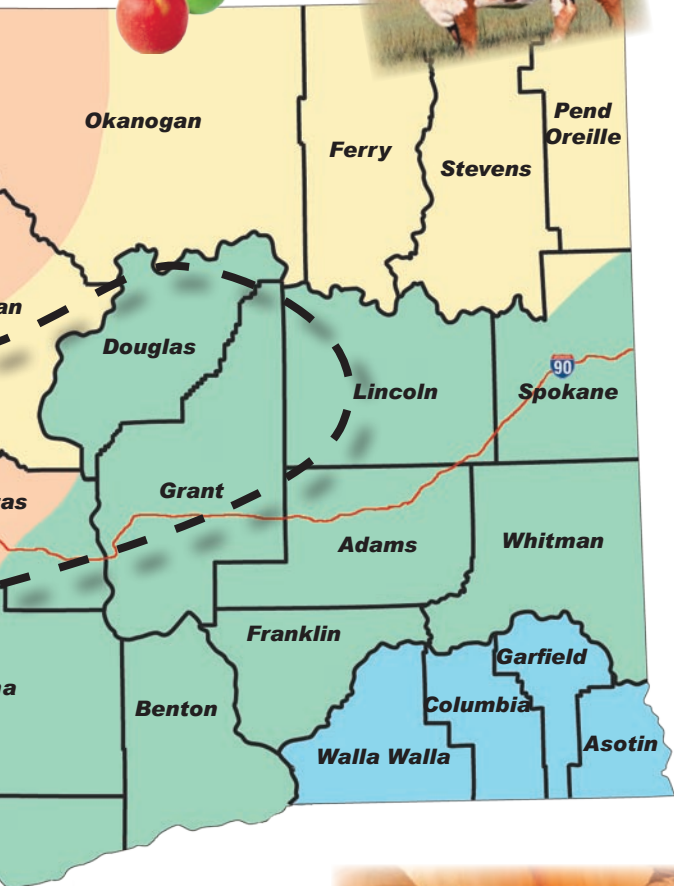
The dry region east of the Cascades is a huge lava plateau with rich soils. The heart of the basin receives less than 10 inches of precipitation yet this region is our most productive agricultural region. The reason is **irrigation**. The Columbia River and its tributaries provide water for a region that has ideal conditions for alfalfa, potatoes, corn, mint, grapes, apples, cherries, and many other crops.

Washington

ange as
tinct

OKANOGAN HIGHLANDS

The Okanogan Highlands are rugged foothills between the Cascades on the west, and the Rocky Mountains to the east. Here beef cattle graze among another valuable renewable resource, trees. Trees provide paper, pencils, furniture, and houses. This region also grows a variety of fruit trees.



BLUE MOUNTAINS

The Snake River skirts around the Blue Mountain Range in the southeast corner of our state before it feeds into the Columbia River. Cattle graze among sagebrush and timber. Wheat, barley, asparagus, onions, green peas, and grapes are grown here. This region also boasts the most inland seaport serving the **Pacific Rim** at Lewiston-Clarkston.

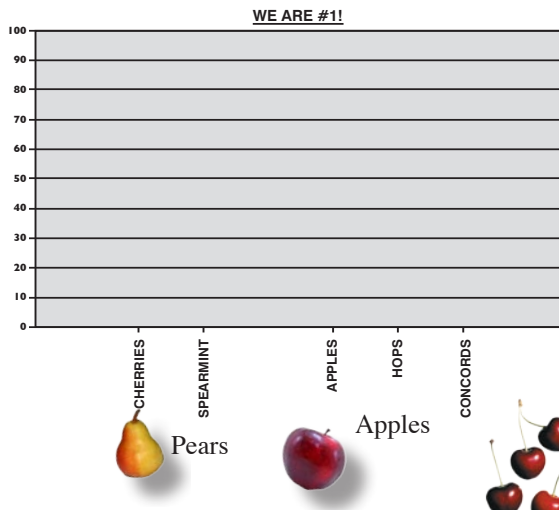
~ Hooray! Washington is #1~

Washington leads the nation in the production of several crops (2014 crop data). Identify the counties or regions that are named below.

- ① **Hops – 78.7%** – Hops are used to flavor beer. The Yakima valley produces three-fourths of the state's hops. The dry climate along with lots of irrigation water from the Yakima River create ideal conditions for this crop. www.usahops.org
- ② **Mint Oil – 69.6% spearmint oil, 26.4% peppermint oil** – Of the total US supply, Washington produces: Grant and Adams Counties lead the state in production of mint. Every pound of oil will flavor 30,000 sticks of gum or 1000 tubes of toothpaste.
- ③ **Peas - Wrinkled Seed Peas 77.7%, Processing Peas 32.6%** – Green peas are eaten cooked as a vegetable, are marketed fresh, canned, or frozen. Wrinkled-seeded garden peas are said to be sweeter than smooth seeded types. Peas are grown in Whitman, Spokane, Garfield, Asotin, Grant, Adams, Benton, and Franklin Counties.
- ④ **Apples – 63.9%** – Apples are the crop that consumers most often link with Washington State. Five areas all share ideal growing conditions -- weather, soil, and water. These areas can be seen at www.bestapples.com/growers/regions/index.shtml (Okanogan, Lake Chelan, Wenatchee Valley, Columbia Basin, and Yakima Valley)
- ⑤ **Sweet Cherries – 65.1%** – Cherries are one of the fastest maturing fruits. In just 60 days blossoms mature into sweet and tasty fruit. They are picked, packed, and shipped to markets in the U.S. and more than 42 countries around the world. Leading cherry counties are Yakima, Grant, Chelan, Benton, and Okanogan. www.nwcherries.com
- ⑥ **Pears – 50.0%** – The pear has been grown by man for more than four thousand years. Washington pears are picked by hand and are prized for their flavor and long storage life. Yakima County has the most acres of pears, followed by Chelan, Okanogan, Grant, and Douglas Counties. www.usapears.com
- ⑦ **Grapes – Concord Grapes 51.5%, Neagara Grapes 35.6%** – Concord grapes are used to make grape juice, jams, and jellies. Niagra grapes are used to make white grape juice. All these grapes are harvested by machine. Yakima, Benton, and Franklin Counties grow the most concord grapes.

Make Your Own Bar Graph:

(using the crop percentages given above)



Concord Grapes



Cherries

Did you know?

Washington's 37,249 farms power a diverse agricultural economy!

Our state, the Evergreen State, can grow over 300 different crops and in addition to our top 10 commodities we are major producers of stone fruits, farm forest products, fish, shellfish, carrots, onions and mint oils.

The state's \$49 billion food and agriculture industry employs approximately 160,000 people and contributes 13% percent to the state's economy.

More than \$15.1 billion in food and agricultural products are exported through Washington ports, the third largest total in the U.S.

GATEWAY TO THE PACIFIC

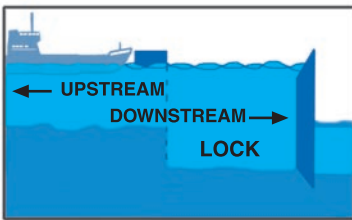
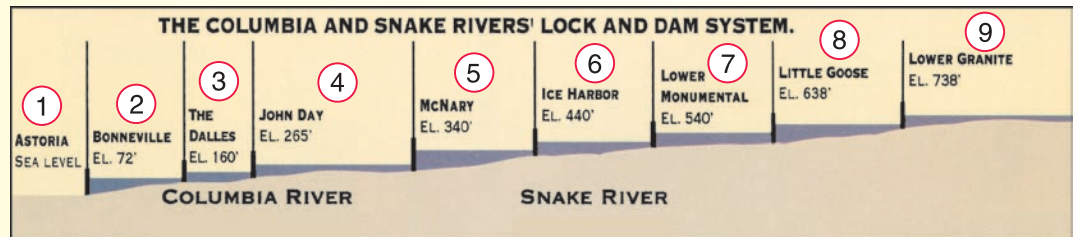
TWO MAJOR RIVERS IN WASHINGTON

- █ COLUMBIA RIVER
- █ SNAKE RIVER

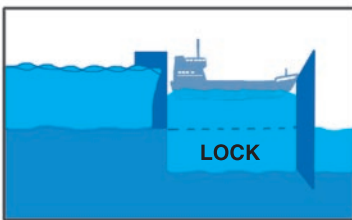
Washington is blessed with great soil and a climate for growing many different crops. That's not all! Our mighty rivers and ocean ports help us move all kinds of products throughout the Pacific Rim at an affordable cost. That means that wheat trucked from Montana and potatoes grown in Idaho, as well as items from our own state, can travel by water to ports around the globe.

A Water Stairway

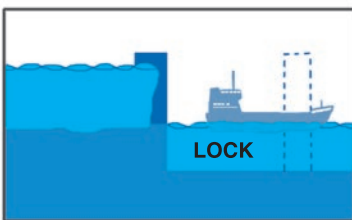
The Columbia and Snake Rivers form a highway for boats and barges. This could not happen without a series of 8 locks and dams that make a stairway in the river. Between the port of Clarkston and the Pacific Ocean the rivers drop over 700 feet. Like a water stairway, the locks allow boats to move up and down the rivers.



(Fig. 1)



(Fig. 2)



(Fig. 3)

A lock and dam work together. The dam holds back water creating a pool. The lock is a rectangular water chamber near the dam with watertight gates at each end.

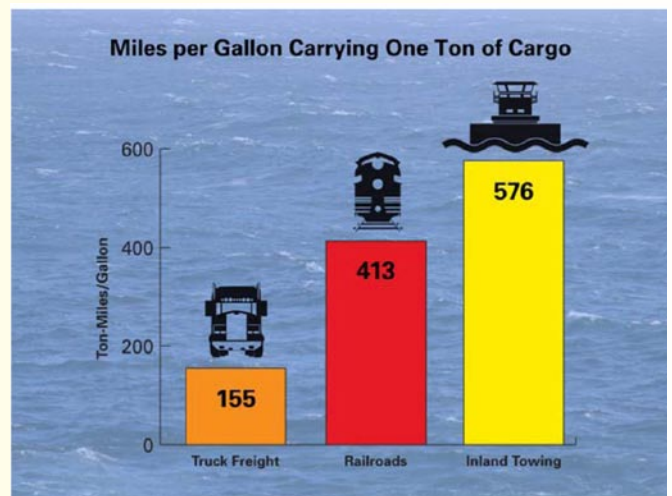
To lower a boat or barge, the lock is filled with water to the upstream level. The barge moves into the lock. The upstream gate closes and water is drained out of the lock, lowering the barge to the downstream level. The downstream gate opens and the barge leaves the lock.

Boats can also travel the other direction moving from lower to higher water levels. Through locks, boats can travel past dams, waterfalls and other obstacles.

That's A Lot of Wheat!

In 2014, Washington farmers produced 6,507,600,000,000 pounds of wheat. How many tons is that? Approximately 80-90% of the crop is exported. Barges are the most efficient transportation to deep water ports.

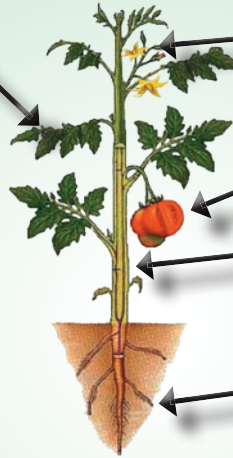
3500 tons of wheat shipped on 1 barge



Life On Earth Depends On Plants

- ☆ Our food comes from plants, or from animals that eat plants
- ☆ Plants produce oxygen that we need to breathe in... and also use carbon dioxide that we breathe out
- ☆ Plants cool our atmosphere, catch and hold water, and keep the soil from blowing away

Leaves make food for the plant and help the plant breathe. Leaves of green plants contain **chlorophyll** (KLOR'-uh-fill). This green material gives leaves their color and enables them to make their own food. The top and bottom of each leaf are covered with tiny holes. Air comes into the leaf through these holes. Using light for energy, in a process called **photosynthesis**, chlorophyll combines carbon dioxide from the air, and water to make sugars and starches and to release oxygen back into the air. These sugars and starches are stored in the leaves and stems of the plant. The plant uses them for food and people and animals eat the plants to use the same sugar and starches for food.



Flowers attract bees and insects to pollinate the plant and make seeds so there will be more plants.

Fruit is the plant ovary containing the seeds.

Seeds are embryo plants surrounded by a supply of stored food to start the baby plant on its way.

Stems hold up the leaves and flowers. They also carry water and minerals from the roots to the leaves and food away from the leaves. Woody, stiff stems of trees are called trunks. Soft, bendable stems are called stalks (asparagus or celery).

Roots grow down into the earth and soak up water and minerals to feed the plant. They also anchor the plant in place so it will not fall down or blow away. They vary in size and depth by plant type.

Parts of the Plant We Eat

Complete the chart below with more examples

	roots	stems	leaves	flowers	fruit	seeds
1	<i>Carrots</i>	<i>Celery</i>	<i>Lettuce</i>	<i>Broccoli</i>	<i>Peaches</i>	<i>Rice</i>
2		<i>*Potatoes</i>	<i>*Onions</i>			<i>*Peanuts</i>
3						
4						
5						

** Potatoes may be a surprise. Potatoes are tubers (short, fleshy underground stems).*

** Onions grow underground, but are actually adapted leaves.*

** Peanut stems bend over so that the pod matures underground.*

Livestock: An Important Part of Agriculture

Cattle, sheep and goats play a very important role in converting solar energy to human food. They eat things people don't eat and turn them into nutritious high-protein foods.

- 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, corncobs, culled potatoes, cottonseed and even apple cores into meat, milk and fertilizer!
- Grazing improves grass by promoting new growth to the plants, controlling brush, and fertilizing with animal manure.



Cranberries Are Climate Specific

Cranberries need an acid soil, an adequate supply of fresh water, and a prolonged growing season that stretches from April to November. Cranberries grow on vines in beds layered with sand, peat (partially decayed plants), gravel, and clay. These beds, commonly known as bogs were originally made by glacial deposits. They are wetlands and strict environmental laws make it extremely difficult to establish new bogs.

Why do they bounce?

Cranberries have pockets of air inside them that make them float and bounce. If a cranberry is damaged or spoiled, it will not bounce. Cranberries are sorted using a bounceboard separator.

Learn more at www.cranberries.org or watch YouTube videos on cranberry harvest





Mint photos courtesy of Monti Cooper

Minty Goodness!

Washington leads the nation in the production of both peppermint and spearmint. Mint roots can be purchased and dug from other mint fields or a farmer can buy mint plugs (baby plants). The farmer uses a mint planter to plant the roots, or the plugs are planted by hand. Mint is shallow-rooted and needs a lot of water and lots of hot weather. A farmer can get two cuttings usually in July and September. A swather cuts the mint and the rows are left on the ground to dry for a couple of days. The mint is then picked up, chopped, and blown into tanks on trucks. The tanks are taken to nearby distilleries where hot steam vaporizes the oil in the leaves. Then the steam and mint oil vapor are cooled and change back to liquid forms. The oil rises to the top and flows into large separating cans. It is strained through filters and stored in 55-gallon drums. About 45% of mint oil is used to flavor chewing gum. Just one pint of mint oil will flavor 30,000 sticks of gum.



Mint farmer Steve Cooper tells us that his crop is used for tea, not oil. When the mint swaths are dry a combine will pick the mint up, separate the leaves from the stems, and unload the leaves into a truck. The mint is then cleaned and sized at the cleaning plant and put in bulk bags and shipped to different companies to be blended into tea. Germany is one of the largest buyers of mint for tea.

Career Corner

Appraiser

When you want to buy a bike, how do you know how much you should pay? You might ask some friends how much they paid for their bikes. Or you might search online or go to several bike stores to look at prices. Figuring out the cost of a bike is like finding out the value of land, buildings and other property, which is what an Appraiser at Northwest Farm Credit Services does. Appraisers help people who want to sell their homes and farms know how much they're worth. Or, if someone wants to buy land and apply for a loan, appraisers research and estimate how much the property could be worth in the future. To become an Appraiser, you take special classes, then pass a test to get your license from the state. After that, you take additional classes to stay licensed.

To be a good Appraiser, you'll work by yourself and with groups, too. Knowing how to manage your time is important because you are responsible to schedule your appointments and turn in your reports on time. Appraisers like getting out of the office to meet and work with all kinds of people who need their help.

Would you like being an Appraiser?



Company Highlight

What would you do without agriculture?

If you eat, you can thank a farmer, or rancher, or fisherman. If you use a pencil or write on paper, you can thank a forester. Was wood used to build your home? If so, you can thank a forester for that, too!

More than 300,000 people in Washington State grow our food, protect our forests and process their harvests so that we can live well. Sales of agricultural products add almost \$59 billion to our state's economy. (For \$59 billion, you could buy 184 new Boeing 777 airplanes!)

To help farmers, ranchers, fishermen and foresters run and grow their businesses; Northwest Farm Credit Services supports them with reliable, consistent credit and financial services. Northwest FCS is part of the Farm Credit System, which was created to serve farmers and ranchers by the U.S. Congress 100 years ago. And because it's a cooperative, farmers, ranchers, fishermen and foresters are customer-members of Northwest FCS.

Do you know someone who works in agriculture?



Ag Library Corner

Visit the Washington Ag in the Classroom web site at: <http://www.waic.net/>

Visit: www.myamericanfarm.org

to play on-line games and explore fun family activities.



It's all about agriculture.

This is a delightful story about a girl exploring where her food comes from written by Bailey Peters, a Washington farm girl, who has extensive experience with 4-H and FFA. Books are available for purchase via email, if interested please email sbpeters716@comcast.net



Books are \$15 each and by purchasing a book you're also providing a donation to Washington Ag in the Classroom.

