



Ag@School

Volume 19 Issue 1 2019/2020

Published by Washington Agriculture in the Classroom



AGRICULTURE Is Your Food and Much More!

Washington farmers produce over **300** different commodities



Washington State Department of Agriculture

WASHINGTON STATE DEPARTMENT OF AGRICULTURE | 1111 WASHINGTON ST SE, OLYMPIA, WA 98504-2560 | AGR.WA.GOV

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 is second only to California in the diversity of agricultural commodities produced.

Today's Children... Tomorrow's Leaders

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



AGRICULTURE IS EVERYWHERE

Can you have an AG-FREE DAY? NO WAY

All the food we eat, the cotton t-shirts and jeans we wear, leather shoes, lumber for our houses and furniture, soap, glue, many medicines, tires, books we read, and thousands of other things we use in our daily lives come from agriculture. 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.

Think & Discuss

If we had no farmers, how would your life be different?

Fun Fact!

Washington produces every native North American Fruit that is grown commercially in the U.S. Three are blueberries, blackberries, and Concord grapes. Can you name the fourth? (Hint: You may eat them with turkey and dressing.)

Answer: Cranberries

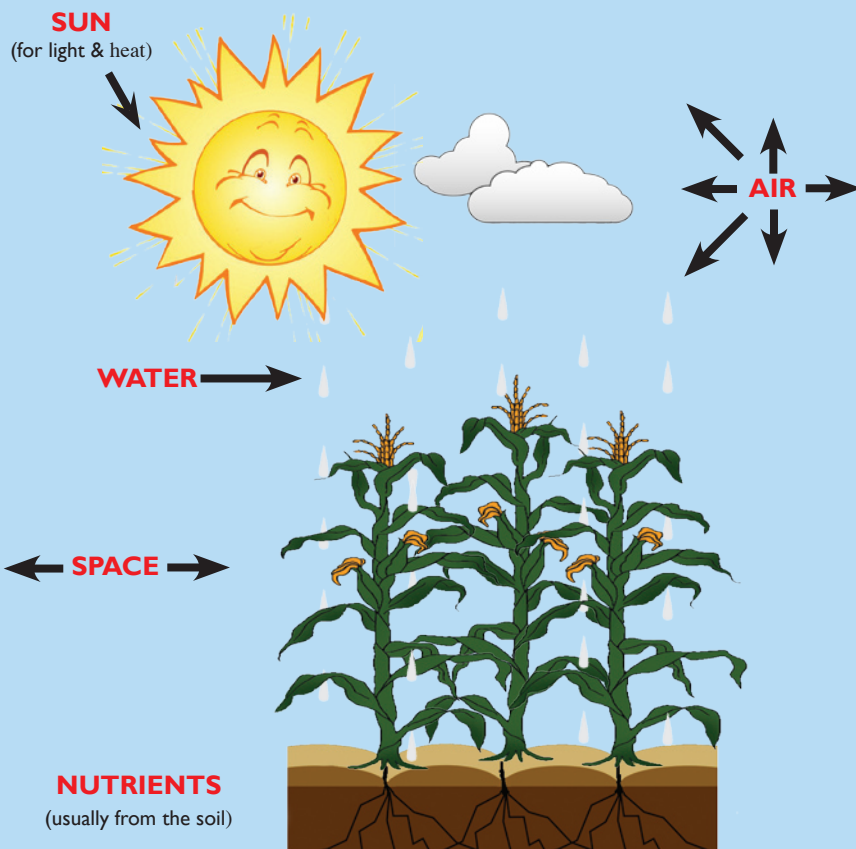
Agriculture is Science and Technology

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. U.S. 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

WHAT A PLANT NEEDS TO GROW

SUN • AIR • WATER • SPACE • NUTRIENTS

How Do Farmers Decide Which Crops to Raise?



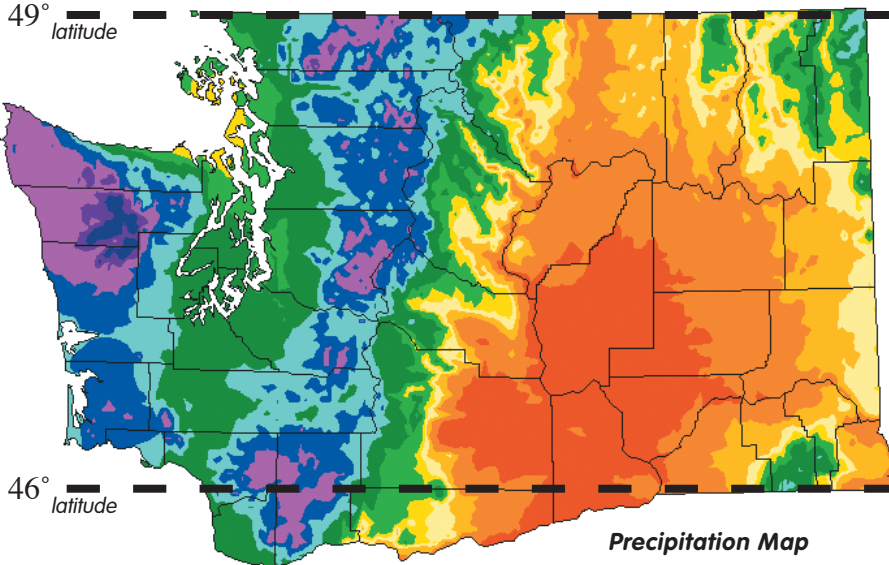
It depends on the weather and the climate. What's the difference between these two terms? **Weather** is the short-term and local version of the climate, like a rainy day. It changes daily or even within the hour. **Climate** is the long-term average of all the conditions in an area's air, including temperature, humidity, precipitation (rain, snow, sleet, hail, or mist), windiness, cloudiness, and atmospheric pressure.

When choosing crops to raise, farmers must consider all these items in the climate, as well as the number of frostfree days and when and how precipitation comes to their land.

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.



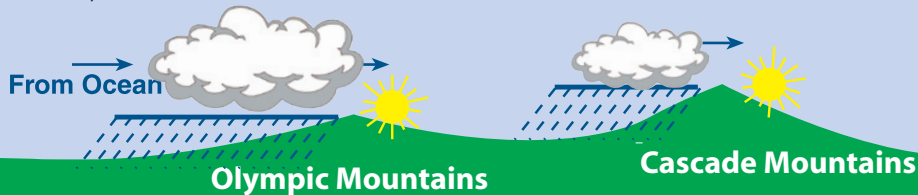
1. Outline Washington's wettest area. It is really a rain forest!
2. Which side of the Cascade Mountains gets the most rain? West or East?
3. Where is the Maritime Zone? Where is the Steppe Zone?
4. Most of the wheat is grown in Eastern Washington. Does that crop need a lot of rain?
5. Draw a circle 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



My Washington Plate

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

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.



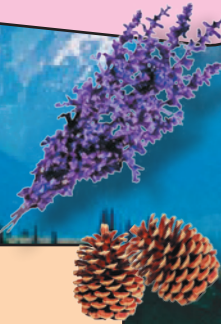
The climate, physical features, and geography change as you cross Washington, dividing our state into distinct regions.

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.

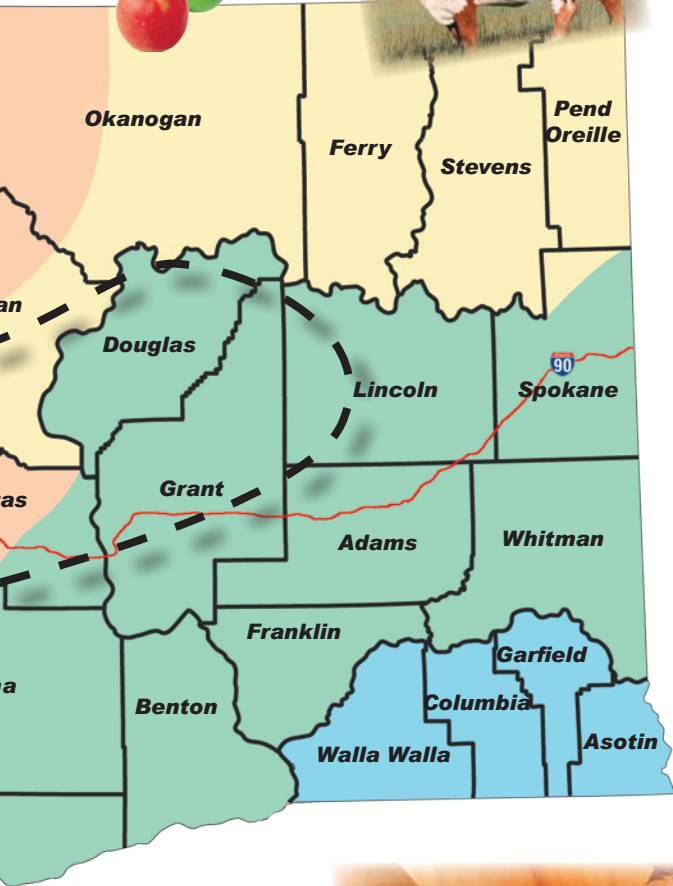
Washington

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.

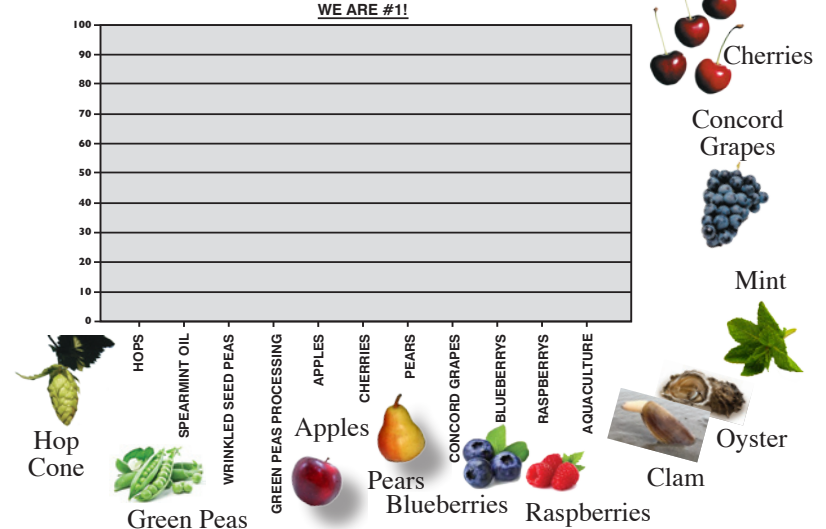
~ Hooray! Washington is #1 ~

Washington leads the nation in the production of several crops (2017 crop data). Identify the counties or regions that are named below.

- ① **Hops** –75.4% – 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** – 75.1% **spearmint oil** – 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 69.7%, Green Peas for Processing 28.5%** – Wrinkled-seed peas are sweeter than smooth seeded peas. We grow the pea seed for next year's gardens and fields. Green peas are vegetables marketed fresh, canned, or frozen. Peas are grown in Whitman, Spokane, Garfield, Asotin, Grant, Adams, Benton, and Franklin Counties.
- ④ **Apples**–65.8% – 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** – 60.0% – 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** – 42.9% – 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 41.9%**, – Concord grapes are used to make grape juice, jams, and jellies. All these grapes are harvested by machine. Yakima, Benton, and Franklin Counties grow the most concord grapes.
- ⑧ **Blueberries** – 22.5% , – Washington blueberry acreage has increased steadily in the last 10 years. We now grow 6 times more than 10 years ago. About 70% of the crop that is processed is picked by machine. The 30% fresh crop is picked by hand.
- ⑨ **Red Raspberries** – 85% – Washington leads the county in producing red raspberries for processing. The Puget sound lowlands provides the perfect climate for berry production.
- ⑩ **Aquaculture** – 45.4% – Washington leads the country in production of clams and oysters. Farmers use the tidal flats as their fields of production.

Make Your Own Bar Graph:

(using the crop percentages given above)



Did you know?

Washington's 35,900+ farms power a diverse agricultural economy!

The state's food processing industry generates 20.1 billion dollars and the agriculture production generates 10.6 billion and provides 164,000 jobs in Washington!

95% of Washington farms are family owned.

TWO MAJOR RIVERS IN WASHINGTON

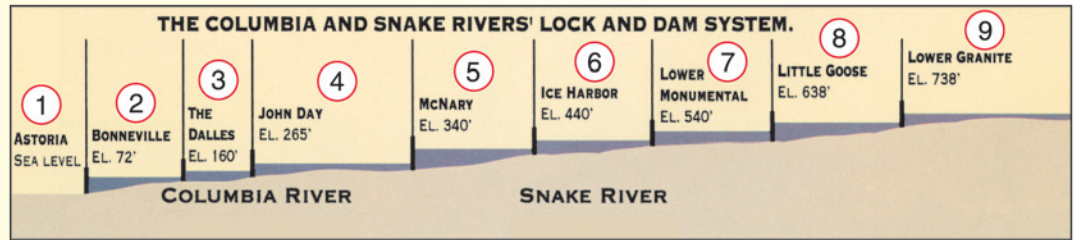
- █ COLUMBIA RIVER
- █ SNAKE RIVER

Washington is blessed with great soil and climate for growing diverse agricultural products. That's not all! Our river resources and ocean ports help us move agricultural and other materials throughout the Pacific Rim at an affordable cost. That means that wheat trucked from Montana and potatoes grown in Idaho, as well as products 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.



Rivers Also Provide Power, Irrigation and Recreation



The dams numbered 10-16 on the map do not have locks for boat passage but they do provide very important benefits. Clean, inexpensive, renewable hydro-electric power is produced as water moves through the dams. Dams are also important for

irrigation, flood control, recreation, and fish passage.

- ⑩ Priest Rapids
- ⑫ Rock Island
- ⑭ Wells
- ⑪ Wanapum
- ⑬ Rocky Reach
- ⑮ Chief Joseph

⑯ - Grand Coulee Dam

No dam is more important to agriculture than the Grand Coulee Dam. It provides water to the huge Columbia Basin Project that irrigates over half a million acres. In addition to watering land that was formerly desert, the project created another half million acres of wetlands, wildlife habitat, and lakes for recreation. Amazingly the project uses less than 2% of the yearly flow of the Columbia.

THINK AND DISCUSS

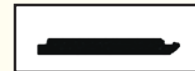
Name three renewable energy sources. Why is hydroelectric energy the most reliable? Should we add more hydropower generators to reduce our dependence on fossil fuels? What is the difference between a lock and a dam?

GATEWAY TO THE PACIFIC

That's A Lot of Wheat!

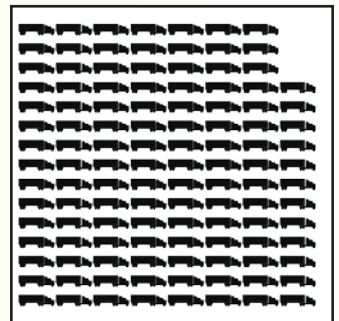
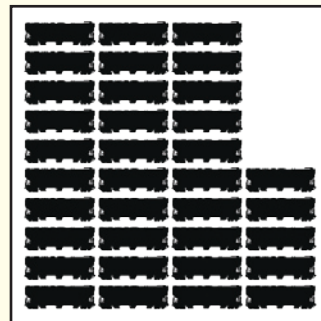
In 2018, Washington farmers produced 9,192,600,000 pounds of wheat. How many tons is that? Nearly 85% of the crop is exported. Barges are the most efficient transportation to deep water ports.

3500 tons of wheat shipped on 1 barge



= 35 rail cars

= 117 Semi Trucks



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, corn cobs, 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.



WHY DON'T PEARS FLOAT?



Unlike other common fruits like apples or oranges, pears do not float in water. Can you explain why?

As a class activity bring different fruits to class and compare their density to other things in your classroom.

WASHINGTON IS PERFECT PEAR COUNTRY

Together Washington and Oregon grow 75% of the U.S. pear crop. Our state ranks 1st and Oregon 2nd in total production. Why?

Because our rich volcanic soil, abundant water, warm days and cool nights provide ideal growing conditions for this tree fruit.

Fast Fact: Pears are one of the few fruits that don't ripen on trees. They are picked and delivered to stores before they ripen. To ripen at home, place in a paper bag at room temperature. Test by pressing gently near the stem. If it gives to gentle pressure, it is sweet, juicy and ready to eat. Store ripe pears in the refrigerator.



Do You Have Pulses In Your Diet?

Do you like to eat hummus or split pea soup? You're eating pulses and possibly ones grown here in Washington! They are easy to add to your diet and provide a source of protein and fiber.

Dried beans, chickpeas (garbanzo beans), lentils and peas are the most commonly known and consumed pulses. Pulses are part of the legume family, but the term "pulse" refers only to the dried seed.



A "legume" is a plant whose seed is enclosed in a pod and which adds nitrogen to the soil by nitrogen-fixing bacteria located in root nodules. This benefits the soil, reduces the need for chemical fertilizers, and works well for crop rotations. Well known legumes include the pulses named above, alfalfa, clover, fresh peas, soy and peanuts.



Pulses can be easily added to provide more nutrients to a meal. They come in a variety of shapes, sizes and colors and can be consumed in many forms including whole or split, or ground into flours.

Pulses are raised in dryland areas of Washington like the Palouse as well as in the irrigated areas of the Columbia Basin.



Apples are not only Washington's top crop, they represent

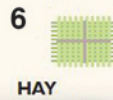
20%

of the total value of ag production in the state.



Top 10 Commodities in Washington

2016



Potatoes

Washington farmers produce more potatoes per acre than any other region in the nation. Idaho still produces more potatoes than Washington because they have more acres planted. Not only do we have rich volcanic soil and abundant irrigation water, Washington has a great climate for potatoes. Because of our latitude, we enjoy long daylight hours in the summer. Long, sunny summer days give better production. The more potatoes it produces. We have a longer growing season than other potato producing areas (150 to 190 frost free days in the Columbia Basin). Our temperatures are ideal (warmer in the early spring when the potatoes are planted to encourage faster sprouting; not too hot in May and early June when the plant sets the potatoes; and warm days but cool nights during July and August when the potatoes enlarge). Farmers are able to provide the exact water and nutrients that the potato plant needs through electronically controlled irrigation systems. Washington farmers average 61,500# per acre compared to a national average of 41,400# per acre.



Potato harvesters are complicated machines that must dig the potatoes out of the ground, separate potatoes from other plant material, dirt, and rocks. Harvesters must do all this while being gentle enough to prevent bruising.

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?

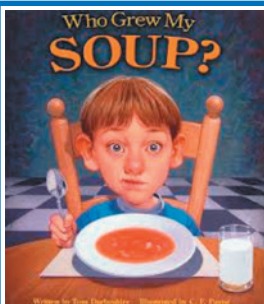
Cranberries have pockets of air inside them that make them float and bounce. If a cranberry is damaged or spoiled, it will not bounce. Cranberries are sorted using a bounceboard separator.

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



Ag Library Corner

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



Who Grew My Soup

Who Grew My Soup? written by Tom Darbyshire, tells a story of a young boy named Phineas Quinn and his curiosity about the vegetables that are in the soup his mom makes

him for lunch. He declares that he will not eat his soup until his questions are answered about who grew his soup. This leads Phineas on a journey from farm to farm, learning about amazing vegetables and the farmers that grow them.

Visit: www.myamericanfarm.org



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

It's all about agriculture.

NATIONAL FARM to SCHOOL MONTH



October is "National Farm to School Month"! On October 2, schools across Washington State will be participating in Taste Washington Day! Check it out at: agr.wa.gov/farmtoschool