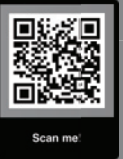


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Ag@School

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AGRICULTURE Is Your Food and Much More!



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**

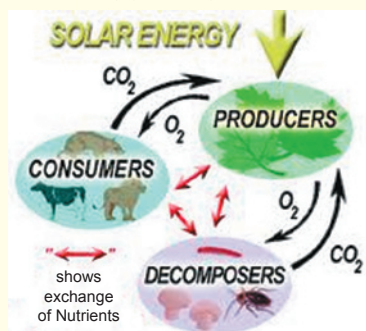
ag•ri•cul•ture (ag´rē´kul´chər), n. growing plants and animals for food and other uses



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.** As you can see in the food web below, plants 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

Think & Discuss

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

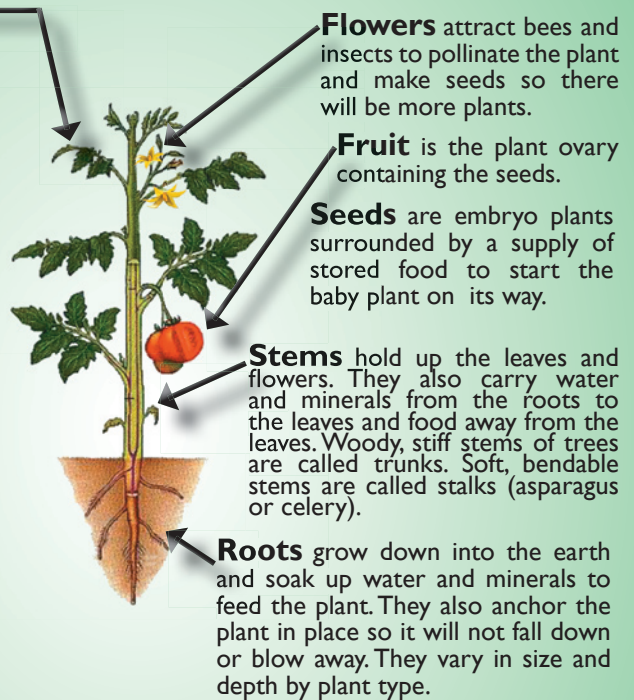
WASHINGTON AGRICULTURE HAS A GLOBAL IMPACT



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.



Parts of the Plant We Eat

Complete the chart below with more examples

	roots	stems	leaves	flowers	fruit	seeds
1	Carrots	Celery	Lettuce	Broccoli	Peaches	Pumpkin
2		*Potatoes	*Onions			
3						
4						
5						

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

* Onions grow underground, but are actually adapted leaves.



Kids Corner – Living on a Ranch

My name is Elsie. I'm 11 years old and I go to Washtucna School. I live on a ranch in Eastern Washington and we raise cattle for beef. The ranch is a lot of work but it is very, very fun. I help vaccinate calves when they're yearlings and I also help tag them. We vaccinate cattle to keep them healthy and we tag them for identification. I also feed cows with my Grandpa. We feed our cattle big hay bales of alfalfa, barley and oats from a big feed truck.

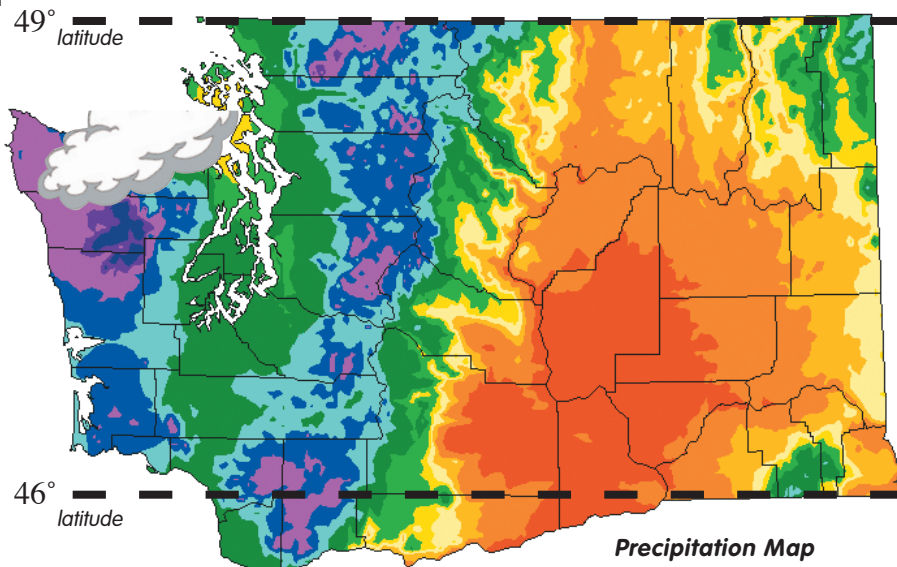
Almost every morning I get up early and I go feed my horses and my goats. I have two horses named Tank and Pasco-Jo. My goats' names are Brenda and Angus. I also name a bunch of baby calves when they are born. My favorite cow is the one that is named White-Nose. She is named that because she has a little white nose that looks like a Hershey's Kiss. For 4-H I show goats and lambs. Next year I will be showing a steer from the ranch.

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?



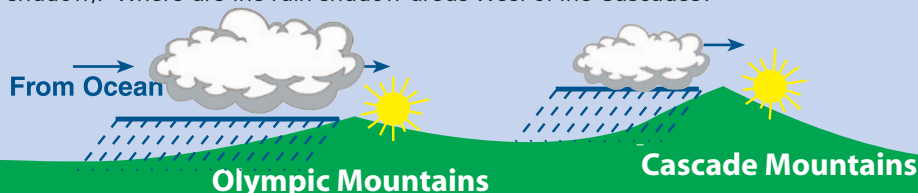
Legend (inches of rain per year)

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?



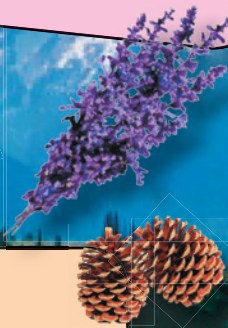
PUGET SOUND LOWLANDS

Most of our urban population is concentrated in this region. There is rich soil in these lowlands that stretch 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.



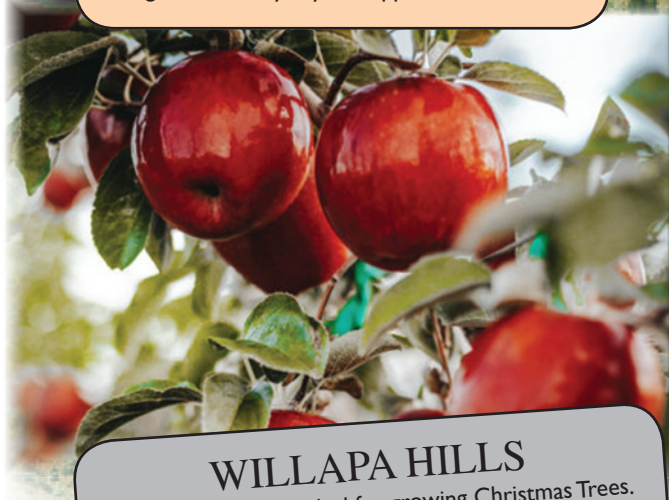
OLYMPIC PENINSULA

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.



Grown In W

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.



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

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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 (2023 crop data). Identify the counties or regions that are named below.

- ① **Hops** –73.6% – 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 **Spearmint Oil** – 67.7% – 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 **Apples**–67.0% – 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)
- ④ **Sweet Cherries** – 62.4% – 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
- ⑤ **Pears** – 44.3% – 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
- ⑥ **Blueberries** – 29% – 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.
- ⑦ **Clams** – 56.6% – Washington leads the country in production of clams. Farmers use the tidal flats as their fields of production.
- ⑧ **Onions** – 28.0% – Most onions in Washington are grown in the eastern part of the state. Benton and Adams and Walla Walla counties. Grown in the fertile soils of Walla Walla Valley, the Walla Walla sweet onion has a unique sweetness that sets them apart. Unlike other onions, they contain less sulfur, which means fewer tears when chopping

* Percentages represent Washington's production in the United States

AND Washington Agriculture is:

Number 2

U.S. Producer of:

APRICOTS
GRAPES
POTATOES
RASPBERRIES
WINTER WHEAT

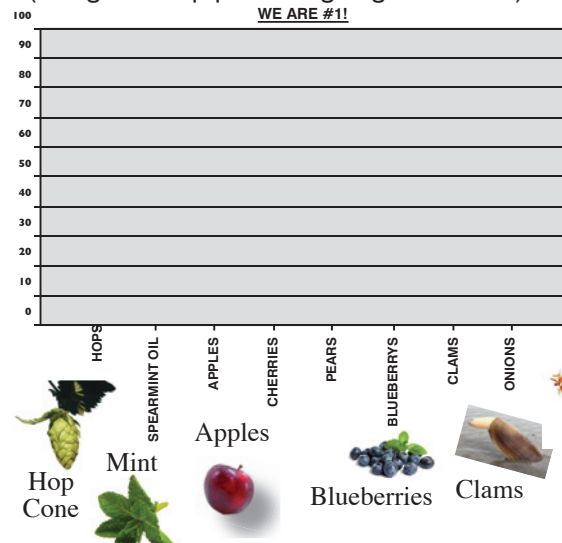
Number 3

U.S. Producer of:

DRIED PEAS
LENTILS
PEPPERMINT OIL

Make Your Own Bar Graph:

(using the crop percentages given above)



Hop Cone



Mint

Apples



Blueberries



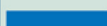
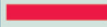
Clams



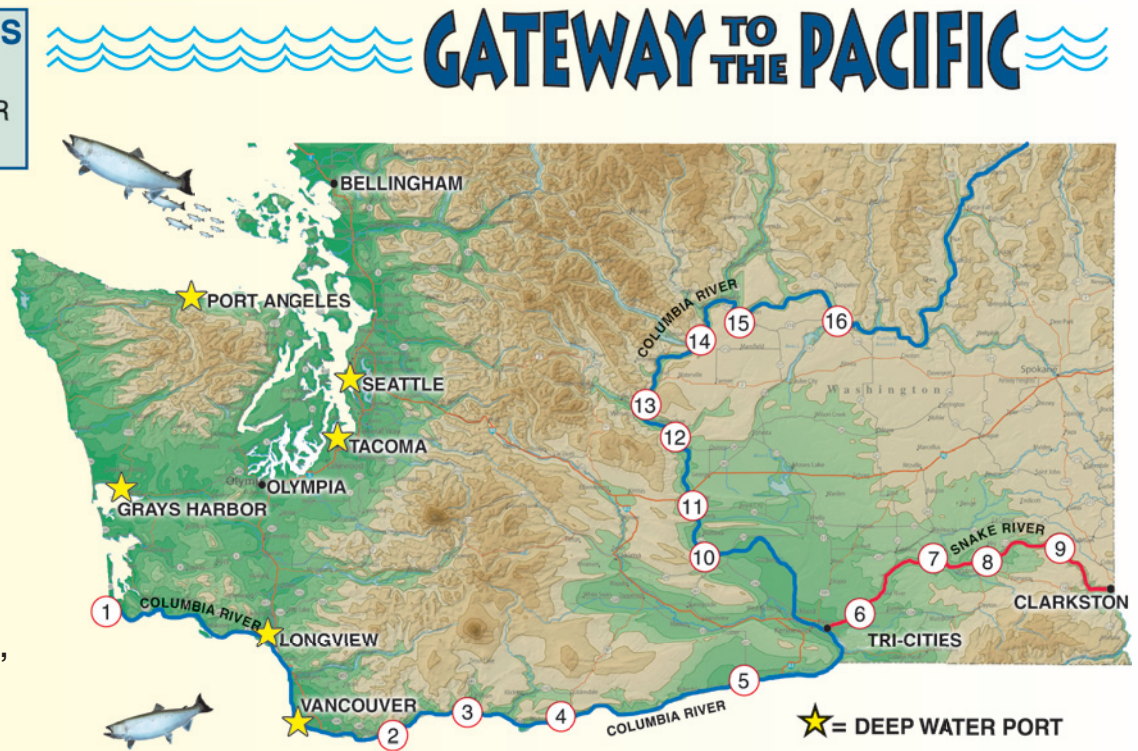
Did you know?

Washington's 32,076+ farms power a diverse agricultural economy! The state's food processing industry generates 20.1 billion dollars and the agriculture production generates approximately 14 billion and provides 164,000 jobs in Washington! 94% of Washington farms are family owned.

TWO MAJOR RIVERS IN WASHINGTON

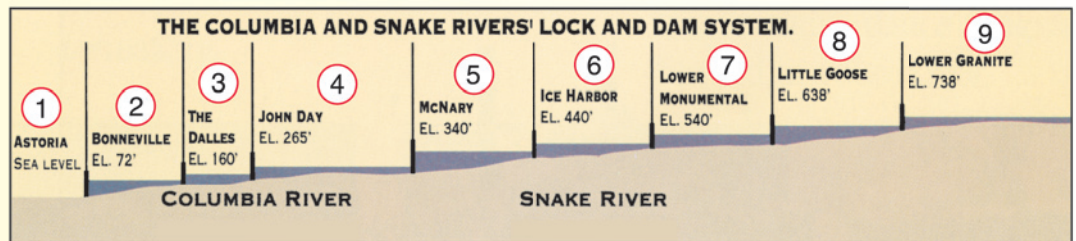
 COLUMBIA RIVER
 SNAKE RIVER

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



irrigation, flood control, recreation, and fish passage.

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

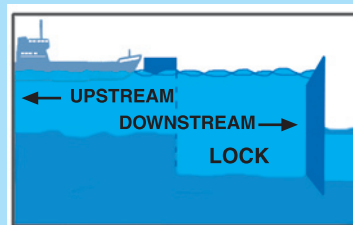
⑯ - Grand Coulee Dam

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.

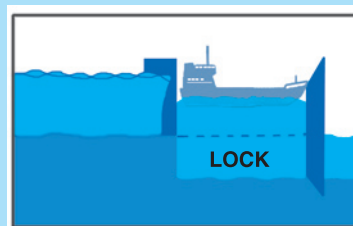
THINK AND DISCUSS

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?

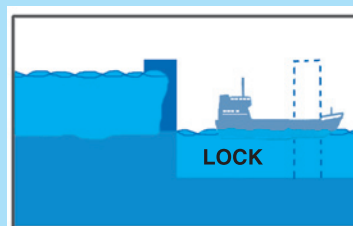
GATEWAY TO THE PACIFIC



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

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 sunlight a potato plant absorbs, 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



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.



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.

Why Washington Apples?



Did you know that Washington established the first grade standards in the nation for apples? In 1915, the state started categorizing apples by quality, including color, shape, sugar level, crispness, and condition. Eight years later, the US Department of Agriculture followed suit. National grade standards for apples were introduced in 1923.

Between Washington and US standards, there are six grades of apples: Washington Extra Fancy, US Extra Fancy, Washington Fancy, US Fancy, US No. 1, US No. 1 Hail. Washington apple growers hold

themselves to a higher standard, and exceed even stringent US regulations. Apples are tested at random before and after harvest to ensure the highest quality.

Once each and every apple is carefully picked in the orchard, the apples are collected into large bins which are promptly brought to a nearby packing house. There, they are thoroughly washed, and computer-controlled cameras and scales weigh, inspect, and separate the apples according to color, shape and size. Another system is able to determine the internal condition of the apple, and to cull apples out that do not meet the high Washington standards for crispness and condition.

The apples are also tested for starch and sugar content to determine when they will be at the peak of flavor. The apples highest in sugar are placed in refrigerated storage rooms and will be packed and sold soonest. Those with higher starch content are stored in sealed, controlled atmosphere (CA) storage rooms, where oxygen is replaced by nitrogen and the temperature is held at about 32 degrees Fahrenheit. This CA storage slows the apples' respiration rate so that they do not mature as quickly, which helps to maintain crispness and flavor. During this time, the starch also slowly changes to sugar, so that an apple coming out of CA storage has that "just-picked" taste.

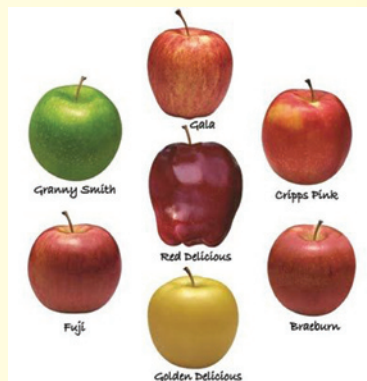
Apples ready for shipping are carefully packed by hand into consumer pack or tray pack boxes ready to deliver to grocery stores, fruit markets, and restaurants around the world.

FUN FACTS

The average American eats over 16 pounds of fresh apples every year.

Eating one large apple provides 20% of the recommended daily value of dietary fiber, 8% of the antioxidant Vitamin C, and 7% of your day's potassium. All that comes in a few juicy, crunchy bites for only 130 calories — with no fat, no sodium, and no cholesterol.

For more information and many recipes visit waapple.org



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.



Washington's farms power a diverse agricultural economy, led by the state's apple industry with 67 percent of U.S. production!



TOP 10 COMMODITIES



Career Corner

Crop Insurance Agent

Have you ever wondered who helps farmers when things don't go as planned? What happens to a farmer when bad weather ruins their farms? Or when there's not enough rain to water their crops? That's where a crop insurance agent comes in! These helpful workers make sure farmers don't lose the farm if something goes wrong - like a big storm or not enough rain. They help farmers protect the money they need to keep farming after their crops get damaged by weather, just like other types of insurance agents help people pay for repairs to their home after a fire or their car after an accident.

Crop insurance agents talk with farmers to learn what kinds of problems they might face and risks they might have. Then, they help them choose an insurance plan that fits the farm. For example, if a farmer grows wheat in a place with lots of hailstorms, the agent might suggest hailstorm protection insurance to protect the wheat.

This job is important because it helps farmers feel safe and worry less. Crop insurance agents help farms stay strong even when nature causes trouble. This helps farmers grow new crops the following year, and that helps us because we eat the food they grow.

To be a crop insurance agent, you need to be a good listener, solve problems, work well with others and enjoy learning new things.

If this sounds fun to you, start by learning about farming, how insurance works and how to actively listen to others. In high school, take classes like math and business. Later, you can go to college to study agriculture, business or finance. Being a crop insurance agent is a great way to help farmers and be part of your community!



Ag Library Corner



Company Highlight

At AgWest Farm Credit, we're all about helping the people who feed and clothe the world. Our team works with farmers, ranchers and rural residents to provide loans and support for their businesses and homes. Our territory covers seven western states and is full of amazing people and farms. We live and work in the same communities as our customers, which makes us a great resource to help them succeed. It's also important to us to help the next generation of farmers and ranchers. That's why we have internships and trainee programs to give young people like you a chance to learn and grow in the agricultural industry. We want to make sure that the future of farming is bright and full of opportunities. Want to learn more about real-life agriculture, the food you eat and the people who produce it? Follow us on social media to see cool stories about our customers and updates from the world of farming.



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

15 Children's books
about farms and food
for 2025.

www.agfoundation.org



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