Ag@School

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Agriculture Is: Your Food & More!












Production

Processing

Transportation

Marketing

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**. Farms and ranches produce the food we eat, the cotton t-shirts, jeans, and leather shoes we wear. Important ingredients such as fuel for our cars, soap, glue, many medicines, tires, books, and thousands of other things we use in our daily lives are also produced by farms and ranches.

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. In Washington State 37,000 farms create a $49 billion food and agriculture industry. That represents 13% of our state's economy. We lead all other states in the production of raspberries, hops, mint oil, cherries, apples, pears, concord grapes, and carrots for processing.

Food comes from farms:

Thank a farmer!

Agriculture: Is Science and Technology

Agriculture is the nation's largest industry. It is everywhere and involves more than 250 different ag careers. Research and scientific discoveries have led to increased agricultural productivity. 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. Growers produce the raw products and other people turn them into the things we eat and use every day. Consider all the jobs from the farm to your table, closet, or fuel tank. Explore Ag careers at www.agriculture.purdue.edu/USDA/careers

Genetic Science in Agriculture

Genes are distinct portions of a cell's DNA. Genes are coded instructions that determine a particular characteristic such as red hair or blue eyes. Plants and animals also pass genetic traits to their descendants.

Farmers have been improving plants and animals since agriculture began by selecting the best individuals to use as parents for the next generation. This process involves the crossing of thousands of genes with the hope of randomly passing on desirable traits. It is a hit-or-miss process. Unfortunately, undesirable traits might also result. For instance, when farmers selected for heavily muscled pigs it also resulted in easily stressed pigs and meat that could be tough.

Using new technology, scientists can now identify the specific genes that carry a certain trait and that single trait can be passed on. This more precise science eliminates passing along undesirable traits.

GMO (Genetically Modified Organism)

GMO refers to a living organism that has been genetically altered to change some trait. In agriculture, the most widely modified trait is tolerance to herbicide (weed killer), followed by insect resistance.

Why do we use this technology? It is precise genetic gain. It results in higher yields, higher quality crops, yet it saves money because farmers use fewer and less toxic chemicals.

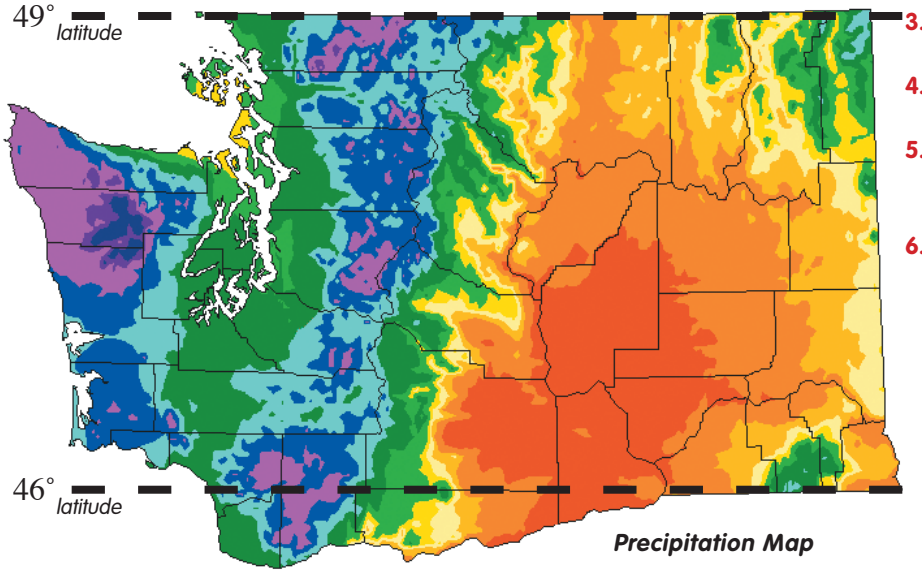
Corn, soybeans, and cotton are the most advanced in GMO technology. In the future, using this technology we will be able to affect traits like drought resistance, nitrogen uptake, and nutritional quality.

Extensive food safety testing is required of all GMO crops before they can be grown for the public.

AG DEPENDS ON CLIMATE

Climate depends mainly on **latitude**. Latitude governs the angle of the suns 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?



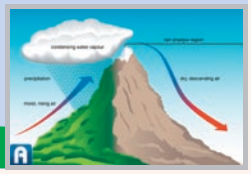
Precipitation Map

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?



CLIMATE

DESERT
HAIL
HIGHLANDS
MARITIME
PRECIPITATION
RAIN
RAINFOREST
RAINSHADOW
SLEET
SNOW
STEPPE
TEMPERATE
WEATHER

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

Grown In W

The climate, physical features, and geography ch
you cross Washington, dividing our state into dis
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.

PUGET SOUND LOWLANDS

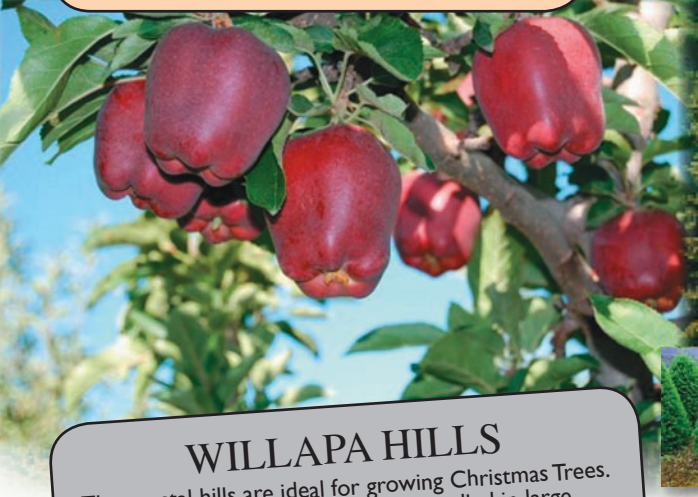
Most of our urban population is concentrated in this region. There is rich soil in these lowlands that stretches from the Puget Sound to the base of the Cascades. This area is perfect for that fabulous milk maker, the dairy cow, as well as for raspberries, vegetable seed, produce, tulips, nursery products,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

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.

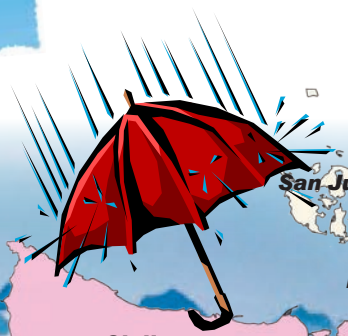
CASCADE MOUNTAINS

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.

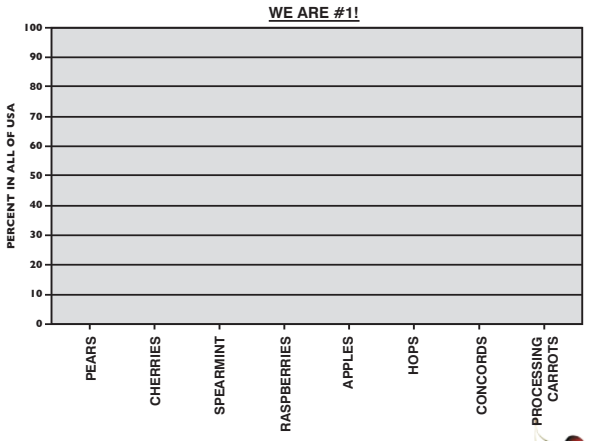
~ Hooray! Washington is #1~

Washington leads the nation in the production of several crops (2013 crop data). Identify the counties or regions that are named below.

1. Red Raspberries – 92.7% – Delicious and nutritious, grown for eating fresh, or in jams, jellies, or pies. Raspberries can be harvested mechanically. Whatcom County leads the state with over 90% of this crop. www.red-raspberry.org
2. Hops –79.2% – 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
3. Mint Oil – 72.9 spearmint oil, 31.4 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.
4. Peas - Wrinkled Seed Peas 60%, Processing Peas 34.4% – 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.
5. Apples–57% – 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)
6. Sweet Cherries – 50.9% – 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
7. Pears – 49.5% – 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
8. Concord Grapes – 36.5% – These are the grapes used to make grape juice, jams, and jellies. Washington State also grows 23% of Niagra grapes which are used to make white grape juice. All these grapes are harvested by machine. Yakima, Benton, and Franklin Counties grow the most concord grapes.
9. Processing Carrots – 36.5% – Carrots provide 30% of the Vitamin A in the US diet. Carrots are sliced or diced to be frozen or canned. Benton, Franklin, and Grant counties grow these carrots. Carrots for the fresh market are grown in both Western and Eastern Washington.

Make Your Own Bar Graph:

(using the crop percentages given above)




Hop Cone

Concord Grapes


Mint


Processing Carrots


Raspberries


Pears


Apples

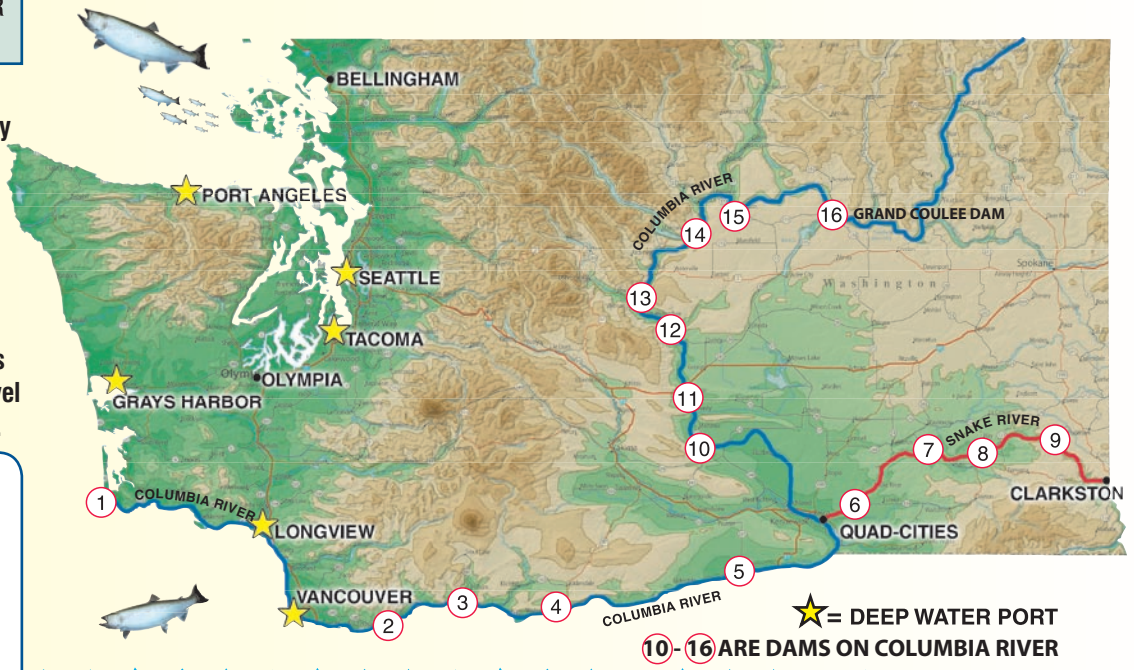

Cherries

GATEWAY TO THE PACIFIC

TWO MAJOR RIVERS IN WASHINGTON

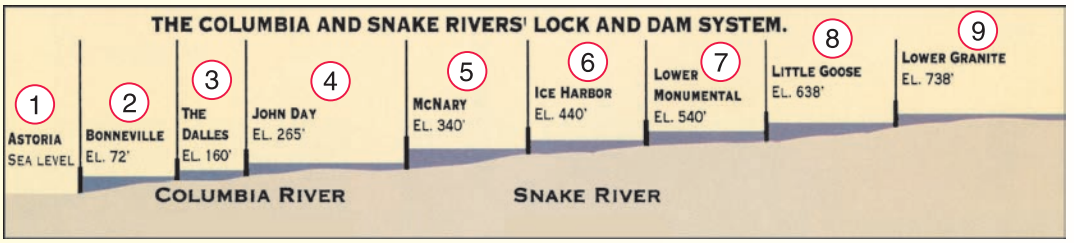
COLUMBIA RIVER
SNAKE RIVER

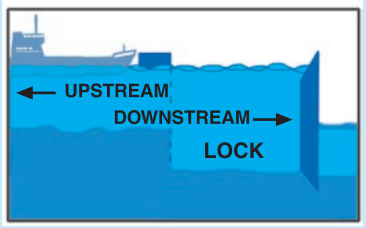
Washington is blessed with great soil and a climate for growing many different crops. That's not all! Our mighty rivers and ocean ports help us move all kinds of products throughout the Pacific Rim at an affordable cost. That means that wheat trucked from Montana and potatoes grown in Idaho, as well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



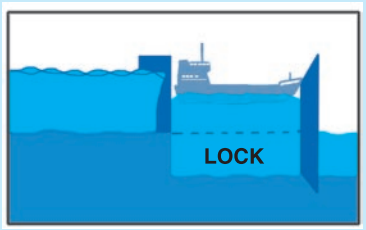
A Water Stairway

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.

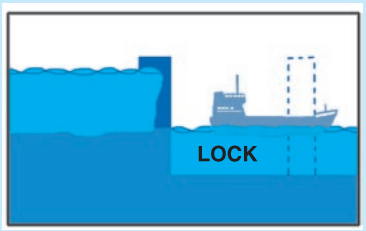




(Fig. 1)



(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.

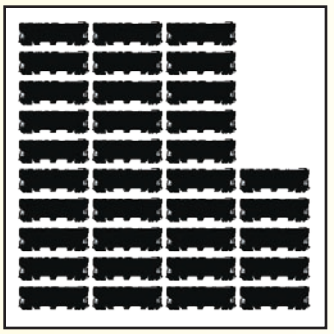
Boats can also travel the other direction moving from lower to higher water levels. Through locks, boats can travel past dams, waterfalls and other obstacles.

That's A Lot of Wheat!

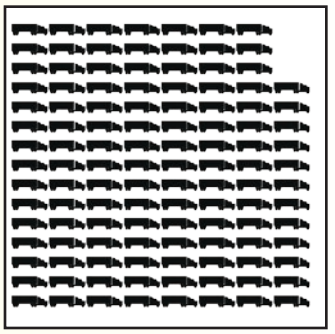
In 2011, Washington farmers produced 10,072,800,000 pounds of wheat. How many tons is that? Nearly 85% of the crop is exported. Barges are the most efficient transportation to deep water ports.

3500 tons of wheat shipped on 1 barge

= 35 rail cars



= 117 Semi Trucks



Timothy Hay

Timothy hay is great food for cows and horses. In Washington State, you will find a perfect mix of climate, temperature, sunshine, and wind to grow the finest Timothy hay in the United States.

What is Timothy hay?

Timothy is a perennial grass (phleum pretense), native to Europe. It is known in England as "meadow cattail grass." A farmer named Timothy Hanson first cultivated the grass in New Hampshire in 1720, which is how this grass got its name in the US! It grows well in the Pacific Northwest because it needs hot summers and cold winters to grow.

To some, this may just look like another grass. It can be confused with meadow foxtail or timothy canary grass, but Timothy hay is unique. It grows 19-59 inches tall, with hairless leaves. The flower head can be 2-3/4 to 6 inches long, and 1/4 to 1/2 inches wide. It is harvested during the summer.

What is it for?

Timothy hay is mostly used for cattle feed and hay for horses. Famers like feeding it to their cattle and horses because it is high in fiber and easy to ruminate (digest). Horses also think it is quite the treat!

Most of the Timothy hay grown in Eastern Washington is exported to foreign countries. Places like Japan don't have the right climate and land to grow this kind of forage to feed their horses and cows, so they buy it from the United States.

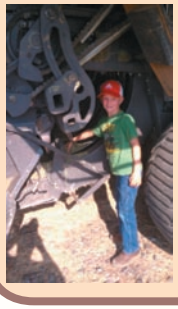
Small animals such as rabbits, tortoises, chinchillas, and guinea pigs also enjoy Timothy hay.

How is it harvested?

First, the hay grows until it is about 4 feet tall. Then, a large mower called a swather cuts the hay and forms windrows. After it is cut, the hay sits in the windrows to dry, also known as curing.

After the hay has cured (anywhere from 4-7 days depending on the weather), a machine called a baler comes through and forms it into rectangles called bales. Bales comes in all different sizes, and can be as small as 110lbs or as large as 950lbs.

Then, the bales are loaded on trucks and taken to a production facility where they are pressed into a more compact package and loaded into containers. The containers are then shipped on boats to places all over the world.



Hi, my name is Matthew Anderson. My family owns Anderson Hay & Grain Co., Inc. We farm Timothy Hay and many other kinds of hay.
It looks easy to grow but it really isn't. You have to have water, fertilizer and all kinds of good stuff for it. You have to really watch it in the heat so it doesn't burn. It burns easier when it is moist.
We sell most of our hay to Japan. There are a lot of dairy cows and race horses in Japan. I have been to Japan one time and they have weird food. It was really fun though.

Wheat Feeds the World

What's so special about wheat? Wheat has been a staple in our food supply for over 12,000 years. All parts of the wheat kernel, from the outer bran to the inner germ, supply nutritious ingredients in a variety of breads, cakes, cereals, pastas and more. Wheat is a delicious part of healthy eating, low in fat and high in complex carbohydrates that fuel our bodies with long-lasting energy.

Production

Wheat was first grown in the US in 1602 as a hobby crop. The first Northwest wheat crop was planted in 1825 at Fort Vancouver, Washington. Today, the Northwest produces 91 percent of US white wheat. Washington is the 4th largest wheat producing state in the nation with more than 2 million acres in production (1 acre is about the size of a football field).

Processing

Most wheat is milled into flour. Thousands of years ago, milling wheat into flour involved crushing the wheat and other grains between stones. This was a difficult and slow process. Those stones have evolved into machinery that turns the wheat into a fine powder. At one point in history there were as many as 160 flour mills in Washington. Today there are less than ten.

Transportation

The bulk of Washington wheat, about 85-90%, is exported. There are three main modes of transportation used to get our grain to the Pacific Northwest ports along the Columbia River: trucks, barges and trains. Over 60% of Washington's wheat exports travel by barge from ports along the 400-mile Columbia-Snake River System to Portland.

Marketing

Washington wheat is marketed around the world especially to nations in the Middle East, Japan, Taiwan and South Korea. If 85% of it is exported, how much do we use domestically? A farmer's livelihood depends on the wheat market. Prices are constantly changing depending on world supply and the needs of the consumers. Once the wheat has been harvested and sold, it is time to think about next year's crop

Wheat Facts

..The kernel is also the seed from which the plant grows.

…More foods are made with wheat the world over than with any other cereal grain.

…One 60-pound bushel of wheat provides about 42 pounds of white flour, 60 to 73 loaves of bread, or 42 pounds of pasta.

…A modern combine can harvest 2,000 bushels (60 pounds = one bushel of wheat) per hour

. …Assuming a sandwich was eaten for breakfast, lunch, and dinner, it would take 168 days to eat the amount of bread produced from one bushel of wheat.

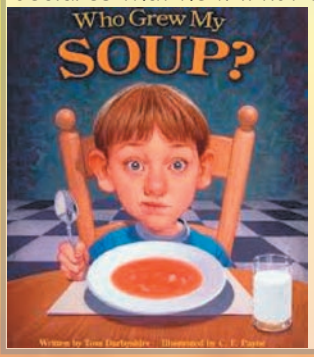
Visit: www.myamericanfarm.org to play on-line games and explore fun family activities.

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.



Max the Farm Dog

Follow Max the Farm Dog on Facebook and learn interesting facts about Agriculture in Washington State.

Farming

Gail Gibbons delivers another wonderful book describing real-life and factual information. In this book you will read about what life is like on a farm throughout all of the seasons. Every season is illustrated to show the different chores and activities that are done to provide food and crops for people. This is a wonderful book that helps us understand where our food comes from and the hard work it takes to get it to our plates.