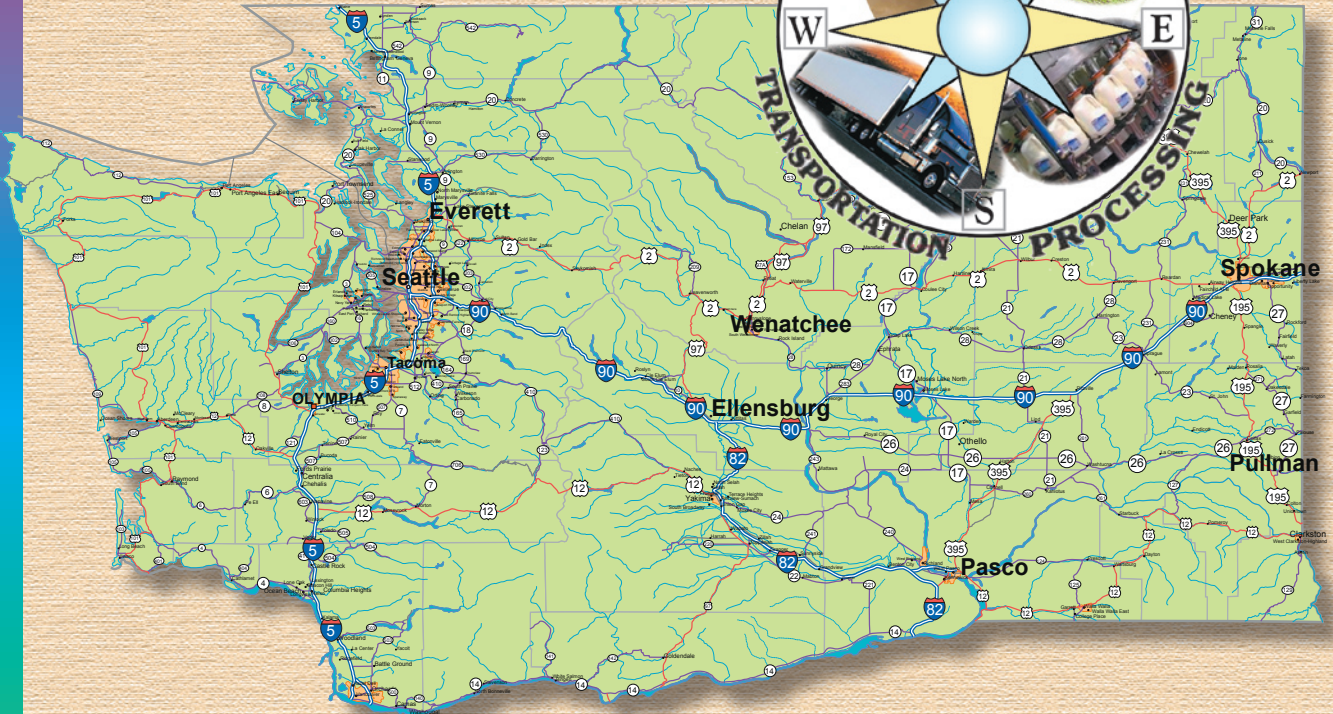


# Ag@School

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## Agriculture - From Field to Table



Imagine you are a truck driver and your office is in Seattle. Your boss gives you the following work schedule. Trace your driving route on the map. In the blanks, write the name of the highway you would use to get to that stop and how many miles you traveled.

- Pick up raspberry jam from a processor in Everett.  
Highway \_\_\_\_\_ for about \_\_\_\_\_ miles
- Pick up fresh apples at a fruit packing plant in Wenatchee.  
Highway \_\_\_\_\_ for about \_\_\_\_\_ miles
- Deliver the apples and the jam to a supermarket in Spokane.  
Highway \_\_\_\_\_ for about \_\_\_\_\_ miles
- Pick up a load of wheat flour near Pullman.  
Highway \_\_\_\_\_ for about \_\_\_\_\_ miles
- Drop off flour in Pasco; pick up sweet corn.  
Highway \_\_\_\_\_ & \_\_\_\_\_ & \_\_\_\_\_ for about \_\_\_\_\_ miles
- Deliver corn to processing plant in Ellensburg.  
Highway \_\_\_\_\_ for \_\_\_\_\_ miles
- Pick up hay and deliver to port of Seattle for shipment to Japan.  
Highway \_\_\_\_\_ for about \_\_\_\_\_ miles
- What is the total number of miles traveled?  
\_\_\_\_\_ miles
- How many different highways did you travel?  
\_\_\_\_\_
- How many cities did you visit? \_\_\_\_\_

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 39,500 farms create a \$46 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](http://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.

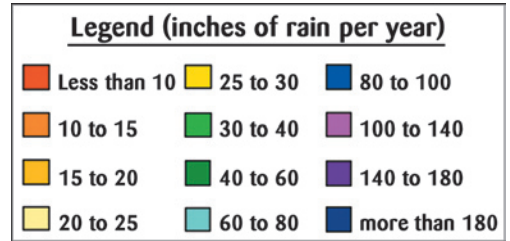
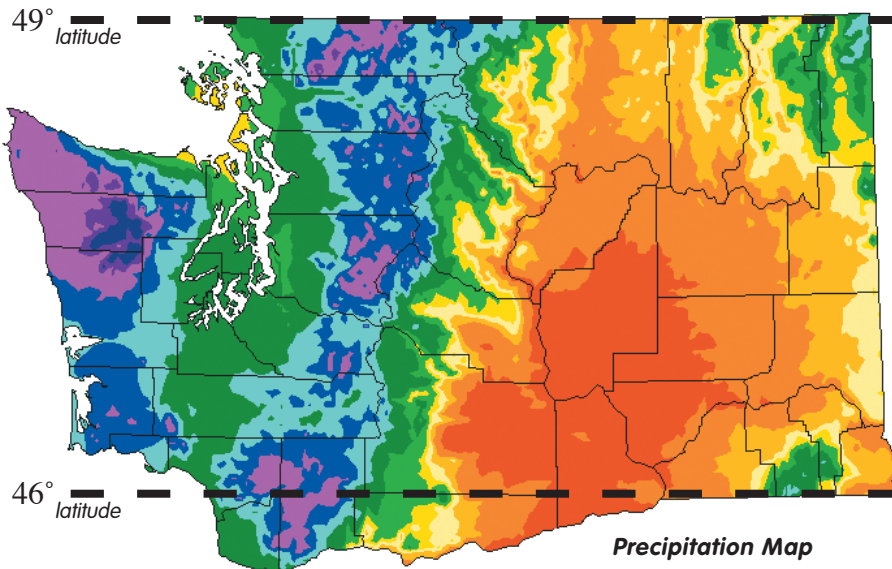


# AG DEPENDS ON CLIMATE

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



## 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 Wa

## PUGET SOUND LOWLANDS

Most of our urban population is concentrated in this region, but 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

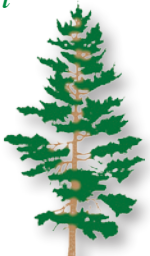
Change as distinct

ts ys

~ Hooray! Washington is #1 ~

Washington leads the nation in the production of several crops (2011 crop data). Identify the counties or regions that are named below.

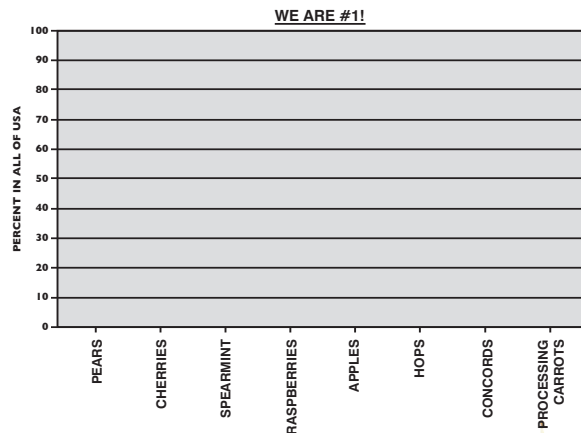
**OKANOGAN HIGHLANDS**  
 The Okanogan Highlands are rugged foothills between the Cascades on the west, and the Rocky Mountains to the east. Here beef cattle graze among another valuable renewable resource, trees. Trees provide paper, pencils, furniture, and houses. This region also grows a variety of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



- ① **Red Raspberries – 92.3% of US supply** – 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](http://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](http://www.usahops.org)
- ③ **Mint 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. Of the total US supply, Washington produces:  
**78.7% Spearmint Oil 26.1% Peppermint Oil (2<sup>nd</sup> in nation)**
- ④ **Sweet Cherries – 58.6%** – 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](http://www.nwcherries.com)
- ⑤ **Apples – 57.4%** – 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](http://www.bestapples.com/growers/regions/index.shtml) (Okanogan, Lake Chelan, Wenatchee Valley, Columbia Basin, and Yakima Valley)
- ⑥ **Pears – 47.9%** – 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. [www.usapears.com](http://www.usapears.com)
- ⑦ **Concord Grapes – 37.3%** – These are the grapes used to make grape juice, jams, and jellies. We also grow 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.
- ⑧ **Processing Carrots – 35.6%** – 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



## 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.



# GATEWAY TO THE PACIFIC

## TWO MAJOR RIVERS IN WASHINGTON

- █ COLUMBIA RIVER
- █ SNAKE RIVER

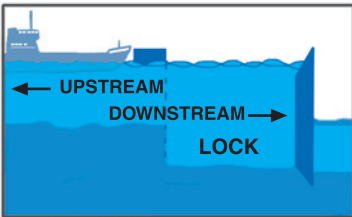
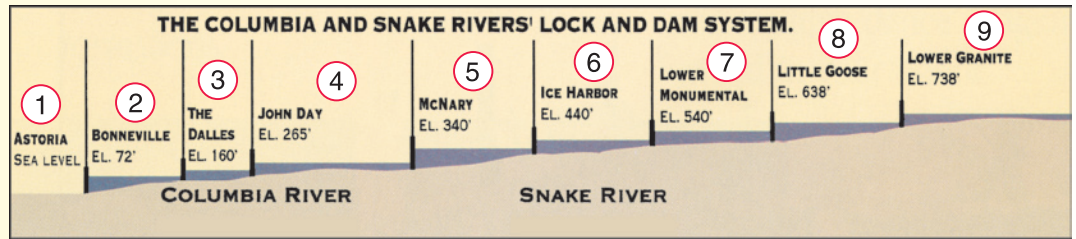
Washington is blessed with great soil and a climate for growing many different crops. That's not all! Our mighty rivers and ocean ports help us move all kinds of products throughout the Pacific Rim at an affordable cost. That means that wheat trucked from Montana and potatoes grown in Idaho, as well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

## A Water Stairway

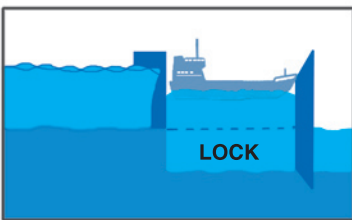
The Columbia and Snake Rivers form a highway for boats and barges. This could not happen without a series of 8 locks and dams that make a stairway in the river. Between the port of Clarkston and the Pacific Ocean the rivers drop over 700 feet. Like a water stairway, the locks allow boats to move up and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



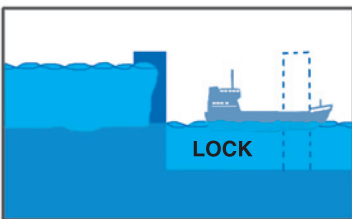
★ = DEEP WATER PORT  
10-16 ARE DAMS ON COLUMBIA RIVER



(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.**

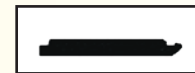
**To lower a boat or barge, the lock is filled with water to the upstream level. The barge moves into the lock. The upstream gate closes and water is drained out of the lock, lowering the barge to the downstream level. The downstream gate opens and the barge leaves the lock.**

**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!

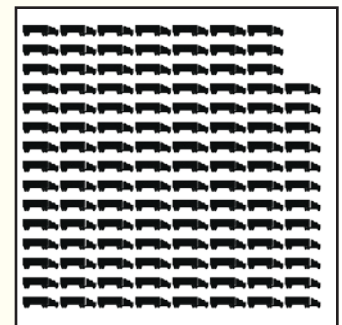
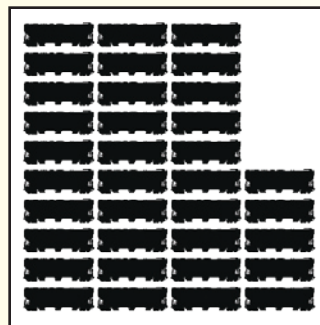
In 2011, Washington farmers produced 10,072,800,000 pounds of wheat. How many tons is that? Nearly 85% of the crop is exported. Barges are the most efficient transportation to deep water ports.

3500 tons of wheat shipped on 1 barge



= 35 rail cars

= 117 Semi Trucks





## Pumpkin Poem

One day I found two pumpkin seeds.  
I planted one and pulled the weeds.  
It sprouted roots and a big, long  
vine.

A pumpkin grew; I called it mine.  
The pumpkin was quite round and fat.  
(I really am quite proud of that.)  
But there is something I'll admit  
That has me worried just a bit.  
I ate the other seed, you see.  
Now will it grow inside of me?  
(I'm so relieved since I have found  
That pumpkins only grow in the  
ground!)

Author: Unknown

Circle all the nouns  
Underline the verbs  
Cross out the adjectives.

Hi, we're Bennett and Mally Huffman. We are 12 and 10 years-old and we live on Huffman Farms, a pumpkin farm in Ellensburg, WA.



We love growing up on our farm because it means having lots of animals for our petting zoo. In the spring, we get to help deliver the baby lambs and bottle feed anybody who needs extra milk. Spring also means pumpkins! We each get to help plant, then we see all of our great pumpkins sprouting just weeks later. Our family also planted a corn maze this year, which has been a lot of fun to run through this summer. The best part of growing up on our farm though is seeing everyone come out and have fun in the fall. We like telling people about our animals, leading hayrides, watching people pick their favorite pumpkin and seeing all of our friends. These are just a few of the reasons we like growing up on our farm. If we listed them all, we'd have a book.



# Pumpkins



Pumpkins are more than a just a pretty or scary face. They are healthy to eat, have a rich history, and are also used as decorations. Pumpkins are a member of the gourd family, which includes cucumber, honeydew melons, cantaloupe, watermelons, and zucchini. They have been grown in North America for thousands of years and are grown on every continent except Antarctica.



Pumpkins are grown and processed into canned pumpkin and canned pie mixes. Pumpkins can also be grown for decorative reasons. They can range in size from less than one pound to more than 1,000 pounds (The current Guinness world record is 2,009 pounds). A common use for them is to carve them into Jack-O-Lanterns, but did you know that the tradition originated in Ireland with the carving of turnips?

Before corn was a staple food source for the Native Americans they used pumpkins to help them through the winters. They discovered many ways to use the pumpkin in their diets. They would boil, roast, or fry the inner meat. The blossoms were added to soups and the seeds made a tasty snack.

Eating pumpkins can provide your body with Vitamins A, C, K, and E. It is also a good source of other minerals such as magnesium, potassium, and iron. The bright orange color of the pumpkin tells you that it is full of beta-carotene. Beta-carotene is converted to vitamin A in the body, which helps bones, cell development, and also helps promote healthy eyesight.

There are many ways to get pumpkins in your diet or in your home. You can visit a farmer's market, look for them at your local grocery store, or visit a pumpkin patch in your area. Take a look at [pickyourown.org](http://pickyourown.org) for you-pick farms near you.

### Pumpkin Life Cycle



seeds sprout vines flower green orange



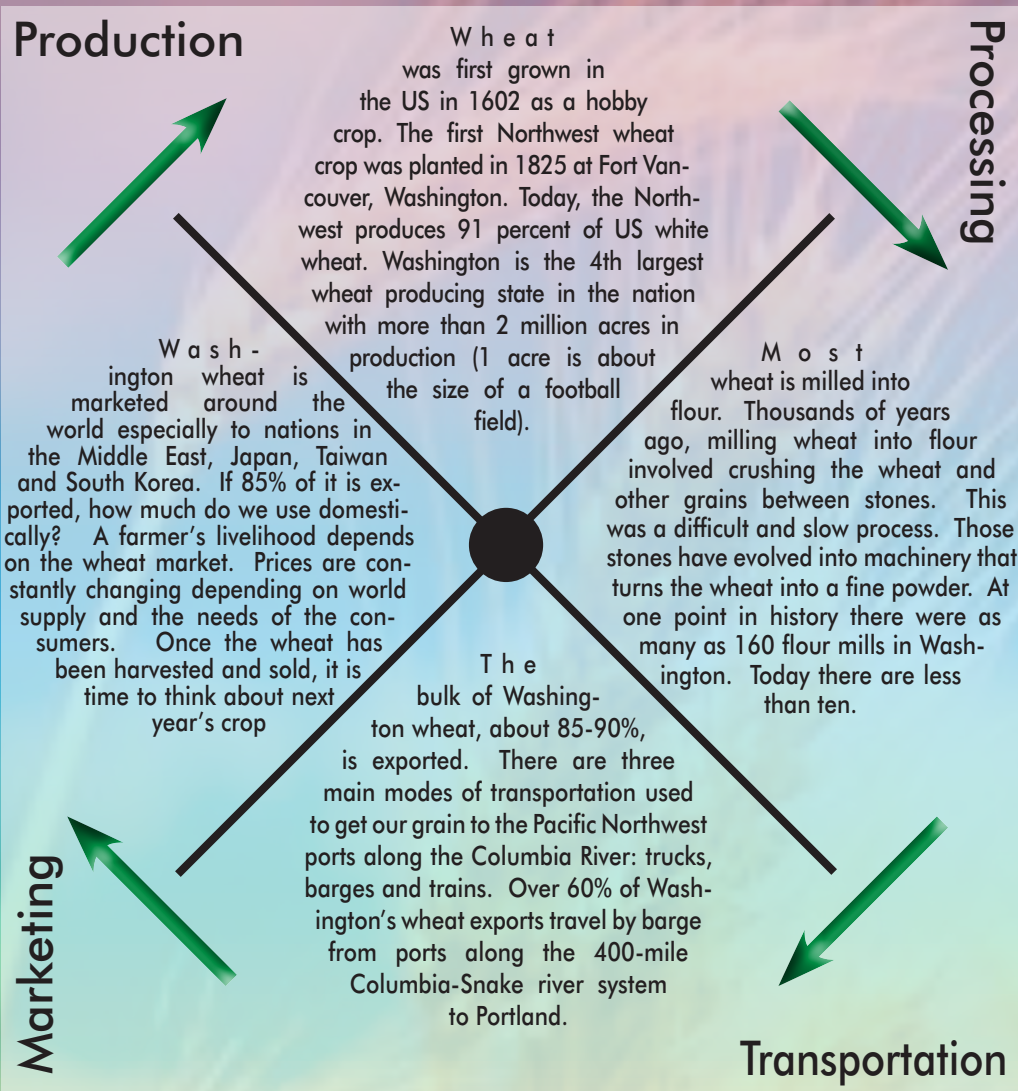
## Agritourism

Agritourism is growing in popularity across the US. The term agritourism means any activity that attracts visitors to a farm or ranch. The types of activities on the farm may include picking fruits and vegetables, riding horses, tasting honey, learning about cheese making, or shopping at the farm stand. Agritourism provides farmers the opportunity to share and educate visitors about their way of life, and to earn extra money.



# 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.



### 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](http://www.myamericanfarm.org) to play on-line games and explore fun family activities.

It's all about agriculture.

## 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.