



Ag@School

Volume 20 Issue 1 2020/2021

Published by Washington Agriculture in the Classroom

FOOD – NEEDED FOR LIFE

Brought to you by...AGRICULTURE

Food comes from farms. Farmers and ranchers grow crops and animals to feed you and many others around the world. In the USA we enjoy the safest, most abundant, least expensive food supply in the world. Washington state is second only to California in the diversity of agricultural commodities produced.



Washington's Top Five

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!!

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
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Today's Children... Tomorrow's Leaders

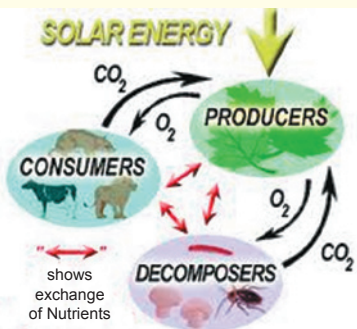
ag•ri•cul•ture (ag´rĭ´kul´chĕr), n. growing plants and animals for food and other uses



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?

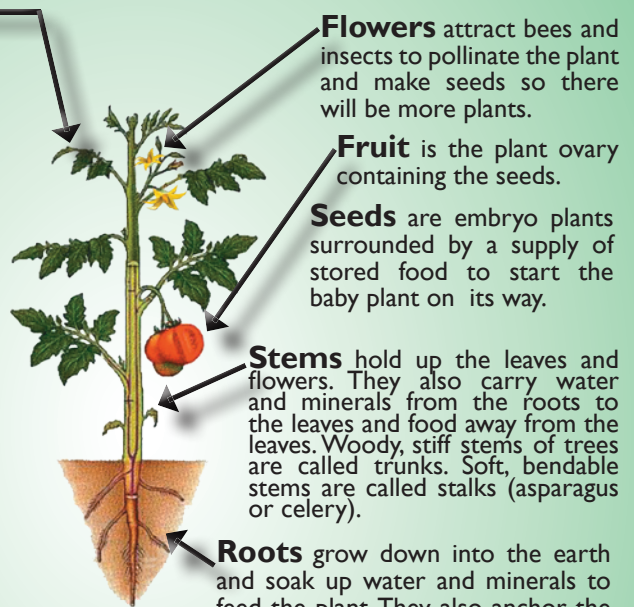
Agriculture is Science and Technology

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

Life On Earth Depends On Plants

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

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



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

Fruit is the plant ovary containing the seeds.

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

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

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

Parts of the Plant We Eat

Complete the chart below with more examples

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

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

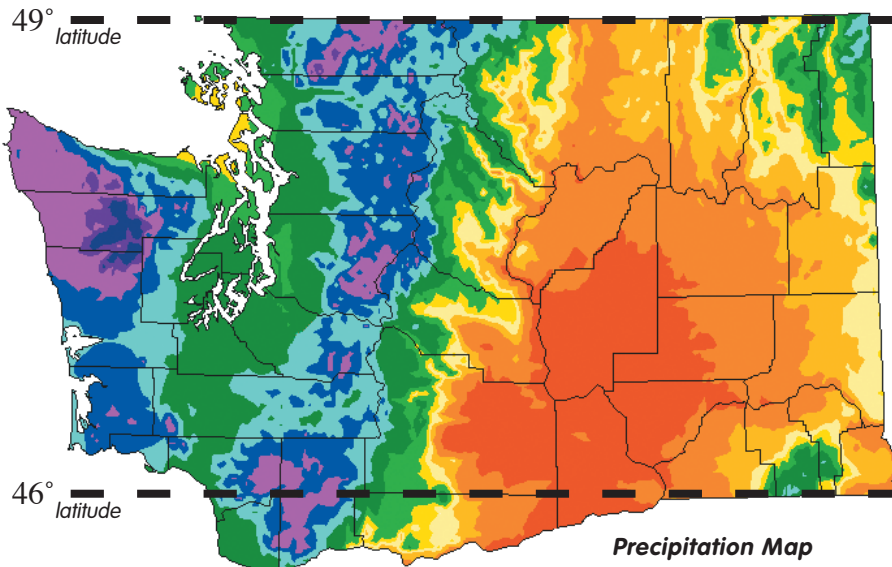
* Onions grow underground, but are actually adapted leaves.

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.

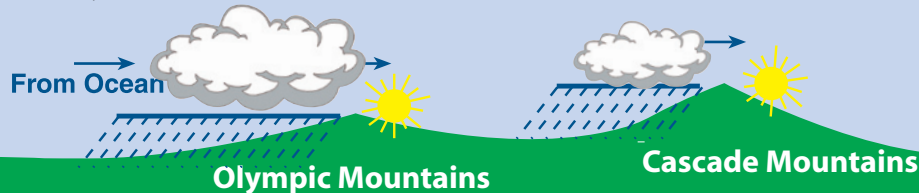
1. Outline Washington's wettest area. It is really a rain forest!
2. Which side of the Cascade Mountains gets the most rain? West or East?
3. Where is the Maritime Zone? Where is the Steppe Zone?
4. Most of the wheat is grown in Eastern Washington. Does that crop need a lot of rain?
5. Draw a circle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



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



Grown In Wa

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.



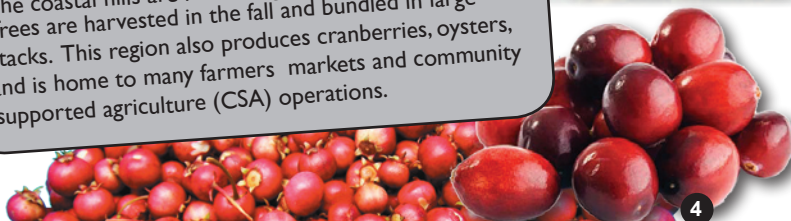
CASCADE MOUNTAINS

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

Change as distinct

ts ys



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.

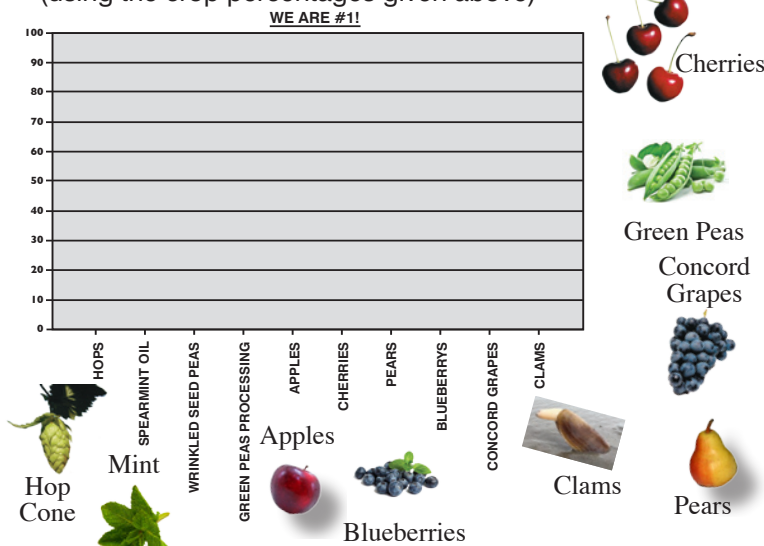
~ Hooray! Washington is #1~

Washington leads the nation in the production of several crops (2018 crop data). Identify the counties or regions that are named below.

- ① **Hops – 72.7%** – Hops are used to flavor beer. The Yakima valley produces three-fourths of the state's hops. The dry climate along with lots of irrigation water from the Yakima River create ideal conditions for this crop. www.usahops.org
- ② **Mint Oil – 68.0% 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 70.2%, Green Peas for Processing 35.1%** – 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 – 64.4%** – 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 (Okanogan, Lake Chelan, Wenatchee Valley, Columbia Basin, and Yakima Valley)
- ⑤ **Sweet Cherries – 71.1%** – Cherries are one of the fastest maturing fruits. In just 60 days blossoms mature into sweet and tasty fruit. They are picked, packed, and shipped to markets in the U.S. and more than 42 countries around the world. Leading cherry counties are Yakima, Grant, Chelan, Benton, and Okanogan. www.nwcherries.com
- ⑥ **Pears – 49.4%** – 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. WA is ranked #2 in the production of all types of grapes.
- ⑧ **Blueberries – 24.5%** – 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 **Clams – 56.6%** – Washington leads the country in production of clams. 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 35,800+ farms power a diverse agricultural economy! The state's food processing industry generates 20.9 billion dollars and the agriculture production generates 9.7 billion and provides 164,000 jobs in Washington! 95% of Washington farms are family owned.

TWO MAJOR RIVERS IN WASHINGTON

- █ COLUMBIA RIVER
- █ SNAKE RIVER

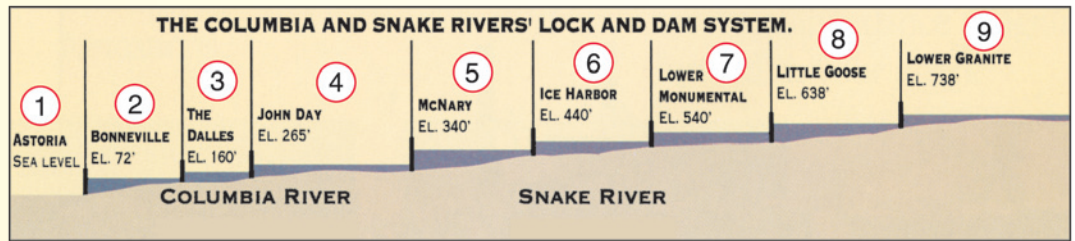
Washington is blessed with great soil and climate for growing diverse agricultural products. That's not all! Our river resources and ocean ports help us move agricultural and other materials throughout the Pacific Rim at an affordable cost. That means that wheat trucked from Montana and potatoes grown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

GATEWAY TO THE PACIFIC



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

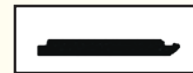
⑯ - Grand Coulee Dam

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.

That's A Lot of Wheat!

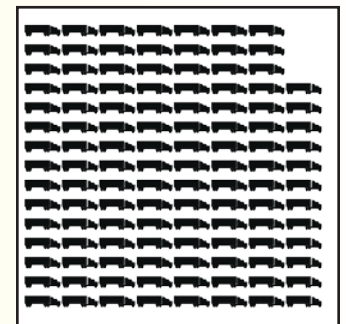
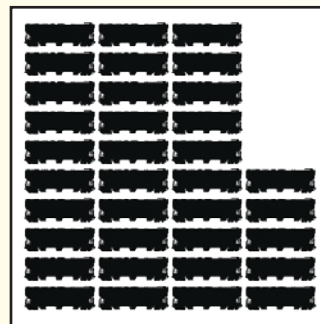
In 2018, Washington farmers produced 9,192,600,000 pounds of wheat. How many tons is that? Nearly 85% of the crop is exported. Barges are the most efficient transportation to deep water ports.

3500 tons of wheat shipped on 1 barge



= 35 rail cars

= 117 Semi Trucks



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?

Livestock: An Important Part of Agriculture

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

- Livestock graze on land that is not useful for growing crops, including forest land.
- Livestock are great recyclers. They eat waste from food processing that would otherwise be thrown away. They can turn sugar beet pulp, corncobs, culled potatoes, cottonseed and even apple cores into meat, milk and fertilizer!
- Grazing improves grass by promoting new growth to the plants, controlling brush, and fertilizing with animal manure.



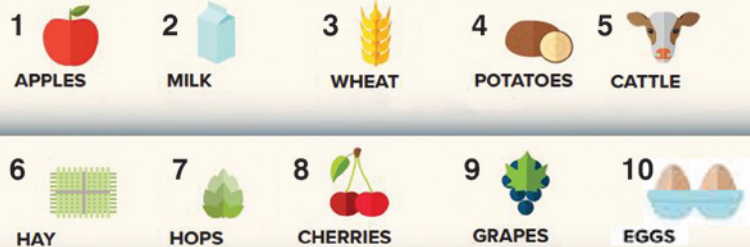
Apples are not only Washington's top crop, they represent

20%

of the total value of ag production in the state.



Top 10 Commodities in Washington



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.



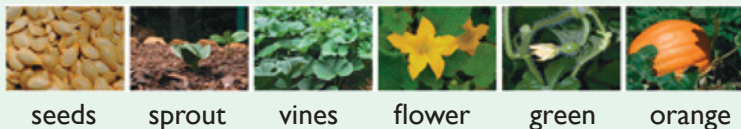
Pumpkins are grown and processed into canned pumpkin and canned pie mixes. Pumpkins can also be grown for decorative reasons. They can range in size from less than one pound to more than 1,000 pounds (The current Guinness world record is 2,009 pounds). A common use for them is to carve them into Jack-O-Lanterns, 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 for you-pick farms near you.

Pumpkin Life Cycle



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.

Washington farmers produce over **300** different commodities



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

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.

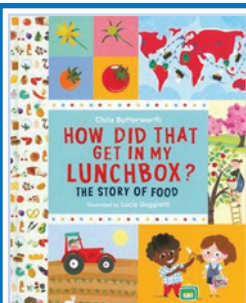
A "legume" is a plant whose seed is enclosed in a pod and which adds nitrogen to the soil by nitrogen-fixing bacteria located in root nodules. This benefits the soil, reduces the need for chemical fertilizers, and works well for crop rotations. Well known legumes include the pulses named above, alfalfa,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

Ag Library Corner

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



How Did That Get In My Lunchbox?

By Chris Butterworth

The best part of a young child's day is often opening a lunchbox and diving in. But how did all that delicious food get there? Who made the bread for the sandwich? What about the cheese inside? Who plucked the fruit? And where did the chocolate in that cookie get its start? From planting wheat to mixing flour into dough, climbing trees

to machine-squeezing fruit, picking cocoa pods to stirring a vat of melted bliss, here is a clear, engaging look at the steps involved in producing some common foods. Healthy tips and a peek at basic food groups complete the menu.

ISBN: 978-0763650056

Visit: www.myamericanfarm.org



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

It's all about agriculture.



October is "National Farm to School Month"! On October 7, schools across Washington State will be participating in Taste Washington Day! Check it out at: agr.wa.gov/farmtoschool