



## Welcome to Ag@School!

Class sets of this magazine, aimed primarily at the 4th grade level, are FREE to subscribing Washington teachers. Instructions for subscribing are on page 4. Back issues are available at [www.waic.net](http://www.waic.net).

This is the first of three issues for 2018-2019. Delivery of the next two issues will be in January and April.

Produced by Washington Ag in the Classroom, Ag@School is designed to help teachers meet student educational goals as well as develop agricultural literacy.

This issue is designed to help students understand:

- The economic importance and diversity of Washington agriculture
- The importance of agriculture to their lives
- Washington geography and climate and how these influence agriculture
- The benefits of dams and how locks enable river transportation

Reproducible activities in the teacher guide expand on concepts covered in the magazine.

### Why Agricultural Literacy?

Agriculture is society's lifeline and an integral part of our heritage. Unfortunately as our country moved from agrarian to urban, people lost contact with the main industry necessary for survival—food production. America's largest industry has dropped from public discourse except for the occasional media splash. Yet we all eat, and it is important that we have an understanding of where our food is produced and who we depend upon to deliver it to our tables.

Less than 2% of the US population is involved in agriculture production (farming) yet 24 million American jobs are dependent upon it. Agriculture is more than working the land and tending the animals. This huge industry—production, processing, transportation, and marketing—generates billions of dollars each year. Agriculture is vital to national security, a stable economy, and the US trade balance.

### Why Agriculture?

Teaching about agriculture is an ideal way for students to make real-life connections to science, math, and social studies concepts. Agriculture is relevant because students encounter it daily. Who doesn't enjoy talking about food? Nearly everything we eat, wear, use- even some fuel that powers cars and buses, comes from plants and animals grown on farms. Agriculture provides perfect real-world connections to STEM and makes learning relevant to students.

Helping students understand the farm-to-table connection is important in our consumer-driven society. Teaching students to be agriculturally literate connects their learning to everyday life.

### Augmented Reality

Augmented reality (AR) is a live direct or indirect view of a physical, real-world environment whose elements are augmented (or supplemented) by computer-generated sensory input such as sound, video, graphics or GPS data. (Wikipedia)

Ag@School has added this feature using the Aurasma platform.

While you read you will see pictures with the Aurasma (A) logo on them . Those are the pictures that have a video attached that will hopefully enhance understanding of an operation or concept. Scan it using the Aurasma app (it's free and can be found at on our website for how to use it) and enjoy the video.

You can also look online at <http://www.waic.net> under publications for the online version of this magazine. With the online version you can simply click on the picture to show the videos to the class.

We hope you enjoy this feature, as we think that it will be a great way to make connections to this magazine and to agricultural information.

### Browse the Matrix!

Visit our website at <http://www.waic.net> and browse the National Ag in the Classroom link to the Curriculum Matrix

The Agricultural Literacy Curriculum Matrix is an online, searchable, and standards-based curriculum map for K-12 teachers. The Matrix contextualizes national education standards in science, social studies, and nutrition education with relevant instructional resources linked to Common Core Standards.

Search our instructional, classroom ready resources now! After you find what you need, consider storing them in your personal binder — MyBinder! Create a MyBinder profile now, or login.

**Vocabulary** – There are words and concepts throughout the magazine (some are bolded) that can be used in variety of ways to enhance learning and expansion of concepts.

**agriculture, commodity, water cycle, latitude, lock, dam, pacific rim, weather, climate, precipitation, rain shadow, irrigation, hydropower, renewable energy sources, fossil fuels, irrigation, oxygen, carbon dioxide, leaves, chlorophyll, photosynthesis, flowers, fruit, seeds, stems, roots.**

### Standards Alignment

This publication is aligned with 4th grade standards for Washington students

#### Essential Academic Learning Requirement – EARLS for Social Studies –

EALR 2: Economics 2.1.1, 2.2.1, 2.2.2, 2.4.1, EALR 3: Geography 3.1.2

EALR 5: Social Studies skills 5.1.1

#### Common Core State Standards (CCSS)

##### Reading –

Questioning, Inference, and Interpretation - RI.4.1, Themes and Central Ideas –RI.4.2

① Connections - - RI.4.3 , Academic Vocabulary – RI.4.4, Point of View/Purpose – RI.4.6

## Page 2 – Ag is Science & Technology

Agriculture is responsible for the food we eat. Food comes from farms; it doesn't just magically appear in grocery stores or restaurants. Farmers and ranchers depend on a wide variety of ag-related careers. Have students brainstorm jobs that are needed to bring food to their tables. Have them research related ag careers like agronomist, entomologist, mechanic, irrigation manager, satellite guidance technician, or food photographer.

### Think, Discuss and/or Writing Prompts

If we had no farmers, how would your life be different? Would your parents have the same jobs as today? Would you have different chores? If we didn't have semi-trucks would your diet be the same? Would the foods you eat change with the seasons?

## Agriculture Is Your Food and Much More

US consumers spend just 10% of their disposable income on food; 50% is for food eaten at home and 50% is for food eaten away from home. In comparison other countries spend much more: New Zealand 15%, Venezuela 20%, India 30%, Guatemala 40% and Kenya 47%. (source: USDA-ERS)

Washington ranks second only to California to the number of crops that can be raised. Washington can produce over 300 different commodities and all the food groups on "our plate" can be Washington grown.

### Discussion starters:

1. Which of the crops or products around the edges of the cover have you seen growing? What crops and animals are raised where you live?
2. How does your county rank in ag value and food processing value? Go to the Washington Dept. of Ag website to download useful maps for the answers: [www.agr.wa.gov/http://agr.wa.gov/AgInWA/](http://www.agr.wa.gov/http://agr.wa.gov/AgInWA/)

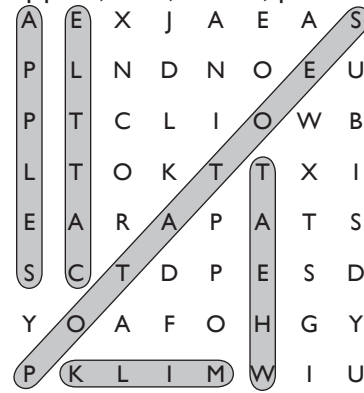
## Page 3 – Climate

### Discussion starters:

1. Why are different crops and animals raised in different regions of Washington? (They all have unique requirements for climate, rainfall, terrain, and soil to thrive)
2. What is meant by a "rain shadow"? (as clouds rise they lose moisture causing a dry region east of the Cascades) How does it affect the types of crops grown east of the Cascades? (With irrigation, anything can be grown, without irrigation farmers are limited to grain, grass seed, legumes, and some oil seed crops) Using the precipitation map, have students find rain shadow areas caused by the Olympic Mountains. Watch the aurasma video on the page with students and/or type in rain shadow on You tube to find some great videos.
3. Track the fruit growing areas in Washington. They follow the banks of major rivers and lakes and the Columbia Basin Irrigation Project. There is enough water in these areas to make "micro-climates" that are warmer in the winter and cooler in the summer.

## Washington's Top Five

Answers are apples, milk, wheat, potatoes, cattle



To learn more about Washington diversity and our top commodities visit:

Washington Department of Agriculture at <http://agr.wa.gov/AgInWA/>

USDA National Agricultural Statistical Service at [https://www.nass.usda.gov/Statistics\\_by\\_State/Washington/](https://www.nass.usda.gov/Statistics_by_State/Washington/)

For more on my plate nutrition and the USDA go to:

<https://www.choosemyplate.gov/> and

<https://www.choosemyplate.gov/washington>

### Nutrition/MyPlate

Nutrition is essential to health. Food supplies the energy we need to build and maintain our bodies. Making good food choices is a personal responsibility that should be fostered even in elementary school. Have students keep food diaries and then chart how their actual diet compares to My Plate. Which food groups have insufficient entries (i.e. are you eating your veggies?)? Make a plan to improve, and then do another food diary. Stress that we need to eat the foods in our plan first, before we have extras (like desserts). It would also be a good idea to keep track of minutes of physical activity. Students should be familiar with the terms "empty calories" (too many calories; too few nutrients) and "nutrient dense" (lots of nutrition for the calories involved). Encourage students to try new foods, especially fruits and vegetables. Have students compare the variety in their diets. Which of the foods consumed is produced in Washington state?

## Page 4/5 – Grown in Washington

On our website – [www.waic.net](http://www.waic.net) under resources, then links to WA Ag information, is an excellent powerpoint on celebrating Washington agriculture that highlights regions, provides history and much more! Check it out! (produced by Robyn Meenach)

### Discussion starters:

1. What geographical features make WA such a diversified agricultural state? (Next to the Pacific Ocean; deep-water ports in Puget Sound; Columbia River for navigation, irrigation and power generation; Cascades split the state; volcanoes have provided the rich ash component of our soils; elevation goes from sea level to the top of Mt. Ranier)
2. Discuss individual growing regions and what factors make each an ideal place to grow specific crops or products (have students refer to the boxes on pages 4-5)
3. Why is a location on the Pacific Rim so important? (Closer to trading partners, especially around the Pacific Ocean)

## Page 6 - Gateway to the Pacific

Remind students that **technology involves changing the natural world to meet human needs or wants**. Our rivers are excellent examples of this. With our system of dams and locks, we provide water for irrigation, electricity production, recreation, cities and industry. We have flood control, transportation, and still provide for the needs of salmon. Discuss how engineers found solutions to many problems to better serve our citizens and our economy. This in turn has improved the quality and quantity of crops we can raise. Ballard Locks videos can be found on Youtube.

### **Background:**

1. Rock Island dam was the first large dam on the Columbia (1933). Bonneville Dam was second, built in 1938 for electricity generation. Grand Coulee was authorized as one of the many projects to put men back to work after the depression and was built to supply irrigation water for the Columbia Basin Project, using the sale of electricity generated by the dam to pay for the construction of the dam and the irrigation delivery system. In 1948 the Snake and Columbia Rivers crested simultaneously and created a flood that wiped out a section of Portland. River-use planners turned their attention to flood control (as well as navigation and power generation) as the remaining dams were completed on the two rivers.
2. Deep water ports are those capable of handling a fully laden Panamax ship. That is a ship that is the maximum size that can still fit through the Panama Canal (965' X 106' X 41'). It is important that we dredge the Columbia River Channel to keep the necessary depth clear for these huge ships to reach the largest Columbia ports. The third lane of the Panama canal has been modernized to take New Panamax ships (1200' X 161' X 50'). Not all ports will accommodate these larger ships.
3. Discuss the different ways people use and depend upon the Columbia and Snake Rivers (recreation, irrigation, water supply, power generation, flood control, wildlife habitat, transportation and commerce. Can the students think of more?)

### **Think & Discuss:**

Have students name three renewable energy sources. (hydro-electric power, wind power, and solar power). Why is hydroelectric energy the most reliable?



### **Discussion starters:**

Hydroelectric power is the most reliable because water behind the dams can be released through the generators at any time to supply electricity. If the sun is not shining or the wind is not blowing, solar and wind energy do not produce electricity. In fact, hydroelectric power is called upon to deliver electricity when these other power sources wane.

Hydro-electric power is possible on the Snake-Columbia System because of the drop in altitude between the source of these rivers and the ocean. A large river like the Mississippi is unable to use hydro-electric generators because it is relatively flat along its' length.

Fossil fuels, such as coal, oil, and natural gas are sources of energy derived from plants and animals that lived long ago. They are carbon based and release carbon dioxide into the atmosphere when burned. Our clean, renewable hydropower keeps the Northwest's carbon footprint at half that of the rest of the nation. Removal of the Snake River dams would add 5.4 million tons of carbon dioxide into the atmosphere each year. Replacing the energy capacity lost by Snake River dam removal would take at least three nuclear power plants or six coal-fired or fourteen natural gas-fired plants.

It would also take an additional 120,000 rail cars or more than 700,000 semi-trucks annually to move the cargo that now travels by barge on the Snake-Columbia river system. That traffic would stress already overtaxed bridges and highways.

Sensible solutions have been found and implemented to benefit fish and protect the value of the Columbia-Snake River System to Northwest families and businesses. Additional hydropower generation would seem to be logical.

More info at:

[www.nwriverpartners.org/](http://www.nwriverpartners.org/)

## Math Problem

1 60,000 ton Panamax ship = 17 barges = 600 rail cars = 2400 semi-trucks

### **Problem:**

Using the information above, how many barges are used to move 9 million tons of grain? (Answer: 9,000,000 tons divided by 60,000 tons/ship X 17 barges/ship = 2550 barges.)

Per ton-mile, barges use 40% of the fuel required for rail and an astonishing 11% of what is needed for trucks. The river system transports \$16 billion in cargo annually.

## Page 8

Ag Library corner – for more accurate agriculture books visit [www.agfoundation.org](http://www.agfoundation.org) and on our website [www.waic.net](http://www.waic.net) books and resources will appear within the lesson plans when you utilize the curriculum matrix.

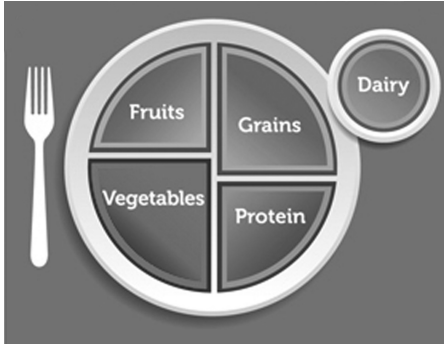
## Writing Prompts

1. Tell why weather and climate are important to farmers. For instance, which fruits can we raise in Washington, and which ones will not survive here?
2. What is your favorite food grown in Washington? Describe how it looks, smells, and tastes. What color and texture does it have?
3. Some people believe that the lock and dam system on the Snake and Columbia Rivers should be removed. Do you agree or disagree? Write to persuade a friend of your opinion. Give reasons to support your position.



Excellent materials are available at the dairy council website [www.eatsmart.org](http://www.eatsmart.org). WA teachers can receive **\$20.00 FREE materials** each calendar year.

For more on my plate nutrition and the USDA go to: <https://www.choosemyplate.gov/> and <https://www.choosemyplate.gov/washington>



**7-12 grade teachers – check this out!**

Journey 2050 takes students on a virtual simulation that explores world food sustainability. Using an inquiry based approach the program encourages students to make decisions and adjust them as they see their impact on society, the environment and the economy at a local and global scale. The students experience the lives of three farm families in Kenya, India, and Canada.

As the student interacts with each family they learn the role of best management practices in feeding the world, reducing environmental impacts and in improving social performance through greater access to education, medical care and community infrastructure. Our Journey to feeding the world has started.

<http://www.journey2050.com>

**Become a Washivore**

Visit WA Grown for excellent videos on the diversity of WA agriculture

<http://www.wagrown.com/>

Check out the website [www.washivore.org](http://www.washivore.org) for fun facts and profiles of Washington Ag products.



**Publication and Credits**

Ag@School is a publication of Washington Agriculture in the Classroom, a non-profit entity created in 1981 to encourage and help teachers increase agricultural literacy in their students. Both public and private groups including the WA Dept. of Agriculture, WSU, commodity commissions, farm organizations, agri-businesses and individuals, support this mission. Teachers may reproduce any pages for use.

Graphic design is by Mike Hendricks, Hendricks Design. Edited by Kristen Hinton-Vanvalkenburg, Robyn Meenach and Cheryl DeHaan.

**WHERE DO YOUR FOOD DOLLARS GO?**

- Bring a Newspaper grocery ad to class.
- Write a shopping list for at least eight items from your grocery ad.
- You must purchase at least one fresh fruit, one vegetable, and some meat. The other items are your choice.

<u>Shopping list</u>	<u>Price per unit</u>	<u>How many?</u>	<u>Your cost</u>
(fruit) _____	_____	_____	_____
(vegetable) _____	_____	_____	_____
(meat) _____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Add up your purchases to get the total spent at the store: \$ \_\_\_\_\_

**Subscribe to Ag@School**

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To subscribe, log onto [www.waic.net](http://www.waic.net) and click the subscribe button at the top of the page!

You may also subscribe via postal mail by sending the above information to:

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**Subscriptions are not automatically renewed.** In the spring and fall issue teachers will be reminded to log onto [waic.net](http://waic.net) and renew their subscription with a few easy clicks and completely a short survey!

Thank you in advance for your feedback. Sorry, subscriptions are not accepted by phone

# The Agriculture Cycle

## AGRICULTURAL JOBS ARE EVERYWHERE

The Agricultural Cycle employs millions of people in many different kinds of jobs. Follow the cycle below. At each step list two jobs taken from the word bank below.

### PRODUCTION:

growing and harvesting food, fiber, forests and flowers



Harvesting wheat From Fields

### PROCESSING:

changing food or fiber raw products into things we can use



Filling Bags Of Flour At Flour Mill

### TRANSPORTATION:

Moving crops and food products around the state and world



Loading Pallets For Shipping

### MARKETING:

selling the food and finished products to you



Shelves With Bakery Goods For Sale

## AGRICULTURAL JOB BANK

Baker

Cashier

Mechanic

Chef

Butcher

Forester

Electrician

Bale Loader

Horticulturist

Accountant

Longshoreman

Food Chemist

Tractor Driver

Agronomist

Logging Engineer

Fork Lift Driver

Refrigeration Mechanic

Advertising Executive

Computer Technician

Irrigation Specialist

Produce Manager



Washington  
State Department of  
Agriculture

# WASHINGTON AGRICULTURE SNAPSHOT

Agriculture and food processing provide over **164,000** jobs in Washington (2013)

**35,900+** farms (2016)

**800** organic farms (2016)

**63%** of farms are less than 50 acres



**OVER 7,500**  
female farmers

Food processing generated more than **\$20.1 billion** in revenues (2016 WA Dept. of Revenue)



**94%** of Washington's farms are small farms – selling less than \$250,000 per year...



... and small farms are **65%** of Washington's total farmland, far higher than the national average of **45%**. (2016)

**Washington farmers produce over 300 different commodities.**

Apples are not only Washington's top crop, they represent **20%** of the total value of ag production in the state.



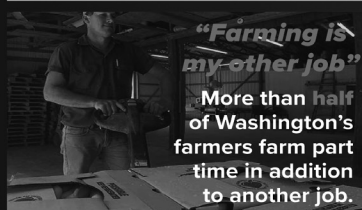
There are **170** farmers markets in **121** towns.

King County alone has over 40.

In 2016, Washington agriculture production alone topped

**\$10.6 billion**

**95%** of Washington farms are family farms



## Top 10 Commodities in Washington\*

(2016)



**1 APPLES**  
\$2.389 billion



**2 MILK**  
\$1.097 billion



**3 POTATOES**  
\$813 million



**4 CATTLE**  
\$704 million



**5 WHEAT**  
\$656 million



**6 CHERRIES**  
\$502 million



**7 HAY**  
\$478 million



**8 HOPS**  
\$382 million



**9 GRAPES**  
\$359 million



**10 PEARS**  
\$233 million

AGR PUB 101-641 (R10/17) Source: USDA National Agricultural Statistics Service, unless otherwise noted. \*USDA statistics exclude cannabis. Do you need this publication in an alternate format? Please call the WSDA Receptionist at 360-902-1976 or TTY 800-833-6388.

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

\*\*FYI - WSDA graphic complete with 2016 Data. Your magazine provides 2017 data that was just released on October 10<sup>th</sup>! WSDA has not had time yet to update graphic (mainly affecting top 10 crops)