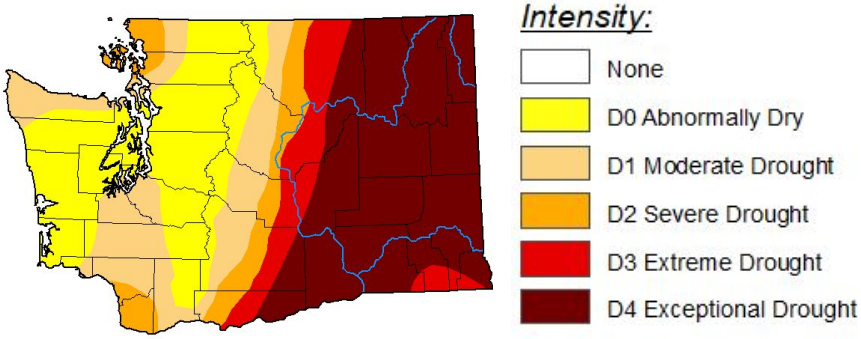
Name:_____ PRD: _____

Essential Question: How does climate change affect Washington wheat farms?

Background



Figures 1-3: [Left] Drought map for Washington state August 2021 from Tinker, Richard. *U.S. Drought Monitor Washington August 3, 2021*, CPC/NOAA/NWS/NCEP, August 2021, droughtmonitor.unl.edu [Right, top] Heat-stressed wheat from Berg, Nicole. *'Early and Fast' wheat harvest due to drought*,Capital Press, June 2021, capitalpress.com/ag_sectors/grains/early-and-fast-wheat-harvest-in-washington-due-to-drought/article_394eed38-d83c-11eb-bd4d-cb0440f58b21.html[Right, bottom] Hessian fly, a wheat plant pest from Bauer, Scott. *Hessian fly, Mayetiola destructo,* Agricultural Research Service USDA, August 2013, en.wikipedia.org/wiki/Hessian_fly#/media/File:Hessian_Fly.jpg

In the 2021 growing season, extreme drought in Washington state means that soils are very dry. Farmers are concerned about sufficient **yield** this year - about harvesting and selling enough wheat to make a profit.

Over much of Washington's wheat fields, farmers rely completely on precipitation (snow and rain) to provide enough moisture for their wheat plants (no sprinklers or irrigation on these fields!). Many, especially in areas where the **climate** is already dry, use a summer fallow rotation, which means that they leave empty, or fallow, half of their acres each year in order to build up moisture before planting more wheat. After a field is harvested (July-August) it will sit fallow until the following September when it will be planted with winter wheat. With enough precipitation the fallow field will accumulate moisture for the next year's crop. It's a long-term commitment that drought can quickly spoil.

In addition, the overall warming of temperatures in Washington state means wheat farms may become more **susceptible** to certain pests, wheat diseases, and even weeds. So, **how does climate change affect Washington wheat farms?**

Vocabulary

climate: weather patterns and average conditions over a long time period.

susceptible: able to be harmed by something.

trend: the overall or average direction over time.

yield: the amount of wheat seeds that can be harvested and sold.

variety: a type of wheat plant or seed that has specific traits.

bushel: volume measure for harvested wheat.

pest: insect that harms the health or growth of the wheat plant.

---

1. MARK THE TEXT

Underline claims the author makes and any pieces of information and evidence that are relevant to the Essential Question. A claim is the idea (or ideas) the author will show you or try to convince you of.

Circle the vocabulary words listed in the box above if you find them in the text. These words might clue you into places where there is evidence in the text.

Put a question mark ? above any other word you need to look up to help you best understand what the author is saying.

2. CONNECT AND RESPOND

Use these symbols to mark sentences or paragraphs in the article. Explain your connections or responses in the **margin**. Include at least two of the following:

→ Something you have a connection to (Do you know something else about the point the author is making? Did you learn this information in another place?)

┼ Something you agree with

╳ Something you disagree with or have a counterclaim for

△ Something that changes what you thought at first

~ Something you have a question about or don't understand yet

Name:_____ PRD: _____

Essential Question: How does climate change affect Washington wheat farms?

‘I haven’t seen anything like this’: Washington wheat growers face low yields in record drought year *The Spokesman Review* August 4, 2021 by Nico Portuondo

1 Whether you talk to a farmer, wheat breeder or economist, they have one message about the wheat harvest in Washington so far after a spring of extreme drought and roasting summer temperatures.

2 “Generally speaking, for the winter wheat and spring wheat, yields are just down,” said Glen Squires, CEO of the Washington Grain Commission.

3 Squires said average winter wheat yields last year were about 76 bushels per acre, with one bushel equaling about 60 pounds of wheat.

4 This year, estimates are showing about 55 bushels per acre, and that number could drop even more, according to Squires.

5 While experts and farmers said it’s clear that yields are down across the board, yields can vary wildly from farm to farm depending on who got small pockets of rain and who chose the right breed of wheat.

6 Arron Carter, a winter wheat breeder at Washington State University, said yields could be down 10% or 40% from average depending on how dry a farmer’s region has been.

7 It can even vary in a farm itself. Klein said that the field he was working on probably got 40 to 60 bushels per acre this harvest, which isn’t great, but other fields could be better, since he planted different varieties of wheat.

8 But even Klein’s less than ideal harvest is much better than what some other farmers are going through.

9 “There are some people that are not even harvesting,” Squires said. “They see two to three bushels and they just stop.”

10 The record drought’s effects may linger into the next wheat planting season as well.

11 “There’s no moisture left in the soil; we’ve sucked out and it’s all gone,” Carter said. “Even if we get normal rain in the fall and winter, we’re going into the driest soil we’ve ever had.”

12 Farmers will likely have to wait longer to plant if significant rain doesn't come soon to their region. Other than less time to grow, delaying planting can mean that the wheat does not grow tall enough to survive the winter.

13 When the winter and snow arrive, wheat stops growing and goes into a kind of hibernation. If the wheat isn't tall or fully developed enough, it can result in winter kill, which isn't good news for farmers, according to Squires.

14 And the down year poses more than just current and future yield problems.

15 Eastern Washington is known around the world as the home of soft white wheat with low protein count, which makes the grain great for using in cookies, crackers and cakes.

16 It's why countries from around the world, from the Philippines to Yemen, choose to import Washington wheat, resulting in the state's $663 million worth of exports in 2020.

17 But because of the stress put on the wheat crops by the drought and extreme temperatures, Carter said he expects protein levels to be up.

18 "I think they're either bad or really bad," Carter said about protein levels in Washington wheat. Carter said he won't know for sure until more wheat samples come in as the harvesting season wraps up in September.

19 Wheat with high protein counts generally gets discounted by buyers, which means less profit for farmers who already have less product to sell than normal.

20 Washington farmers will just need more rain to get their product and yields back to normal, and back to full strength on the market.

Adapted from Portuondo, Nico. "'I haven't seen anything like this': Washington wheat growers face low yields in record drought year." *The Spokesman-Review*, 4 August 2021, spokesman.com/stories/2021/aug/01/i-havent-seen-anything-like-this-washington-wheat-/.

Summary: Review the essential question and your annotations. Answer at least two of the following questions in the space below. What claim(s) does the author make about the essential question? Do you agree with the claims? Are they well supported by evidence from the article? What connections did you make that help you evaluate the author's claim?

Name:_____ PRD: _____

Essential Question: How does climate change affect Washington wheat farms?

Discussion Use the information on this page to help guide your discussion to answer the essential question. Remember to say just enough to make your point while leaving **room for others to speak**. It is okay for there to be **periods of silence** while you and your classmates think. (If it's quiet - **go back to your article** annotations and try a sentence starter below!) Make sure you respond to or question each other's ideas while you talk. Look out for times when you can clarify with evidence, ask questions about relevancy or accuracy of information, or identify a counterclaim.

Near the beginning
Give (and analyze) claims and evidence

My author claims…

My article says…<u>but</u> I think…

My article says...<u>and</u> I think...

In the middle
Evaluate information and look for connections and/or counterclaims

From what I know...because...

What does your article say about...

A counterclaim would be that…

Does anyone have more information about...

Does…depend on having...point of view?

Near the end
Answer the essential question

When you said…I thought…

Does the group agree that…?

Even though my article claims...I now think…

My article claims...and I think it is right because…

After listening to everyone's thoughts, I think...

<u>Discussion Checklist</u>

→ Share information by stating (at least 1)
- ❑ **My article's claim, quoted directly from article**
- ❑ My analysis of the claim
- ❑ **Relevant connection or background information**
- ❑ Evidence, quotes directly from article

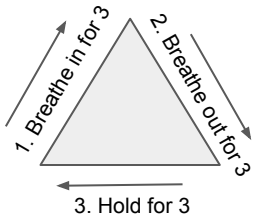
→ Respond to others ideas by (at least 1)
- ❑ Pointing out a counterclaim
- ❑ Asking for examples
- ❑ Asking for evidence
- ❑ **Saying more about others' ideas**
- ❑ Prompting someone else to respond

→ Show respect for others' ideas by (at least 1)
- ❑ **Paying attention to people who are talking**
- ❑ Staying on-topic
- ❑ Re-engaging the group after a period of silence or if you go off-topic
- ❑ Monitoring time

→ Answer the essential question by (at least 2)
- ❑ **Saying my ideas about the essential question**
- ❑ **Using evidence to back up my ideas**
- ❑ Providing a different answer or idea
- ❑ Giving OR asking for a summary

<u>Nervous about speaking? It's normal.</u>
Here are some things that might help:

Breathe. Use a triangle breath to regulate your nerves and prepare yourself to speak.



Go back to your article and look for where you noted **personal connections** to the text. Speaking about something you have experience with may be easier in the group discussion.

Look at the sentence starters above. Write out what you are going to say by filling in the blanks and be on the lookout for when to add your thoughts.

Name:_____ PRD: _____

Essential Question: How does climate change affect Washington wheat farms?

Reflection Think about what you read and what others said in the group discussion to answer the following questions.

1. What did you get out of this activity?

I learned	☐ a lot	☐ a little	☐ nothing
I participated	☐ a lot	☐ a little	☐ not at all
My thinking changed	☐ a lot	☐ a little	☐ not at all
I enjoyed it	☐ a lot	☐ a little	☐ not at all

2. Choose a stem from above and say more. For example, *<u>I participated a lot</u> because the article I read had good evidence for the essential question* or *<u>My thinking changed not at all</u> because I agreed with the article's claim and we did not find any credible counterclaims during our discussion.*

3. How would you answer the essential question in 3-5 sentences? Consider the claims and evidence from your article, along with connections, background information, and counterclaims and evidence brought up during the discussion.