

Essential Question: Is no-till a no-brainer for Washington wheat farms?

Background



Figure 1: Tilled field from Mykura, Nigel. *Freshly Tilled Field*, [geograph.org.uk/p/4200214](http://geograph.org.uk/p/4200214)



Figure 2: Crop residue from Burton, Rodney. *Grain Maize Stubble*, [geograph.org.uk/p/724310](http://geograph.org.uk/p/724310)

Vocabulary

**no-brainer:** A very easy or obvious choice, decision, or solution (So easy or obvious that it is humorously said to require no brain)<sup>1</sup>.

**conventional:** done the usual way.

**no-till (direct seeding):** a farming practice where residue is left on the field and new seeds are planted into the covered soil.

**residue:** parts of the plant that are not harvested (i.e. roots, stem).

**sustainable:** crop growth is balanced with soil health and environmental stewardship.

**erosion:** the loss of soil from a field by wind or water.

**No-till** or **direct seeding** is a farming practice that skips the **conventional** step of **tilling** before planting seeds in the ground. The ground in figure 1 has been **tilled** - the soil has been broken up and turned over to remove weeds and leftovers from last season's harvest and prepare the field for planting new seeds.

The field shown in figure 2 has not been tilled and seeds will be planted by drilling directly into the soil through the **crop residue**, or the remains of last season's plants that have been left on the field after harvest.

No-till and direct seeding are lauded by many as a **sustainable** farming practice. These low-disturbance practices can protect against soil **erosion**, reduce carbon dioxide emissions, and save farmers money by reducing labor and fuel costs. So, **Is no-till a no-brainer for Washington wheat farms?**

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

<sup>1</sup>no-brainer. (n.d.) *Farlex Dictionary of Idioms*. (2015). Retrieved July 8 2021 from [idioms.thefreedictionary.com/no-brainer](http://idioms.thefreedictionary.com/no-brainer)

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**Beyond sustainable: Shepherd's Grain regenerates the land**

- 1 Shepherd's Grain was born in 2003 and carries on a tradition that reaches back generations.
- 2 Sustaining our family tradition is intimately connected to sustaining the earth that enables our livelihood. Co-founders Fred Fleming and Karl Kupers envisioned a better farming model that regenerates our most precious asset, our planet.
- 3 They started Shepherd's Grain to promote no-till, direct-seed farming so they could renew and preserve the land for generations to come – theirs and yours. They knew that better soil makes for richer grain, which produces flour that bakes better and tastes better.
- 4 Shepherd's Grain is happy to spill the beans (yes, some of our farmers also grow garbanzo beans). As one of our growers Allen Druffel said, "If a farmer isn't proud to show you their operation, then there should be a concern." It's why one of our core values is transparency. Our growers are happy to share their way of life with you.
- 5 Farming is a science under constant exploration. With a mixture of Mother Nature and man-made tools and supplies, farmers rely on tracking and experimenting to improve crop quality and increase yield. There are no universal solutions because of things like climate, how long the land has been farmed, and the farming methods used.
- 6 Conventional farming uses heavy tillage (loosening soil and removing weeds), which increases soil erosion (versus natural causes like wind and water movement).
- 7 According to a report cited by the EPA in 2004, soil is eroding 10-40x faster than it's renewing.<sup>1</sup>
- 8 This is not sustainable.

<sup>1</sup>Pimentel, D. Soil Erosion: A Food and Environmental Threat. *Environ Dev Sustain* 8, 119–137 (2006). <https://doi.org/10.1007/s10668-005-1262-8>

- 9 Shepherd's Grain farmers, like many farmers worldwide, have made the switch to no-till, direct-seed farming. It's exactly like it sounds. Instead of turning the soil, growers plant the seed directly into the ground and leave behind the organic matter.
- 10 By not disrupting the natural microbiology occurring (think earthworms and such), there are more nutrients left behind, which end up in the wheat and eventually on your table. So, you get tastier food and the farmers can boast higher quality crops, as well as a greater yield.
- 11 Plus, by not tilling the land, less carbon is emitted. Retired Ohio State University Extension agricultural engineer Randall Reeder claims, "If all the land farmed around the world was in no-till, we could probably reverse climate change." Is this feasible? Some argue no, but we'd argue that it's an "over the moon" goal we should certainly move towards.

Adapted from "Beyond Sustainable: Shepherd's Grain Regenerates the Land." *Shepherd's Grain*, 1 June 2019, [shepherdsgrain.com/blog-uploads/2018/7/13/beyond-sustainable](http://shepherdsgrain.com/blog-uploads/2018/7/13/beyond-sustainable).

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**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?

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**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....but I think...

My article says...and 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...

### Discussion Checklist

→ 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

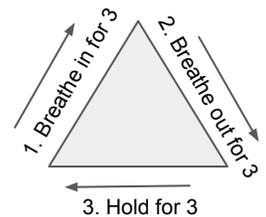
→ Answer the essential question by (at least 2)

- 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

### Nervous about speaking? It's normal.

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.

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**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, *I participated a lot because the article I read had good evidence for the essential question or My thinking changed not at all 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.