



## Agriculture, Food & Natural Resources

### *A Note on Teamwork and Presentations to Further Connect WRS to the Activity:*

- Identify the competency or unit in your program that would be most appropriate for teaching this activity synchronously. Students learn best in context.
- Divide the class into competitive teams (at least two).
- Have the teams brainstorm ideas and establish rules for brainstorming: all ideas are accepted.
- Have teams arrive at consensus and choose their best idea to propose.
- Teams should establish norms, roles, and expectations for team members.
- Teams will clearly define their mission and the idea of their proposals.
- The teacher should act as the judge of the quality and feasibility of the ideas.
- Teacher should also provide enough background to get students started and monitor student behavior along the way, providing helpful feedback when necessary.
- Students should share work and reflect on how well the team worked together.

## Resources

- New [research](#) published in the *Yale Journal of Industrial Ecology* looked back at how things have gone since the initial 1972 report and concluded that we could indeed witness the collapse of civilization as soon as the year 2040. But that's only if we continue our business-as-usual approach to resource extraction and overexploitation — suggesting that there's hope for society as long as we can change course. — Futurism.com ([New Research: Human Civilization Will Likely Collapse By 2050](#))
- "Some one billion people would be forced to attempt to relocate from unlivable conditions, and two billion would face scarcity of water supplies. Agriculture would collapse in the sub-tropics, and food production would suffer dramatically worldwide. The internal cohesion of nation-states like the US and China would unravel." — Vice.com ([New Report Suggests Likelihood of Civilization Coming to an End in 2050](#))

## Scenario

Now more than ever, we need to make the most out of what remains, restore what is threatened, or take some action to prevent further loss. To do so, new technologies are already



being implemented and new innovations are on the way, especially in the area of Agriculture, Food & Natural Resources.

You will use the following list to research your topic and present your findings, proposing adoption and widespread implementation to the class. In so doing, your presentation must address the following components:

- Identify and explain the technology, innovation, or practice in a way that others will understand.
- Present the problem it tries to mitigate or solve.
- Describe additional benefits of adopting it, beyond the primary problem. Could it replace a current, more accepted practice or technology? If so, which?
- Discuss the viability or other practical considerations for its adoption, including acceptance by culture, political climate, and cost. In other words, is it possible? In which environment is the solution best suited?
- Connect your proposal to the first five WRS, using some of the process questions listed under each WRS in the following sections.

Choose from one of the following technologies, solutions, or innovations.

1. Bee Vectoring Technologies
2. Precision Agriculture
3. Indoor Vertical Farming
4. Livestock Farming Technology
5. Laser Scarecrows
6. Farm Automation
7. Real-Time Kinematic (RTK) Technology
8. Minichromosome Technology
9. Farm Management Software
10. Water Management Technology
11. Other ideas, such as No-Till Farming, not addressed in this article

The list above comes from: <https://masschallenge.org/article/agriculture-innovation>

*Note:* Teachers, divide your class into teams of at least two students each to cover the following topics. You may first ask students to divide themselves, based on interest or career path, but try to assign all the topics or as many as you feel would be worthy of their time.



## WRS Connection

Each of the following Workplace Readiness Skills with their definitions is followed by a series of process questions that students may pull from and answer to include within their presentations.

1. Creativity and Innovation—We define creativity and innovation as:

- Discussing the importance of creativity and innovation in the workplace
- Brainstorming and contributing ideas, strategies, and solutions
- Developing and/or improving products, services, or processes
- Identifying and allocating available resources.

### Process Questions

- a) Sometimes, creative ideas represent a disruption or change to the same pattern or way of doing things. In what way does your topic disrupt or change a current way of thinking?
- b) When deciding how to start your presentation, what was your creative process?
- c) Is your topic a brand new idea (as far as you know) or does it come out of some emerging idea?
- d) How would you change this idea to make it even more innovative?
- e) On which resources are you basing your proposal? How would you make it into more widespread accepted practice?
- f) How do you define or summarize your idea (frame your idea as a very short story or pitch to persuade investment)?
- g) With your idea, what is improved: a product, a service, or a process?
- h) What resources are needed to help bring your idea to life: time, people, technology, funding?
- i) There are two ways of seeing and thinking about the future: pessimistically and optimistically. How is optimism particularly creative in nature?

2. Critical Thinking and Problem Solving—We define critical thinking and problem solving as:

- Recognizing and analyzing problems
- Evaluating potential solutions and resources
- Using a logical approach to make decisions and solve problems
- Implementing effective courses of action.

### Process Questions



- a) What problem is your topic trying to solve? Define it clearly.
- b) What is affected by the solution (implementing your topic)? What are the possible impacts?
- c) Are there secondary benefits or consequences to adopting your topic?
- d) Is your topic feasible on a widespread scale? How does it make practical and logical sense?
- e) Thus far, how far along is your topic's acceptance? How would you evaluate its progress? What does it still lack or need to grow?

3. Initiative and Self-Direction—We define initiative and self-direction as:

- recognizing the importance of proactive, independent, decision-making
- identifying workplace needs
- completing tasks with minimal direct supervision
- applying solutions.

#### **Process Questions**

- a) To what audience would you professionally propose your topic?
- b) What would be the steps you might follow to propose the solution?
- c) Could you implement this solution alone and inspire others to imitate you?
- d) Which types of businesses might benefit most from implementing this solution or innovation?
- e) What are your perceived barriers for entering a field and implementing this solution?

4. Integrity—We define integrity as:

- recognizing the importance of having integrity in the workplace
- complying with local, state, and federal laws
- adhering to workplace policies and procedures
- exhibiting honesty, fairness, and respect toward self, others, and property.

#### **Process Questions**

- a) Are there policies and regulations governing the implementation of your topic? If so, what are your biggest hurdles?
- b) Do you think your topic/solution would warrant new legislation? How could green or sustainability initiatives impact policy requirements?
- c) How do you, in the way you frame your argument, account for global warming and similar elements that may affect current perception?



- d) In what ways does your argument support or counter public policy?
- e) Is your topic/solution presented honestly? Does your presentation represent the drawbacks as well as the benefits?
- f) Have you fairly presented any problems that may be a part of your solution?
- g) How does advocating for green technology and sustainability represent integrity?

5. Work Ethic—We define work ethic as:

- demonstrating diligence (e.g., working with persistence to accomplish a task)
- maintaining dependability (e.g., being reliable)
- accounting for one’s decisions and actions
- accepting the consequences of decisions and actions.

**Process Questions**

- a) What is risked by your proposal and are you willing to face consequences?
- b) What setbacks are you likely to encounter when trying to have your idea accepted?
- c) How did you show resilience and drive and a positive mindset as you worked with persistence to create a good presentation?
- d) How might your solution impact morale of consumers and businesses?
- e) Finding meaning in what you do is a motivator. How can your proposal positively affect the world?
- f) How might your solution impact morale and encourage a strong work ethic in others?
- g) If you have an initial setback after your policy proposal, how might you remain diligent and overcome barriers and closed doors to have your solution considered for implementation?
- h) For your presentation, did your team divide and accomplish tasks evenly? Or did someone do more work than another? How did this make you feel, and what does it have to do with work ethic?

We strongly encourage teacher feedback on these activities, if implemented, as well as success stories and examples of your completed work. Reviews may be sent to Darren Morris, Instructional Designer, CTECS, [dmorris@ctecs.org](mailto:dmorris@ctecs.org).

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**For teachers who wish to expand the activity into a larger project, the following PBL Design Principles and Teaching Practices are provided**

**PBL Project Design Principles**



1. **A Challenging Problem or Question:** The project is framed by a meaningful problem to be solved or a question to answer, at the appropriate level of challenge
2. **Sustained Inquiry:** Students engage in a rigorous, extended process of posing questions, finding resources, and applying information.
3. **Authenticity:** The project involves real-world context, tasks and tools, quality standards, or impact, or the project speaks to personal concerns, interests, and issues in the students' lives.
4. **Student Voice & Choice:** Students make some decisions about the project, including how they work and what they create, and express their own ideas in their own voice.
5. **Reflection:** Students and teachers reflect on the learning, the effectiveness of their inquiry and project activities, the quality of student work, and obstacles that arise and strategies for overcoming them.
6. **Critique & Revision:** Students give, receive, and apply feedback to improve their process and products.
7. **Public Product:** Students make their project work public by sharing it with and explaining or presenting it to people beyond the classroom.

### **PBL Teaching Practices**

1. **Design & Plan:** Teachers create or adapt a project for their context and students, and plan its implementation from launch to culmination while allowing for some degree of student voice and choice.
2. **Align to Standards:** Teachers use standards to plan the project and make sure it addresses key knowledge and understanding from subject areas to be included.
3. **Build the Culture:** Teachers explicitly and implicitly promote student independence and growth, open-ended inquiry, team spirit, and attention to quality.
4. **Manage Activities:** Teachers work with students to organize tasks and schedules, set checkpoints and deadlines, find and use resources, create products and make them public.
5. **Scaffold Student Learning:** Teachers employ a variety of lessons, tools, and instructional strategies to support all students in reaching project goals.
6. **Assess Student Learning:** Teachers use formative and summative assessments of knowledge, understanding, and success skills, and include self and peer assessment of team and individual work.
7. **Engage & Coach:** Teachers engage in learning and creating alongside students, and identify when they need skill-building, redirection, encouragement, and celebration.