



Customize this project process by creating your own HyperDocs, using the links from this guide and selecting those activities you think are most appropriate for your students.



SPARK AND ENGAGE

start with a stance

Identify opposite sides of the classroom as “agree” and “disagree” sides; simple posters can also be put up in advance to identify each side.

Start with the following statement:

- ◆ A sustainable future requires a sustainable food system.

Ask students to brainstorm what they think about when they hear this statement. Work with students to first focus on and discuss and define the concept of sustainability. There are definitions and descriptions provided across the [Spark Questions](#) and [Learning Source](#) handouts.

According to the Canadian Centre for Food Integrity (CCFI), sustainability is most associated with food options and production practices that address climate change and have a positive impact on the environment. Discuss the extent to which students have identified similar ideas.

- ◆ The Canadian Centre for Food Integrity provides information and insights related to food, farming and agriculture in general through their public opinion research. Reports can be downloaded by providing contact information at www.foodintegrity.ca/research/. Students may find it interesting to explore public perception around agriculture and sustainability issues as some general background to the concept of sustainability and connections that agriculture has to natural environments and ecosystems.

Dig deeper by exploring students’ opinions about sustainability. Select from statements such as the following from the CCFI research – and share those selected orally or display them on the board, one at a time. As each statement is displayed, have students move to the side of the classroom that represents their opinion. Students can stand anywhere between the two sides of the classroom to indicate the extent of their agreement or disagreement; those who are undecided can stand in the middle of the two sides.

- ◆ The food system in Canada, including how food is grown, produced and sold, is heading in the right direction.
- ◆ The word sustainability means something different to everyone.
- ◆ Sustainability is a moving target and continuous improvement is an expectation.
- ◆ Canadian agricultural products are grown and raised using up to date, responsible and sustainable production practices

Ask students to volunteer why they agree or disagree. Encourage students to consider the extent to which they think agriculture and food are important to learn more about. Work with students to draw out connections between

The Canadian Centre for Food Integrity conducts public trust research every year. Their research shows that the topic of sustainability spreads across the entire food system.

Adapt this activity to a **horseshoe debate** format. Share one statement at a time and have students arrange themselves around a horseshoe shaped spectrum with five points that range from strongly agree, agree, neutral, disagree and strongly disagree. As each statement is shared, have students stand at the point of the spectrum that reflects their opinion. As students are asked to explain their opinion, all have the option to change their position. Find a video that describes this process at www.youtube.com/watch?v=8z_gEwJKAbA.

sustainability as it relates to food and farming and what they are learning about ecosystems, natural environments, mechanization and technologies. What do they think these concepts have to do with the food they eat? Is there such a thing as sustainable food?

Alternatively, online apps such as **Google Forms** can be used to set up a simple digital survey or a **Jamboard** to collect students' reasons for their stance. **Mentimeter** can be used to brainstorm student ideas in real time, using a word cloud format.

exploring systems

Ask students what a system is and have them give examples.

- ◆ Grade 7 students may focus on what they are learning about ecosystems – an ecosystem is a system!
- ◆ Grade 8 students may describe a mechanical system like a car or other machine.
- ◆ Students may also identify systems like respiratory systems, social systems like a school or club or even social media.

Using the examples, guide the discussion to lead students to understand that a **system** is a collection of parts or components that interact with one another to function as a whole. Connect this understanding to the idea of the food system. Tell students they will revisit this image and the concept of food systems as they are connected to natural ecosystems, mechanization and technologies in agriculture.

Ask students to initiate their learning by hypothesizing how sustainability has the potential to be part of each component of the food system.

Have students work with a partner or small group to brainstorm words, phrases, images, symbols that could be associated with the “big idea” of a sustainable food system and associated concepts – ecosystems, mechanical systems, technologies and agriculture; and use these to create a word splash on the board or on a poster.



> CONNECT TO PRIOR LEARNING

Ask students to explore what they think agriculture involves – place, activities, practices, issues, values and beliefs. Discuss and create a definition of agriculture on the board before students start brainstorming. **Agriculture** refers to the practices involved in growing crops and feeding and raising livestock for food and other products. Encourage students to make connections between agriculture and the food they eat.

> CONNECT TO EXPERIENCES

Encourage students to share stories about connections to agricultural places, events and activities that they have experienced. Identify and discuss the characteristics of agricultural communities that students live in or have visited. Set up a **Jamboard** or other digital bulletin board for students to post word or image snapshots of their experiences connected to agriculture.

connect to prior knowledge



Share the essential understandings that provide a focus for the three **Spark Questions** learning resources. Essential understandings 1 and 2 are focused on concepts in **Grade 7 Science Unit A: Interactions and Ecosystems/ Unit B: Plants for Food and Fibre** and 3 is focused on concepts in **Grade 8 Science Unit D: Mechanical Systems**.

As you share and discuss these with students, use evidence-focused questions such as the following to encourage their thinking about what they already know and how they know it:

- What terms are you familiar with in this statement? What are the important ideas in the statement?
- What do you envision when you think about this statement? What do you know?
- What do you envision, have you imagined or know that makes you say that?

Ask individual students to use a **KWHL chart** to jot down their resulting ideas in the "What I **Know**" and "What I **Want to Know**" columns. Use the "How I will find out" and "What I **Learned**" columns as students investigate and research.



A KWHL Chart is provided in the **sustainable PRACTICES Project Tools** booklet and on the **PROJECT GUIDES** webpage at www.projectagriculture.ca/share/project-guides/.

Consider creating a class version of a KWHL chart, collecting information on what students know, what they want to know, how they think they will find out, and then, completing what they learned after sharing their projects. Monitor class understandings and provide support in areas that students need.

> SCAFFOLD AND DIFFERENTIATE

Use this evidence-focused questioning strategy as a whole class first, teaching students how to examine their understandings and conceptions. Students can then discuss these or other statements in small groups, using these questioning strategies with each other.

Keep a chart or ongoing list of students' thoughts and ideas in the classroom as a reference to students' initial thinking and ideas. Invite students to use and add to these lists as they develop their projects.

reflect on connections

Create a **mind map** on the board or with a digital app with the whole class to reflect on connections to what students may have learned about concepts related to – and that connect to – sustainability to natural environments, ecosystems, agriculture, farming, food, identities, innovation, traditional knowledge, mechanization and technologies.

A Mind Map is provided in the [sustainable PRACTICES Project Tools](#) booklet and on the [PROJECT GUIDES](#) webpage at www.projectagriculture.ca/share/project-guides/.



> EXTEND LEARNING

Encourage students to consider what they have previously learned about Indigenous perspectives and beliefs regarding the land and resources. To what extent could these perspectives inform current practices, values and beliefs about sustainability, the food system, agriculture, ecosystems, mechanization and/or technologies?

spark inquiry with an AGRICULTURE cafe

Have students further explore perspectives and concepts related to all or some of the three essential understandings in a **world cafe**, using the [Spark Questions](#) handouts.

Start student exploration by sharing the [project AGRICULTURE](#) website on an interactive whiteboard. Go to the [sustainable PRACTICES](#) topic in the **TOPIC VIEWER** on the **LEARN** webpage of the [project AGRICULTURE](#) website and click on the “spark” icons to access and explore the [Spark Questions](#) sources.

Preview the information and questions. Then, provide in digital or print form for students to explore individually.

Several starting points for further inquiry are provided as questions throughout the [Spark Questions](#) handouts. **Select** from these questions to create a project focus. These questions are found in **INVESTIGATE MORE** sidebars in each handout and include:

- The way food is produced, distributed and eaten forms an important link between natural and agricultural environments and a healthy society. What practices are involved in producing sustainable food?
- In what ways can a demand for sustainable food influence sustainable farming practices?
- To what extent and why can definitions and understandings of sustainability change over time?
- How is sustainable food production connected to natural environments and interactions in those environments?
- How do Canada’s goals for sustainable food include protection for natural ecosystems?
- How does the United Nations goal of Zero Hunger involve sustainable agricultural practices?



The three essential understandings from the previous activity are shared with students in the [Spark Questions](#) PDF sources.



The **INVESTIGATE MORE** questions in the [Spark](#) handouts are intended as starting points for student investigation and research. They can be used to identify areas for inquiry or as a focus for the development of a project question.



Specific curriculum outcomes for each of the three [Spark Questions](#) handouts, correlated to each, are provided in the [LEARNING OUTCOMES AND COMPETENCY MAP](#) on page 29.

Click on each guiding question in the map to go directly to the downloadable source on the website.



Consult *Teamwork Skills: Being an Effective Group Member* from the University of Waterloo at <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/tips-students/being-part-team/teamwork-skills-being-effective-group-member> for group and teamwork skills that can be shared with students.

- ◆ How can research into the connections between natural and agricultural ecosystems support sustainable farming practices?
- ◆ How can the steps of the scientific method be followed to investigate sustainable farming practices?
- ◆ How can traditional knowledge of the land contribute to sustainable farming practices?
- ◆ How are Indigenous food initiatives protecting natural ecosystems?
- ◆ What benefits can a mix of “western” science and Indigenous science and knowledge provide to the food system?
- ◆ To what extent do different approaches to agriculture promote sustainable food production?
- ◆ How have changing machinery and technologies affected the changes in Canada’s crop yields and crop diversity?
- ◆ How are machines being combined with digital technologies to increase food production? What more can you find out?
- ◆ How does mechanization make agriculture more efficient? How can mechanization make agriculture more responsible?

Tell students that they will be asked to hold group conversations, focused on one of the **Spark Questions** sources. Organize students into groups of three or four at a table, cluster of desks or at a class computer, loaded with a **Google Doc**. Select a leader for each group. The leader will record the major points of the group conversation and be prepared to summarize them.

Share questions such as the following with students as the focus for their group conversations:

- ◆ What information and examples can you find in this source to support the essential understanding?
- ◆ What additional information do you need to better understand the essential understanding?
- ◆ What would you most like to find out more about? Why?

Have groups discuss the questions for an established period of time.

Once the time is up, have the leader stay but the other group members rotate to a different table. Ask the leader to summarize the main points of the conversation they had with their former group for their new group members.

Have each new group select a new group leader. Repeat the process to provide multiple students with the opportunity to lead a group.



SPARK QUESTIONS: LEARNING OUTCOMES AND COMPETENCY MAP

SPARK AND INQUIRY FOCUS	GRADE 7 SCIENCE UNIT A and GRADE 8 SCIENCE UNIT D	
	CONCEPTUAL KNOWLEDGE	PROCEDURAL KNOWLEDGE
SPARK LEARNING SOURCE What can sustainable agriculture look like? Sustainable agriculture influences, and is influenced by, the way food is produced.	Grade 7 Unit A: Interactions and Ecosystems 1. Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions - identify examples of human impacts on ecosystems, and investigate and analyze the link between these impacts and the human wants and needs that give rise to them (e.g., identify impacts of the use of plants and animals as sources of food, fibre and other materials; identify potential impacts of waste products on environments) - analyze personal and public decisions that involve consideration of environmental impacts, and identify needs for scientific knowledge that can inform those decisions	Grade 7 Unit A: Interactions and Ecosystems Ask questions about the relationships between and among observable variables, and plan investigations to address those questions - identify science-related issues (e.g., identify a specific issue regarding human impacts on environments) - identify questions to investigate arising from practical problems and issues (e.g., identify questions, such as: "What effects would an urban or industrial development have on a nearby forest or farming community?") Demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment (e.g., assume personal responsibility for their impact on the environment; predict consequences of proposed personal actions on the environment; consider both immediate and long-term consequences of group actions; identify, objectively, potential conflicts between responding to human wants and needs and protecting the environment)
SPARK LEARNING SOURCE How do interactions between natural and agricultural ecosystems promote sustainability? Interactions between natural and agricultural ecosystems are part of a sustainable food system.	Grade 7 Unit A: Interactions and Ecosystems 1. Investigate and describe relationships between humans and their environments, and identify related issues and scientific questions - describe examples of interaction and interdependency within an ecosystem (e.g., identify examples of dependency between species, and describe adaptations involved; identify changing relationships between humans and their environments, over time and in different cultures—as, for example, in aboriginal cultures) 4. Describe the relationships among knowledge, decisions and actions in maintaining life-supporting environments - identify intended and unintended consequences of human activities within local and global environments (e.g., changes resulting from habitat loss, pest control or from introduction of new species; changes leading to species extinction)	
SPARK LEARNING SOURCE How does technology and mechanization support sustainable farming? Technologies and mechanization have allowed farmers to grow more while using fewer resources.	Grade 8 Unit D: Mechanical Systems 4. Analyze the social and environmental contexts of science and technology, as they apply to the development of mechanical devices illustrate how technological development is influenced by advances in science, and by changes in society and the environment	Grade 8 Unit D: Mechanical Systems Ask questions about the relationships between and among observable variables, and plan investigations to address those questions identify practical problems (e.g., identify problems related to the effectiveness or efficiency of a mechanical device) • identify questions to investigate arising from practical problems (e.g., "What is the efficiency of this device?") Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields (e.g., investigate examples of mechanical devices in their home and community; ask questions about techniques and materials used; show an interest in related careers and hobbies) Demonstrate sensitivity and responsibility in pursuing a balance between the needs of humans and a sustainable environment (e.g., consider the impacts of their designs on society and the environment; participate in discussions on the appropriateness of a given technology)