LEARNING EXPERIENCE ONE
Guiding Question: What are some of the crops that feed the world?

This **Learning Source** and accompanying **Build Competencies** activities can set the stage for exploration of other guiding questions in this topic that are focused on the needs and uses of plants as sources of food. Students can be encouraged to consider how what they have previously learned about the life processes and structures of plants and predict similarities and differences they might expect to find in the plants that are grown as crops in Alberta – including wheat, barley, canola and pulses. This **Learning Source** and **Build Competencies** activity can also be used with **LEARNING EXPERIENCE TWO** on **pages 43 to 46** to explore the variety of plants used as food sources.

This **Learning Source** provides starting points and information to investigate:

- Crop varieties
- Focus on cereal grains: wheat and barley
- Focus on oilseeds: canola
- Focus on pulses: field peas, lentils, dry beans, chickpeas, faba beans, soybeans

Review what students have learned about plants, life processes and structures. Brainstorm a list of uses of these plants – ranging from essential foods, materials and medicine to enjoyment and enhancement of quality of life.

Have students share how many plant species they think there are. In 2016, a report carried out by the Royal Botanic Gardens in Kew estimated that there are 390 900 plants known to scientists – the first global scientific assessment of world flora. The study also found that 2 034 new plant species were discovered in 2015. [Source: www.bbc.com/news/science-environment-36230858]

Ask students to identify and find illustrations of two to three plants that are common to their environments. Create a classroom or online display of these plants.

- Group similar plants together
- Identify common characteristics of the plants
- Identify characteristics that differentiate the plants from each other

Have students explore the crop plants in the **Learning Source** and add illustrations or photos to the display. Discuss common characteristics and those that differentiate the crop plants.

Build Competencies: Finding Diversity in Crop Plants

Students explain the importance of the diversity of plant species, identify plants and compare the characteristics of different crop plants.

This handout includes activities that support competencies and weblinks to online resources that students can explore.

Assess

Look for evidence of understanding of the following concepts:

- Plant species and varieties
- Characteristics
- Structure of plants
- Uses of crop plants

For a formative assessment, use the **comparison chart** that students complete in the **Build Competencies** handout to assess their understandings of the structures and characteristics of a variety of crop plants.

Students can also be asked to create a **plant profile**, selecting a plant, exploring and illustrating its agricultural ecosystem and its anatomy.

Additional information and discussion questions are provided in the carousel slide for this guiding question in the **food** DIVERSITY section of the **LEARN** webpage.

Click on the carousel slide to open and explore the following content.

- Food variety
- The difference between crops and plants
- Comparing crops and plants
- Preserving crop diversity

Additional Research or Background Sources

Consult teacher or student background sources such as the examples that follow to further explore, enrich or expand activities for this guiding question. Student research sources are also provided in **Build Competencies** handouts.

An overview of field crop farming in Canada, including some of the uses of field crops, is provided in a Field Crop Fact Sheet at www.farmfoodcareon.org/wp-content/uploads/2017/05/Fact-Sheet-Field-Crop-2016.pdf.

Manitoba Canola Growers provides a brief overview of the canola plant, as well as an explanatory video on the canola crop plant and its uses at https://canolagrowers.com/on-the-farm/what-is-canola/.

Alberta Canola also provides a short video about the canola plant and its production at www.youtube.com/watch?v=QQum120DMDQ.

Today's Modern Grain Farm: A Harvest Across Canada is a 20-minute video provided by the Grain Growers of Canada at www.youtube.com/watch?v=XxtIRvYI7g8. Preview and select some segments to share with students as an overview of what a grain crop today "looks like."

Alberta Pulse Growers provides information on pulses and their growing zones, needs and crop characteristics at https://albertapulse.com/growing-pulses/. The video A Year in the Life of a Pulse at www.youtube.com/watch?v=CkOTshjgO4w also provides information on the characteristics of pulses. The Story of Beans at www.youtube.com/watch?v=rb8wfbLZfqs provides a research-focused look at how new bean varieties are developed.

The Canadian Encyclopedia also provides an article at www.thecanadianencyclopedia.ca/en/article/crops that provides background information on crops, including a different classification of the types of crop plants based on general trade use, dividing them into cereal crops, forages, oilseeds, orchard crops, berries, vegetables and special crops.

Students can be asked to compare the classification provided in the Canadian Encyclopedia articles with their own plant groupings.

The Kew Institute provides the State of the Worlds Plants and Fungi 2020 report, accessed at www.kew.org/science/state-of-the-worlds-plants-and-fungi.pdf, which provides some interesting background on the diversity of plant species as well as global efforts to identify new plant species. The report includes a section on finding new edible plants.

The Destination Indigenous website, launched by the Indigenous Tourism Association of Canada, provides insights into ways that traditional food sources are being used in contemporary food in restaurants across Canada. A discussion of the role of traditional food culture can be found at https://indigenouscuisine.ca/food-culture/.

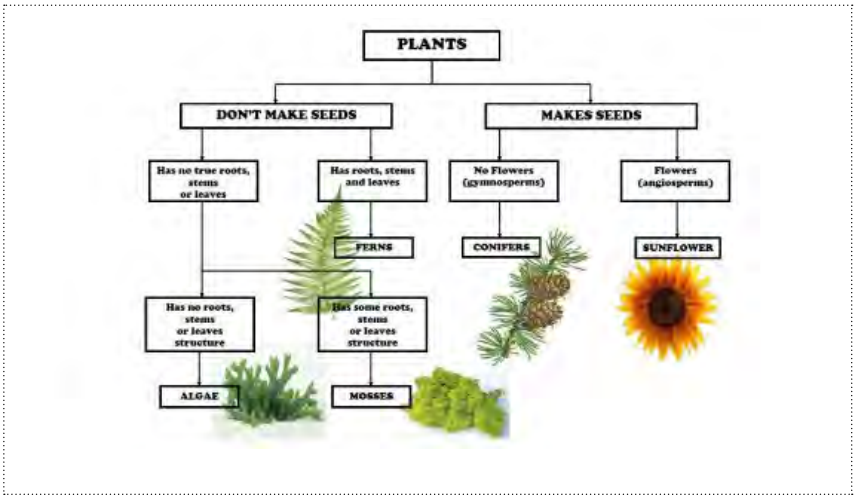
Additional information that reflects the diversity of traditional food sources of Indigenous peoples can be found at https://indigenouscuisine.ca/peoples-of-canada/.

> ACCOMMODATE AND/OR EXTEND LEARNING

Challenge students to develop a **classification guide** for crop plants grown in Alberta that includes instructions for identifying them from photos.

- Have students use a **dichotomous key** format to create their classification guide. Explore examples of dichotomous keys in classroom resources or on the Internet. An example of a Science project based on the creation of a dichotomous key is provided on the Education.com website at www.education.com/science-fair/article/dichotomous-key/.
- The dichotomous key should be constructed with a series of statements consisting of two choices that describe characteristics of the crop plant. To use the key, a person chooses the statement that best describes the unidentified plant, then based on that choice moves to the next set of statements, ultimately ending in the identity of the plant.
- Students can use and adapt a **Mind Map** graphic organizer as a starting point for constructing their keys. Students can also use the illustrations in the Learning Source to identify, sort and group crop plant characteristics.

Encourage students to consider which agricultural activities are best suited to different ecosystems.



Find **Science 7** learning outcomes supported by this learning experience on the following page.

Use this activity to provide students with an opportunity to investigate the structures, characteristics and functions of several crop plants. Make connections between what students have previously learned about plant characteristics and those plants that are commonly grown as crops in Alberta.

Look on the **MEET A FARMER** webpage for video interviews with Alberta farmers. As students watch the videos, ask them to identify crops that are featured and mentioned.

Learning Experience One: Learning Outcomes and Competency Map

project AGRICULTURE Activity	GRADE 7 SCIENCE	
	CONCEPTUAL KNOWLEDGE	**PROCEDURAL KNOWLEDGE**
LEARNING SOURCES What are some of the crops that feed the world? **BUILD COMPETENCIES** Finding Diversity in Crop Plants 	**Grade 7 Unit B: Plants for Food and Fibre** 1. Investigate plant uses; and identify links among needs, technologies, products and impacts • illustrate and explain the essential role of plants within the environment • describe human uses of plants as sources of food and raw materials, and give examples of other uses (e.g., identify uses of plants as herbs or medicines; describe plant products, and identify plant sources on which they depend) 2. Investigate life processes and structures of plants, and interpret related characteristics and needs of plants in a local environment • describe the general structure and functions of seed plants (e.g., describe the roots, stem, leaves and flower of a common local plant) • investigate and interpret variations in plant structure, and relate these to different ways that plants are adapted to their environment (e.g., distinguish between plants with shallow spreading roots and those with deep taproots; describe and interpret differences in flower form and in the timing of flower production)	**Grade 7 Unit B: Plants for Food and Fibre** Ask questions about the relationships between and among observable variables, and plan investigations to address those questions • define practical problems (e.g., identify problems in growing plants under dry conditions) Conduct investigations into the relationships between and among observations, and gather and record qualitative and quantitative data • research information relevant to a given problem Analyze qualitative and quantitative data, and develop and assess possible explanations • use and/or construct a classification key (e.g., distinguish among several grain varieties, using a classification guide or key) • compile and display data, by hand or computer, in a variety of formats, including diagrams, flow charts, tables, bar graphs and line graphs (e.g., prepare a record of a plant's growth that charts its development in terms of height, leaf development, flowering and seed production) • identify new questions and problems that arise from what was learned Work collaboratively on problems; and use appropriate language and formats to communicate ideas, procedures and results • communicate questions, ideas, intentions, plans and results, using lists, notes in point form, sentences, data tables, graphs, drawings, oral language and other means (e.g., show the growth of a group of plants over time through a data table and diagrams) Show interest in science-related questions and issues, and pursue personal interests and career possibilities within science-related fields (e.g., observe plants in the local community, and ask questions about plants with unusual characteristics; pursue a hobby related to the study of living things; express an interest in science-related/technology-related careers) Work collaboratively in carrying out investigations and in generating and evaluating ideas (e.g., assume responsibility for their share of work in preparing for investigations and in gathering and recording evidence; consider alternative ideas and approaches suggested by members of the group; share the responsibility for difficulties encountered in an activity)