SCHOOL FRUIT AND VEGETABLE NUTRITIONAL PROGRAM

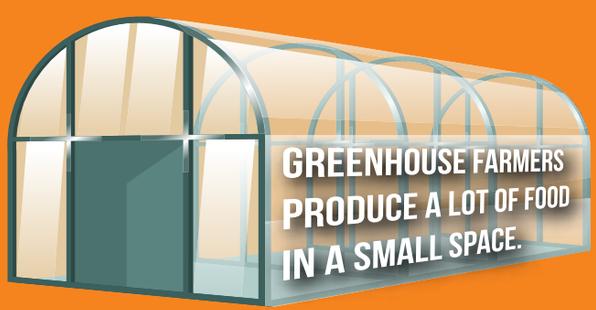
FRESH STORY | PEPPERS

INTERMEDIATE

WELCOME TO THE PEPPER GREENHOUSE

Step into a greenhouse and you'll feel why the plants inside grow so well: the air is as warm and moist as a tropical rain forest.

Greenhouses keep the cold, rain, wind, and even animals outside. While inside, growers control every part of their plants' environment: pumps, fans, light screens, heaters, vents, and more help pepper plants get just the right amounts of water, nutrients, light, air, heat, cooling, and humidity.



Greenhouses use only 0.01% of the Province's farmland to grow 11% of our Agricultural production.

HYDROPONICS: WATER DOES THE WORK OF SOIL

Hydroponics is the practice of growing plants using only water, added nutrients, and a growing medium – but no soil. People have been growing plants in water for thousands of years.

With modern technology, we've learned that if a plant's roots are given just the right mixture of nutrients and water, that plant will grow stronger, and healthier without any soil. Today, almost all of BC's greenhouse-grown peppers are grown hydroponically.

THERE'S NO WASTE IN HYDROPONICS

Hydroponic growing is very efficient: crops need less water, less space, less chemicals, and a shorter time to grow than crops grown in soil. Hydroponic systems operate on a "closed loop." Any water not absorbed by plants is collected, cleaned, topped up with nutrients, and sent back out to the plants. No water is wasted. Growers also collect and use rain that falls onto the greenhouse.

Imagine this: 1 square metre (a space smaller than a bathtub) of hydroponically grown bell pepper plants can produce about 25 kilograms, or about 165, bell peppers. That's between 10 and 20 times more than the amount that would be produced in the same size field!

There are many different ways to grow crops hydroponically:

Some farmers hang plants from nets so the roots can dangle into a container of still or moving water and added nutrients.

Other farmers use a misting system to water and feed roots that dangle in the air.

Some farmers use some sort of substrate (the base on which an organism lives) – like a bag of sawdust or coconut husks so that the plants anchor themselves. Then, they use thin hoses to drip water and nutrients directly onto each plant's roots.

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TEACHER ACTIVITIES

LANGUAGE ARTS ACTIVITY: MINI DEBATE

Curriculum Connection: Language Arts - grades 4 to 7: Exchange ideas and perspectives to build shared understanding. First Peoples Principles of Learning: Learning involves recognizing the consequences of one's actions.

Have students debate the ways in which alternative farming methods (e.g., greenhouse growing, sustainable farming, intensive farming, etc.) are important to our future. For example, greenhouse growing contributes to long-term food security through more effective land use. If a small area in a field could grow 10 peppers, that same amount of space in a greenhouse could grow 100 or even 200 peppers!

Debate Question: How are alternative farming methods important to our future?

Greenhouse growing – Team 1	Other farming – Team 2
Environment	Environment
Pollution	Pollution
Pollination	Pollination
Health	Health

There are many ways to set up a debate. Here is a simple format to follow:

1. Introduce the debate question: How are alternative farming methods important to our future?
2. Divide students into teams, that represent two types of alternative farming methods ("Greenhouse growing" and "Sustainable farming" are provided as examples, but you can choose your own) then within each team, assign 2 to 3 students to each topic.
3. Give students time to research their topics. They can use classroom materials, the student side of this sheet, websites (BC Greenhouse Grown and BC Agriculture in the Classroom), and the BC Greenhouse Growers' Fact Sheet.
4. Set a time for students to speak on their assigned topic (2 to 3 minutes, or more/less, depending on grade level). Flip a coin or draw straws to see which team starts, then select a topic to begin the debate.
5. Have the audience vote on which team they thought presented the most compelling information.

SCIENCE ACTIVITY: HYDROPONICS AND SPACE

Curriculum Connection: Science - grade 4: All living things sense and respond to their environment. Grade 6: The solar system is part of the Milky Way, which is one of billions of galaxies.

Nearly 100 years ago, a professor in California named William Frederick Gericke experimented with adding nutrients to the water. Turns out, he had a very good idea. His tomato vines grew to over 7 metres tall. He called his growing method hydroponics.

What if hydroponics could be used to grow food on another planet? Review "Hydroponics: Water Does the Work of Soil" on the student side of the sheet with your class, then ask students to illustrate and label a plant growth chamber for space. Remind students that they need to include a light source, battery power, water, nutrients, and containers. Students should sketch and label their diagram in a scientific framework. This concept could be extended into a science fair project where students actually build their plant growth chamber.

MATH QUESTIONS

Curriculum Connection: Mathematics - grades 4 to 7: Introduction to ratios and arrays, and represent mathematical ideas in concrete, pictorial, and symbolic forms. First Peoples Principles of Learning: Learning is holistic, reflexive, reflective, experiential, and relational.

Crops grown in a greenhouse can yield 10 to 20 times more than the amount that would be produced in the same size field. Ask students to write simple ratios to start this activity.

For every 1 pepper plant that a field farmer grows, how many plants will a greenhouse farmer grow? (Answer 1:20)

If a field farmer grows 10 pepper plants, how many plants will a greenhouse farmer grow? (Answer 10:200)

Ask students to draw arrays of the two farmers' yields.

Field Farmer

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Greenhouse Farmer

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