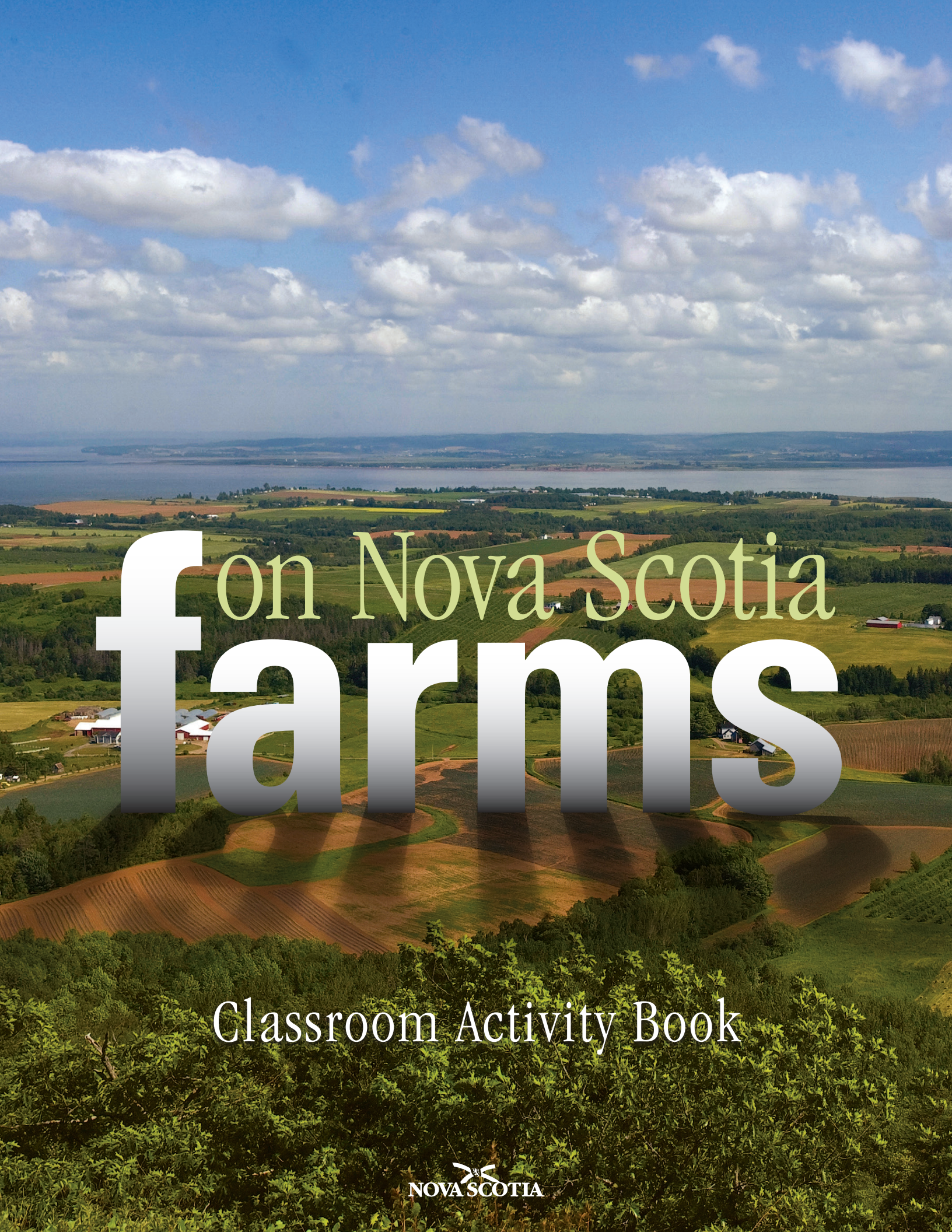
on Nova Scotia
farms
Classroom Activity Book
NOVA SCOTIA

Acknowledgments

The Nova Scotia Agricultural Awareness Committee is pleased to present *On Nova Scotia Farms: Classroom Activity Book*.

The Agricultural Awareness Committee is a partnership of government, industry and rural organizations. The committee works to enhance the knowledge, understanding and appreciation of agriculture and the agri-food industry of Nova Scotia.

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Growing Forward 2
A federal-provincial-territorial initiative

NOVA SCOTIA

Canada

Introduction

The activities in this book were designed for teachers to help students learn about agriculture in Nova Scotia. Curriculum connections for each activity are provided to make it easier for teachers to incorporate the activities in the classroom. Only the most direct links to curriculum outcomes have been listed in the activity outline. A more extensive list of potential curriculum links at a variety of grades is available at novascotia.ca/agri/programs-and-services/educational-resources/teacher-resources/ .

All curriculum connections were drawn from the Nova Scotia Learning Outcomes Framework document (as of March 15, 2011). In most subjects, Specific Curriculum Outcomes are listed. The exceptions pertain to Information and Communication and Technology (ICT), for which Key Stage Curriculum Outcomes are listed, and Agriculture/Agri-Foods 11, for which General Curriculum Outcomes are listed.

Some of the activities have outcomes for several grades. The teacher delivering the programme will decide which activity to use at a particular grade level. The grade level specified on the Contents page is a recommendation only. Depending on how the teacher has prepared the students before they do the activity, and depending on the follow-up afterward, many of these activities may become the core of a specific unit. Teachers should use their own professional judgement when deciding the depth and treatment accorded to an activity. Outcomes may be covered in different ways, depending on the teacher's professional perspective.

TABLE OF CONTENTS

1.1 Mysteries for Your Senses

Did you know?

We use more than one sense when we eat. Sight, taste, smell, hearing and touch are used together when we enjoy good Nova Scotian farm products.

Outcomes

SCIENCE PRIMARY

- develop vocabulary and use language to bring meaning to what is seen, felt, smelled, heard, tasted, and thought (100-1)
- observe, using one or a combination of the senses (201-4)
- use personal observations when asked to describe characteristics of materials and objects studied (202-1)

HEALTH EDUCATION PRIMARY

1.5 use their senses to explore a variety of healthy foods

SCIENCE 1

- identify each of the senses and demonstrate how each of the senses helps us to recognize, describe, and safely use a variety of materials (100-9)
- demonstrate and describe change in materials using the five senses (100-11, 101-3, 101-4)

Questions

- Can you use your sense of smell to identify foods you would ordinarily identify by sight?
- Can you use your sense of touch to identify foods you would ordinarily identify by sight?
- Which fruit or vegetable was the easiest to identify by smell? By touch?
- Which was most difficult to identify by smell? By touch?

Background

A wonderful part of enjoying food is the taste. Other senses also contribute to our enjoyment of the food. In this activity, students examine fruits and vegetables by using different senses.
Note: survey the class for food allergies before starting this activity.

FOR MORE INFORMATION
ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE

- Apples and Other Tree Fruit, p. 22
- Blueberries, p. 26
- Cranberries, p. 36
- Fruit Crops (Other), p. 50
- Vegetable Crops, p. 89

Materials

- Activity Sheet 1.1A
- Small containers with vented lids (you can punch small holes in non-vented lids if need be)
- Paper bags large enough to hold the containers
- Elastics
- Fresh fruit and vegetables (strawberries, blueberries, apples, peaches, cherries, cucumbers, dill pickles, tomatoes, onions, garlic, squash, potatoes, parsnips, etc.)

Procedure

- Bring in (or ask students to bring in) samples of whole fruits and vegetables.
- Cut up each sample and place in individual containers with lids.
- Number enough paper bags for all of the samples.
- Place each container in a paper bag and put an elastic band loosely around the top of the bag.
- Have students smell at the top of each bag while gently squeezing the paper bag.
- Have students guess the fruit or vegetable inside each bag and record their observations on Activity Sheet 1.1A.
- Place uncut samples of the same fruits and vegetables in a second series of numbered bags. Put an elastic band loosely around the top of the bag.
- Have the students reach into each bag and feel the fruit or vegetable.
- Have students guess the fruit or vegetable inside each bag and record observations in Activity Sheet 1.1A

Extensions

- Ask for a student volunteer to taste an apple while blindfolded. Can they identify the fruit? Repeat while holding a slice of onion under their nose. Does the apple taste like an apple now?
- Have the students taste food samples while blindfolded and hold the nose shut to see if the sample can be identified.
- Have the students taste food samples while blindfolded and hold the nose shut to see if the sample can be identified.

Activity Sheet 1.1A

WHAT'S IN THE BAG?			
	It smelled like …?	It felt like …?	Draw what you think it is.
Bag 1			
Bag 2			
Bag 3			
Bag 4			
Bag 5			
Bag 6			
Bag 7			
Bag 8			

1.2 A Healthy Diet

Meeting "Canada's Food Guide" requirements with Nova Scotia food

Did you know?

Dairy, poultry, and egg production form the leading agricultural food sectors in Nova Scotia. Colchester and Hants counties have the most dairy farms, while the Annapolis Valley has most of the poultry farms.

Outcomes

HEALTH EDUCATION 2

2.5 examine "Canada's Food Guide" and demonstrate an understanding that foods within each of the four food groups provide different nutrients that help us grow, develop, learn, play, be active, and keep healthy

MATH 2

F1 conduct simple surveys and record data

Questions

- Do you think your diet follows the recommendations in "Canada's Food Guide"?
- From your food journal for the week, did you meet the recommendations for a healthy diet?
- Where is your food produced?
- Can the recommended diet be supplied exclusively through Nova Scotian products?
- Would you want to eat food grown only in Nova Scotia?

Background

"Canada's Food Guide" helps you learn how much of each type of food you need for a healthy diet. But some of our common foods are not produced here in Nova Scotia. Would it be difficult to follow "Canada's Food Guide" with food grown in this province? Note: there are many foods we enjoy that cannot be produced here. As well, we produce some foods that are sold around the world. The idea is not to condemn food imports but to get students thinking about food and its importance to us.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Industry Overview, p. 5
- Agricultural Sectors, pp. 21-102

Materials

- "Canada's Food Guide" (www.hc-sc.gc.ca/fn-an/food-guide-aliment/index-eng.php)
- Activity Sheets 1.2A and 1.2B

Procedure

- With the students, use "Canada's Food Guide" to determine the daily recommended number of servings for their age group in each food category.
- Multiply the recommended number of servings in each food group by five and record the result in the last row of Activity Sheet 1.2A. This is the students' target for the week.
- Have the students record what they had for each meal throughout the week.
- The following week, work together to identify the food-group servings that are provided at each meal.
- Have the students record the servings in each food category in the weekly serving row of Activity Sheet 1.2A.
- Have students total the number of servings in each food group.
- Compare this number to the recommended number of servings for each food group from the food guide.
- Have the students choose examples of the foods they ate from each food category and record them in Activity Sheet 1.2B. Ask the students where they think each food was produced.
- Have the students check mark each food item they think was produced in Nova Scotia. Draw a circle around each one that was produced somewhere else in the world.

Extensions

- How easy is it to identify Nova Scotian grown foods at your local grocery store?
- What about the foods you find at your local farmers' market?
- Bring a selection of foods into the classroom and ask students to look for origin labels.
- Ask the students if they think there are Nova Scotian farm products that farmers sell outside of the province. (e.g.,blueberries, carrots, fish, maple syrup).

Activity Sheet 1.2A

WHAT DID I EAT TODAY?				
	Breakfast	Lunch	Dinner	Snacks
Monday				
Tuesday				
Wednesday				
Thursday				
Friday				

WEEKLY SERVING TALLY				
	Grains	Fruit & Vegetables	Milk Products	Meats & Alternatives
5-day total				
Food Guide 5-day serving target				

Activity Sheet 1.2B

WHERE IN THE WORLD DOES MY FOOD COME FROM?
Grains
Fruit & Vegetables
Milk Products
Meat & Alternatives

1.3 Earth as an Apple

Did you know?

Almost 30% of Nova Scotia's land base is suitable for agriculture, while only 4.5% is being farmed.

Outcomes

SOCIAL STUDIES 1
1.2.1 recognize that environments have natural and constructed features (local, national, and global)

SOCIAL STUDIES 2
2.4.3 demonstrate an understanding of sustainable development and its importance to our future (local, national, and global)

SCIENCE 3
• identify, investigate, and suggest explanations for life needs of plants and describe how plants are affected by conditions in which they grow (100-29)

SCIENCE 7
• describe interactions between biotic and abiotic factors in an ecosystem (306-3)

• describe essential conditions to the growth and reproduction of plants and microorganisms in an ecosystem, providing examples related to aspects of the human food supply (304-3, 111-1)

Questions

• How much of the Earth's surface can be used for growing food?
• Describe your impression of how much of the Earth's land surface is suitable for growing food.
• What can we do to ensure there is enough land for growing food?

Background

Soil is the basis of agriculture. The thin soil layer on the Earth's surface provides the physical and chemical requirements for the plants that farmers grow. Good agricultural soil is a limited resource on Earth—it is estimated that about 3% of the Earth's surface is suitable for farming. Activity 1.3 shows this graphically.

Soil is a dynamic mixture of rock, minerals, chemicals, air, water, organic matter, and living organisms. The location of a farm determines some of these components, but good management of soil can improve others and optimize productivity on a farm. In Nova Scotia, about 70% of the land is not suitable for farming. However, there is room for more farming on the 30% that is suitable. Right now only about 4.5% of the province is actively farmed.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Industry Overview, p. 5
- Figure 1: Land use in Nova Scotia, p. 6
- Environmental Stewardship on Farms, p. 103
- Soil Management, p. 105

Materials

• Apples (one for demo and more to eat!—check for food allergies first)
• Knife (for teacher)
• Activity Sheet 1.3A
• Crayons or markers
• Scissors

Procedure

• Hand out copies of Activity Sheet 1.3A to each student. Using scissors, students can follow the teacher demonstration by cutting the apple diagram into pieces to match what the teacher is doing. Alternately, students can colour in the sections of the apple diagram as the teacher cuts up the apple.

• Ask the students how much of the Earth's surface they think can be used for agriculture.

• Using an apple to represent the Earth, cut the apple into four quarters.

• Ask if oceans can be used for agriculture (a discussion of aquaculture may develop here). Set aside three-quarters (3/4) of the apple, representing the oceans. The remaining quarter (1/4) represents all the land on Earth.

• Cut the remaining quarter into four parts—sixteenths (1/16).

• Discuss how one-sixteenth of the land represents all the mountains on Earth.

• Discuss how one-sixteenth of the land represents all the deserts on Earth.

• Discuss how one-sixteenth of the land represents tundra, ice-caps, and other non-arable portions of the Earth's surface.

• Discuss how the remaining one-sixteenth represents all the land suitable for growing crops.

• Cut this one-sixteenth into two parts—thirty-seconds (1/32).

• One of these thirty-seconds represents land that could produce crops, but is currently occupied by cities, highways, and other structures.

• The remaining section (1/32) forms about 3% of the apple's (Earth's) surface and represents all of the land that can be used for growing crops.

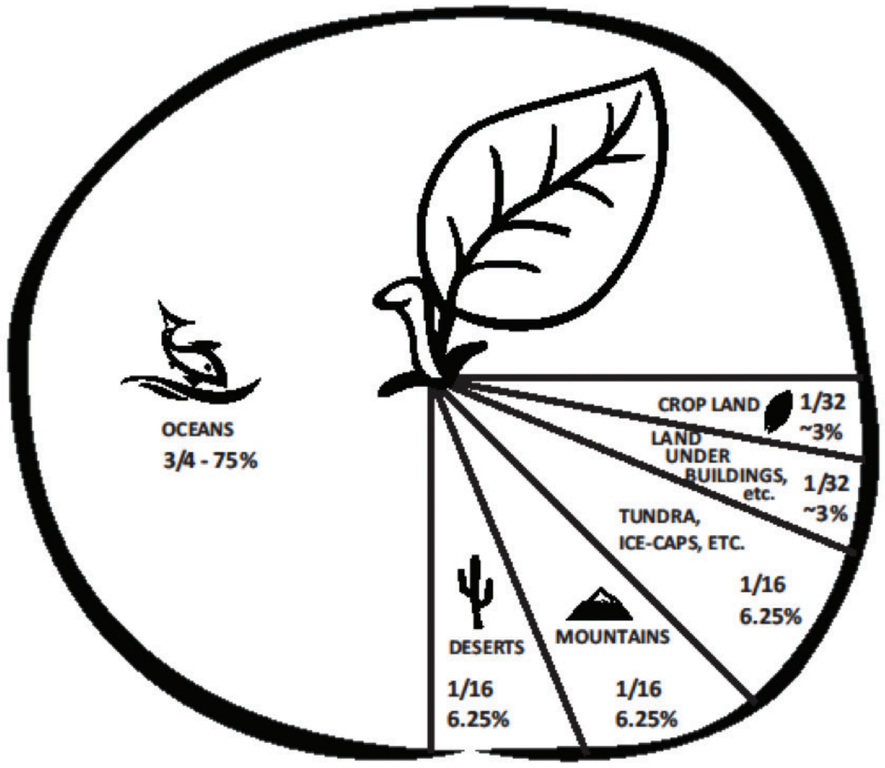
Extensions

• Explore environmental farm practices and discuss sustainable practices being used by farmers.

Activity Sheet 1.3A

Earth as an Apple

Follow the teacher demonstration by colouring or cutting out the appropriate pieces.



1.4 Make It Butter!

Did you know?

The average dairy cow in Nova Scotia produces about 28 litres of milk a day—and drinks at least 75 litres of water a day to do it!

Outcomes

SCIENCE 2

• select and use solids, liquids, and appropriate tools to create new materials that have characteristics different from the original components (100-19, 200-4, 201-3, 100-20)

SCIENCE 5

• observe and identify changes in an object's appearance, state, and/or reversibility and classify it as a physical change or not (301-9, 205-5, 301-10)

Questions

• How is butter made from dairy cream?
• How does shaking cream make butter?
• Are there any uses for the buttermilk left over from butter-making?
• How does salt change the taste of butter?

Background

Milk is a liquid made up of water, fats (lipids), proteins, carbohydrates, vitamins, and minerals. In whole raw milk, milk fats separate and rise to the top of the milk container as cream. Dairies use a centrifuge to separate the milk components and then pasteurize (to kill bacteria) and homogenize the milk (to break the fat into tiny globules so it does not separate out easily). Shaking the cream in this exercise causes the tiny fat globules to stick together, forming butter and buttermilk. Salt is sometimes added to preserve and flavour the butter.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Industry Overview, p. 5
• Dairy, p. 42

Materials

- Whipping cream—at least 35% milk fat (M.F.)
- A new 50 ml food-grade container with tight fitting lid
- Popsicle stick
- Activity sheet 1.4A

Procedure

- Wash hands with soap and water.
- Pour approximately 10 ml of whipping cream into the container.
- Secure the lid to the container.
- Vigorously shake the sealed container for 5–10 minutes. (A ball of butter should begin to form in the container as a result of milk fats sticking together.)
- Pour off the liquid (buttermilk) and rinse the butter with cold water.
- Examine the butter.

Extensions

- Butter contains some water, proteins, and vitamins. After heating and cooling butter, the proteins will become visible on the surface and at the bottom of the butter container.

- Experiment with butter-fat creams of different percentages to determine the effect of concentration upon the process.

- Vary the temperature of the cream used in the experiment. How would this affect the state of the milk fat and the butter-making process?

- Research the milk fat (M.F.) content of various dairy products.

- Use your butter on some food, such as crackers. (Do be aware of dietary restrictions or allergies.)

- Most of the butter sold today is salted. Stir in a small amount of salt with the popsicle stick and taste again.

Activity Sheet 1.4A

Make It Butter!

STEPS TO MAKE BUTTER

- Wash hands with soap and water.
- Pour 10 ml of whipping cream into container.
- Secure lid to container.
- Vigorously shake sealed container for 5–10 minutes.
- Pour off the liquid (buttermilk) and rinse the butter with cold water.

In what state is the milk?	How did the shaking help make butter?
In what state is the butter?	Dairy Product — % M.F. Cheese Yogurt Ice cream Frozen yogurt Homogenized milk Skim milk

1.5 How Hungry Are You?

(How much food do we consume in a year?)

Did you know?

There are about 4,000 farms in Nova Scotia, producing everything from apples to zucchini, beef cows to yogurt.

Outcomes

HEALTH EDUCATION 2

• 2.5 examine "Canada's Food Guide" and demonstrate an understanding that foods within each of the four food groups provide different nutrients that help us grow, develop, learn, play, be active, and keep healthy

HEALTH EDUCATION 3

• 3.2 demonstrate an awareness that people living in their province have values, traditions, and beliefs that influence food choices

• 3.4 demonstrate an understanding that the healthiest foods come from natural sources, and differentiate between whole and processed foods

Questions

• What are some types of food we eat?
• How much of each type do Canadians consume on average in one year?
• How has our diet in Canada changed in the last 30 years?
• Which changes help to improve our health?

Background

Eating well means supplying your body with the energy and nutrients it requires. The types of food a person eats depend on such factors as preferences, availability, and price. The amount a person needs to eat depends on age, body size, gender, and activity level. "Canada's Food Guide" provides lower and higher numbers of servings for each food group, providing for the various needs of individuals.

The diet of Canadians has changed over the years. Statistics show that we are making some different choices for our food baskets. A good place to look for wholesome Nova Scotian farm products is at www.selectnovascotia.ca.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Industry Overview, pp. 5–15
- Agricultural Sectors, pp. 21–102

Materials

• Copies of Activity Sheet 1.5A for each group of students
• Pencils

Procedure

• Make a copy of the activity sheet for each student or group of students.

• Ask students to compare consumption numbers for 1981 and 2009 and to draw an arrow for each to indicate an increase or decrease.

• Ask students to say whether they think the change has a positive, negative, or neutral effect on health. Discuss their reasoning.

• Have the students discuss how farmers could use this information to plan what their farm should produce.

CANADIAN FOOD CONSUMPTION PER PERSON PER YEAR

Food	Consumption (1981)	Consumption (2009)
Vegetables (fresh, canned, frozen, juices)	92 kg	102 kg
Fruit (fresh, processed, frozen, juices)	79 kg	87 kg
Grain products	44 kg	57 kg
Soft drinks (pop)	57 litres	72 litres
Oils and fats	16 kg	18 kg
Red meat	32 kg	23 kg
Poultry meat	9 kg	13 kg
Fluid milk	72 litres	57 litres
Cheese	7 kg	10 kg
Ice cream	9 litres	3 litres
Yogurt	1 litre	5 litres
Eggs	14 dozen	13 dozen
Pulses and nuts (pulses = beans & peas)	7 kg	8 kg

Source: Food Statistics 2009, Catalogue no. 21-020-X
http://www.statcan.gc.ca/pub/21-020-x/21-020-x2009001-eng.pdf

Activity Sheet 1.5A

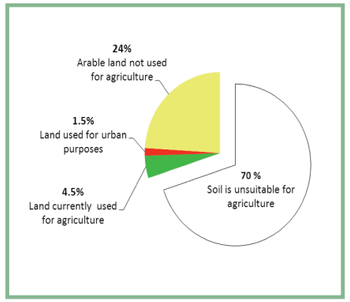
How has the diet of Canadians changed in 30 years?

Food	Consumption in 1981	Consumption in 2009	Increase or decrease?	Does this matter to our health?
Vegetables	92 kg	102 kg		
Fruit	79 kg	87 kg		
Grain products	44 kg	57 kg		
Soft drinks (pop)	57 litres	72 litres		
Oils & fats	16 kg	18 kg		
Red meat	32 kg	23 kg		
Poultry meat	9 kg	13 kg		
Fluid milk	72 litres	57 litres		
Cheese	7 kg	10 kg		
Ice cream	9 litres	3 litres		
Yogurt	1 litre	5 litres		
Eggs	14 dozen	13 dozen		
Beans, peas & nuts	7 kg	8 kg		

1.6 Agricultural Areas in NS

Did you know?

In Nova Scotia, only about 30% of the land is considered suitable for farming. Currently, there are about 4,000 farms on about 400,000 hectares. This represents only about 4.5% of the province.



Outcomes

SCIENCE 3

- ask questions and make predictions that lead to exploration and investigation about the composition of soil (200-1, 200-3)

SOCIAL STUDIES 3

- 3.1.2 describe the major physical features, climates, and vegetation of their province and region

Questions

- Are some types of weather and soil better suited for agriculture than others?
- Where are the warmer areas and the best agricultural soils in Nova Scotia?
- How has the Plant Hardiness map changed from 1967 to 2000? What would cause this change?
- Is the agriculture in Nova Scotia located mainly in areas of higher plant hardiness and more suitable soil?

Background

Soils are based on parent rock material and climate. Parent rock material is broken down into smaller particles through weathering and chemical reactions. This process is also affected by the atmosphere and by plant and animal life.

There are four main components of soil: sand, silt, clay, and organic matter. Most soils contain a combination of these components. Soils are classified according to their texture (feeling) or predominant component. There are many different types and textures of soil found across the various landscapes in Nova Scotia. While not all soils are suitable for agriculture, there are a wide variety of other uses, such as forestry, mining, residential, industrial, recreational, etc.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Industry Overview, pp. 5–15
- Figure 1 Land use in Nova Scotia, p. 6

Materials

Computer and Internet access

Procedure

• Visit the website http://atlas.agr.gc.ca/agmaf/ to see a map for Plant Hardiness Zones of Canada and Thematic Soil Maps of Canada.

• From the left-hand menu, Go to a region, select Nova Scotia.

• In the Map display menu, click box for Reference Features, then for Populated Places, which will show provincial capitals.

• Under Map display menu, select Plant Hardiness Zones of Canada; from there, select Plant Hardiness Zones 2000 and Plant Hardiness Zones 1967

• Observe various zones in Nova Scotia. What range of zones do you find?

• Now go to Choose map collection (on top right): select Soils of Canada

• Under Map display menu on left, select Thematic Soil Maps of Canada, and then select and examine various options: Local Surface Form, Soil Drainage, Soil Orders, etc.

• How do these maps compare to those for the Plant Hardiness Zones?

• Under Map display menu for Thematic Soil Maps select from Reference Features the SLC 3.0 Agricultural Extent (outline), which displays agricultural areas of Nova Scotia.

• How do the agricultural areas compare to Plant Hardiness Zones, Local Surface Form, and Soil Drainage?

Extensions

• Investigate other parts of the website for more information about soils.

• Other sites where you can find more information on soils:

Soils of Canada: http://www.soilsofcanada.ca/

The Canadian System of Soil Classification: http://sis.agr.gc.ca/cansis/taxa/cssc3/index.html

• Find where your school is located and draw conclusions about whether it is generally a good location for agriculture.

• Explore soil components using the kit, "Lunch Box for Plants," available from the Nova Scotia Department of Agriculture:novascotia.ca/agri/programs-and-services/educational-resources/teacher-resources/elementary/#lunchbox. Bring soil samples from your area and compare them to the soils in the kit.

1.7 What's *Growing* on Here?

(Growth patterns of plants)

Did you know?

Nova Scotia farmers grow over 50 types of vegetables. They need to know a lot about plants to do it well.

Outcomes

SCIENCE 3

• identify and describe parts of plants and their general function (100-28)

• identify, investigate, and suggest explanations for life needs of plants and describe how plants are affected by conditions in which they grow (100-29)

• observe, describe, and measure, using written language, pictures, and charts, changes that occur through the life cycle of a flowering plant (201-3, 203-3, 202-4)

• observe and describe changes that occur through the life cycle of a flowering plant (100-30)

• describe and respond to ways in which plants are important to living things and the environment and how the supply of useful plants is replenished (102-12, 102-13, 203-5)

SCIENCE 7

• describe essential conditions to the growth and reproduction of plants and microorganisms in an ecosystem, providing examples related to aspects of the human food supply (304-3, 111-1)

Questions

• What are the similarities and differences in the growth patterns of plants?
• In different plants, do the first leaves look different from those that appear later?
• What are the similarities and differences in mature leaves, stems, and roots of different plants?

Background

While plants may be propagated in a number of ways, including cuttings, division, grafting, and tissue culture, many of the plants we grow are started from seed. Seeds contain a food supply (endosperm) for the embryonic plant they contain. The developing seedling uses the endosperm until it can actively make its own food through photosynthesis.

Plants differ in the way they grow and develop, and generally they are divided into two groups based on the number of seed leaves (cotyledons) they have. The seed leaf is the first leaf that emerges from the seed upon germination. Monocots have one seed leaf, while dicots have two seed leaves. There are many differences between monocots and dicots, several of which the students may be able to identify:

MONOCOTS
- one seed leaf
- first leaf similar to later leaves
- single unbranched stem
- leaf veins straight up and down leaf

DICOTS
- two seed leaves
- first leaf different from later leaves
- usually branched stem
- leaf veins look netlike

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Apples and Other Tree Fruit, p. 22
- Blueberries, p. 33
- Cranberries, p. 40
- Fruit Crops (Other), p. 54
- Forage Crops, p. 51
- Grains, p. 62
- Greenhouse Industry, p. 68
- Vegetable Crops, p. 97

Materials

- Seeds of 1) corn, wheat, or grass; 2) broccoli or tomato; 3) peas; 4) beans
- Potting soil
- 15 cm pots (You can use 2-litre milk cartons with the tops cut off. Make sure there are a few small holes in the bottom of the pot for drainage.)
- A bright window sill or artificial light source
- Measuring devices
- Activity Sheet 1.7A

Procedure

- Students can work in small groups to prepare one pot.
- Fill pots to within 2 cm of top with moistened potting soil.
- Plant the 4 seeds of each plant type in each pot. Seeds should be planted to a depth of 4 times the seed diameter.
- Keep them where the temperature is above 22oC and provide adequate light.
- Water regularly to keep the soil damp, not soggy.
- At least once a week, record observations on the Activity Sheets, starting when the plants first emerge from the soil.
- Encourage students to look for: whether the seed leaf lifts above the level of the soil or not; whether the plant has one or two leaves in the early stages; how many leaves they have; what colour, shape, length, width, and texture the leaves have; whether the stem is straight or branching; and any other observations they may make.

- At the end of the period of observation of the plants, gently remove them from the soil and examine their roots for similarities and differences.
- Sketch or photograph plants as they grow and make the pictures into a presentation.
- If the plants are not directly under a light source, you may have to turn the pots so that the plants don't lean too much toward the light.

Extensions:

- Investigate different food crops and try to discern why some are appropriate for growing in Nova Scotia and some are not. In this investigation consider the length of growing season, average daily temperature, soil types, moisture, and any other factors that students suggest. Consider the use of greenhouses in winter.

Activity Sheet 1.7A

Plant Growth Observation

GROUP:				
KIND OF PLANT:				
	OBSERVATIONS – DRAWINGS – MEASUREMENTS			
DATE	seed	first leaves	stem	true leaves

2.1 Grocery Ad Flyer

Did you know?

The local food movement has created a demand for local products, which has room to grow!

Outcomes

HEALTH EDUCATION 4

1.3 demonstrate an awareness that values are an integral part in making healthy decisions and fostering healthy behaviour

MATH 4

B1 add and subtract decimals involving tenths and hundredths, and whole numbers to five digits

VISUAL ARTS 4

1.3 use a combination of the visual elements and principles of art and design in art making

Questions

- How is a grocery store advertising flyer constructed to encourage people to go to a store and buy groceries?
- Can you design your own grocery store flyer to advertise Nova Scotian grown and processed commodities?

Background

In recent years there has been an increased interest in locally produced foods. While grocery retailers are recognizing the interest and providing some local food opportunities, most of the demand is being met through direct marketing, such as at farmers' markets, and through growing interest in Community Shared Agriculture (CSA) and urban agriculture.

Visit:

- selectnovascotia.ca/
- farmersmarketsnovascotia.ca
- acornorganic.org

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Agriculture in Nova Scotia, p. 2
- Agricultural Marketing Opportunities in Nova Scotia, p. 4

Materials

- Activity Sheet 2.1A
- Grocery store advertising flyers
- List of Nova Scotia commodities and/or food products
- Paper
- Coloured markers or coloured pencils
- Glue

Procedure

- Work in groups of 3 or 4 students.
- Review advertising flyers from at least two different grocery stores.
- Make lists of the ways in which the flyers compare and contrast.
- Develop a list of foods produced in Nova Scotia that your group would like to see in your flyer. Divide the workload so that various group members have specific jobs to do. (For example, one person will look after meat and meat products, while another will look after fresh fruits and vegetables.)
- Gather images of food products (draw, cut from flyers, and/or take digital photos).
- Decide on pricing and do a layout of your Nova Scotia food flyer.
- Share your food flyer with other groups and discuss what you like and what you might change about each group's flyer.

Extensions

- Invite a person from an advertising agency to visit your class and give a presentation on advertising.
- Use a computer to design and construct your flyer, using your own digital photographs.
- Shop for a week's groceries from each flyer and decide who has the best buys of the week.
- Identify locally produced foods in your flyer.

Activity Sheet 2.1A

How do the flyers compare and contrast?

Comparison	Contrast

Can you find products produced in Nova Scotia? What are they?

What sections would you have in your flyer?

2.2 Making Ice Cream

Did you know?

Milk processors in Nova Scotia produce approximately 40 million litres of ice cream annually.

Outcomes

SCIENCE 2

• select and use solids, liquids, and appropriate tools to create new materials that have characteristics different from the original components (100-19, 200-4, 201-3, 100-20)

SCIENCE 5

• observe and identify changes in an object's appearance, state, and/or reversibility and classify it as a physical change or not (301-9, 205-5, 301-10)

Background

Adding salt to the ice lowers the freezing point of water to -11 oC. Heat energy is transferred easily from the milk through the plastic bag to the salty ice water, causing the ice to melt. As the ice melts, the water and the milk freeze, resulting in ice cream, which freezes at -6 oC.

Questions

• Which kind of home-made ice cream has the greatest consumer appeal?
• Which ice cream has the highest consumer appeal score in your group? Which has the highest in the class?
• Are there other criteria that you could include to rate the ice cream?

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Agriculture in Nova Scotia, p. 2
• Agricultural Marketing Opportunities in Nova Scotia, p. 4
• Dairy, p. 42

Materials

• Activity Sheet 2.2A
• Ice cream recipe
• Milk or cream products (skim, 2%, whole milk, blend, coffee cream and/or whipping cream)
• Sugar
• Vanilla extract
• Rock salt
• Ice
• Small and large plastic re-sealable freezer bags
• Duct tape
• Bath towels to wrap around the freezer bags
• Sample cups and spoons, or mini cones (6 per student)

Procedure

Working in groups of 6 people, have each group member make the ice cream recipe using different milk products: skim milk, 2 % milk, whole milk, blend, coffee cream, and whipping cream.

ICE CREAM RECIPE:

• In a small re-sealable freezer bag, measure:
  500 ml milk or cream product
  60 ml sugar
  1 ml vanilla extract

• Zip the bag shut, then seal with a strip of duct tape.
• Place the bag and ingredients inside a large re-sealable freezer bag.
• Add enough ice to almost fill the larger bag.
• Pour approximately 250 ml of rock salt over the ice.
• Zip the large bag shut and seal with duct tape.
• Wrap in a bath towel and shake gently for 10 minutes.
• Open the outer bag and remove the inner bag.
• Wipe it off carefully so that no salt gets in the ice cream.
• Open the bag and serve the ice cream.

THINGS TO NOTE:

• 1 bag of ice will freeze 3 bags of ice cream.
• 2 kg of salt equals around 2 litres of salt.
• 1 recipe makes around 550 ml of ice cream.

• Have each group member sample all 6 ice creams they created.
Be aware of food allergies and sensitivities that may exist.

• Have each group member assess general appearance, taste, and texture. Confirm a mark from 1 to 6 (6 indicating the best) in each category.

• Total your group results.

• Combine the totals assigned by each group for each category.

• Construct a suitable graph to show the results.

Extensions

• Calculate the cost of each type of ice cream and record on the chart.

• Compare your list of ice cream ingredients with those of commercially made ice cream. Investigate the function of ingredients that are different.

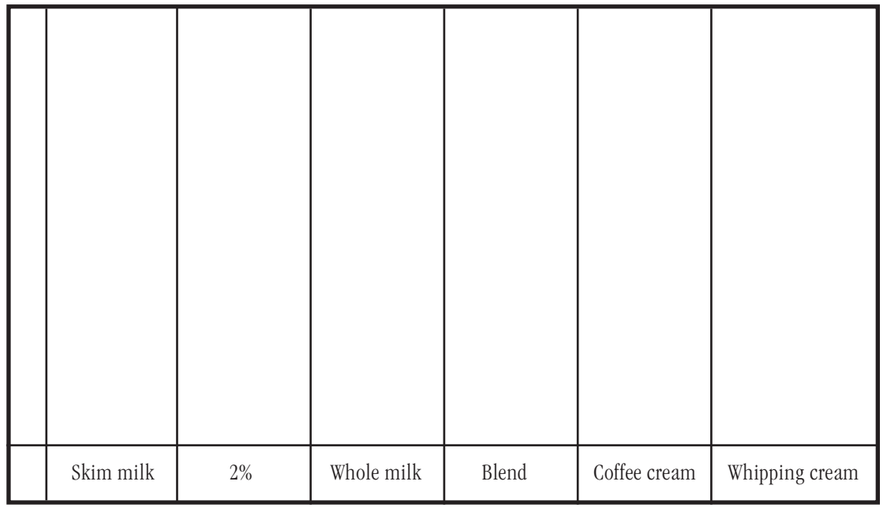
• Add other ingredients, such as chocolate flavouring, sprinkles, chocolate chips.

Activity Sheet 2.2A

Rate each ice cream from 1–6

MADE FROM	HOW DOES IT LOOK?	HOW DOES IT FEEL?	HOW DOES IT TASTE?
Skim milk			
2%			
Whole milk			
Blend			
Coffee cream			
Whipping cream			
Total			

Graph your results



2.3 A Real Grind

(Grind wheat and sort flour components)

Did you know?

Wheat grown for human consumption in Nova Scotia is sold to Dover Mills in Halifax or Speerville Mills in New Brunswick for processing into flour.

Outcomes

SCIENCE 5

• describe nutritional and other requirements for maintaining a healthy body; and evaluate the usefulness of different information sources in answering questions about health and diet (206-4, 302-9)

HEALTH EDUCATION 5

• 1.5 demonstrate an understanding of the basic nutrients found in food and the function they serve within the body

HEALTHY LIVING 7

• 7.22 recognize the characteristics of supportive environments within various community contexts for healthy eating, environmental sustainability, physical activity, and non-use of tobacco and alcohol

Questions

• What are the components of wheat and how are they used?

• Identify the following: whole grain, bran (the light-weight, largest particles), shorts (small bran flakes), wheat germ (the yellow coloured specks), flour (the finest part).

• What components are used for whole wheat flour, white flour, and wheat bran?

• Why is the germ kept out of the flour?

• What are the shorts used for?

Background

Grains, also known as cereals, are the seed heads of grass plants. Wheat, along with barley, oats, rye, and corn, are grains grown in Nova Scotia. Most of the grain grown in Nova Scotia is for animal feeds, but a small amount is grown for milling.

A kernel of grain has three components: the starchy interior or endosperm; the protective seed coat or bran; and the embryo or germ, which can germinate into a new plant. Whole wheat flour contains all three components, while white flour contains only the endosperm.

Flour and other by-products are made from grains through a process known as milling. Milling results in a mixture of particles of different sizes that separate into white flour, which is mostly endosperm and will

be caught in a 100-mesh sieve; shorts, which consist of germ, coarse endosperm, and fine bran and will be caught by a 30-50 mesh; and bran, which is caught in coarser sieves.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Grains, p. 62

Materials

- Whole wheat seeds
- Coffee grinder or mill
- Sieves of various coarseness 100, 50, greater than 30 mesh

Procedure

- Obtain whole wheat seeds.
- Use a coffee mill to grind the wheat fine enough to sieve.
- Sieve the components of the wheat flour and place them on paper for observation.

Extensions

- Make enough flour to make a loaf of bread or some muffins.
- Grind other whole grains, such as rye, barley, and oats, and compare the products.

Investigate the steps that wheat goes through in a commercial flour mill.

- Visit these websites:

North American Millers' Association: www.namamillers.org

Health Canada: http://www.hc-sc.gc.ca/fn-an/nutrition/whole-grain-entiers-eng.php

2.4 The Farmer's Daily

Did you know?

Agricultural publications in Atlantic Canada include Farm Focus, Rural Delivery, and Atlantic Beef, and daily highlights are available at atlanticfarmer.com.

Outcomes

SCIENCE 5

- using a variety of sources, gather information to describe the key features of weather systems and identify weather-related technological innovations and products that have been developed by cultures in response to weather conditions (107-14, 205-8, 302-11)

SOCIAL STUDIES 5

5.1.1 demonstrate an understanding of the concept of society

- provide examples of societies (past and present)
- identify some common features of societies

VISUAL ARTS 5

- 1.1 express themselves in relation to the world through art-making
- 1.2 develop ability and initiative in the use of techniques, technologies, materials and equipment

INFORMATION AND COMMUNICATION TECHNOLOGY INTEGRATION 4-6

PTS 6.4 (relates to 3.1, 3.3)

- conduct simple research, then plan and create a representation of their learning, such as a storyboard, a multimedia presentation, an audio recording, a web page, or a print publication independently and in collaboration with others

RPSD 6.4 (relates to 3.4)

- complete short, clearly defined research tasks, assessing information selected from several sources beyond paper and print-based media, with some teacher assistance

Questions

- What kind of information is found in an agricultural newspaper?
- How much [What?] effort goes into publishing a small newspaper?

Background

The availability of a range of media enables farmers to keep informed about news and trends in their industry. It helps farmers to stay up-to-date, alerting them to things they need to know to make decisions and helping them to develop expertise.

Materials

- Some sample agricultural newspapers
- Access to the Internet

Procedure

Have your class make a farm newspaper. This can be done in small groups by assigning one aspect to each group and assembling a final product. Here are some ideas you might want to consider:

- A feature agricultural story concerning Nova Scotia that has been in the news recently.

- An editorial in which a journalist voices an opinion about agriculture.

- "Commodity Corner," featuring research on one or more of the main types of agriculture in Nova Scotia.

- "A Day in the Life"—interview a farmer. This could be done by telephone, or, better yet, have some students visit a farm to conduct the interview.

- The entertainment section could feature jokes or cartoons with an agricultural theme. It could also contain a review of a book or movie that has an agricultural setting. Another idea might be to describe a farm vacation.

- Farmers need a weather forecast so they know what weather conditions to expect. High and low temperatures and the prediction for the next few days are important. This section could contain articles about weather and agriculture, e.g., how a drought, flood, or ice storm has affected a farm.

- A heritage page could show how agriculture in Nova Scotia has changed over the years. "Then and Now" comparisons might be made, a historical artifact drawn and explained, or the changing ways of life for farm families discussed.

- No paper is complete without advertisements. Students could learn how to create advertisements for selling produce, livestock, or equipment (e.g., harvesting machinery or feed equipment), informing potential customers what's new and what's on sale.

Extensions

Send one or two of your best articles to an agricultural newspaper to be published.

2.5 No More Broken Eggs

(Design and construct a new egg carton)

Did you know?

Over 20 million dozen eggs are produced in Nova Scotia annually.

Outcomes

SCIENCE 5

- demonstrate and describe the effect of increasing and decreasing the amount of force applied to an object (303-14)

VISUAL ARTS 5

- 2.1 work individually and collaboratively to apply learned skills, solve problems, and express ideas

Questions

- Can a simple protective capsule be constructed to keep an egg from breaking when dropped from increasing heights above the floor?

- What design features best protected the egg during the drop?

- Can these design features be adapted for a one dozen egg package?

Background

While an egg shell forms a natural package, it is a very fragile one. Even when handled very carefully damage can occur. To prevent loss, eggs must be protected with packaging and handled with care.

Egg cartons are very important to the delivery and maintenance of a quality product for the consumer. Packages serve many purposes in protecting eggs from micro-organisms, predators, moisture loss, tainting, harmful temperatures, and crushing during handling, storage, and transport.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Eggs, p. 48

Materials

Each group requires:
- Activity Sheet 2.5A
- 30 plastic drinking straws
- 1 fresh raw egg
- 1 m of masking tape
- Newspaper (for egg to land on when dropped)
- Ladder
- Measuring tape

Procedure

- Divide into groups.

- Using the plastic drinking straws and masking tape, design and build a capsule for the egg.

- The design should allow a raw, intact, grade 'A' large egg to fit inside.

- Starting at 0.25 m from the floor, each group will drop its protected egg.*

- Eggs that make it through each round without cracking continue on to a greater height. Keep increasing height of drop by 0.25 m increments until a winner is determined.

- Points may be awarded for each height from which the egg survives being dropped.

*Broken or cracked eggs should be placed in the green bin.

Extensions

- Instead of using drinking straws, leave the materials open to 'anything goes.'

- Might the design features be adapted to egg-packing facilities in Nova Scotia?

- What impact might a new egg container have on marketing, shelf space in grocery stores, and cost of production?

Activity Sheet 2.5A

Egg-drop Design and Scoring Sheet

DRAW YOUR DESIGN	HEIGHT OF DROP	SCORE
	25 cm	
	50 cm	
	75 cm	
	100 cm	
	125 cm	
	150 cm	
	175 cm	
	200 cm	
	Total score	

2.6 The Price of Processing

(How much are you paying for the processing of food?)

Did you know?

Nova Scotia processed products range from blueberry juice to feta cheese, from apple pies to herbal extracts, from ice cream to pasta sauce, from potato chips to gourmet chocolates. Approximately 4,700 Nova Scotians are employed in the food and beverage manufacturing sector (excluding fisheries and seafood manufacturing).

Outcomes

SCIENCE 5

• describe nutritional and other requirements for maintaining a healthy body, and evaluate the usefulness of different information sources in answering questions about health and diet (206-4, 302-9)

HEALTH EDUCATION 5

• 1.5 demonstrate an understanding of the basic nutrients found in food and the function they serve within the body

MATH 5

• D6 solve simple problems involving volume and capacity

• F7 explore relevant issues for which data collection assists in reaching conclusions

Questions

• How do various foods compare in cost per kg or cost per litre?
• Do processed foods cost significantly more than unprocessed foods?
• How much are you paying for the convenience provided by the processing?

Background

A processed food is any food other than a raw agricultural commodity, food altered from its natural state. Foods may be processed to prevent spoilage, to ensure safety, or to enhance their appeal, convenience or nutrition.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Careers in Agriculture, p. 16

Materials

• Computer access and/or grocery store flyers
• Recent grocery store receipts
• Data concerning weights or volumes and pricing of food items

Procedure

• Make lists of comparable food items, such as whole chicken, cut up chicken (drumsticks, thighs, wings, breast), deboned chicken parts (drumsticks, thighs, wings, breast), and processed chicken strips.

• Include beverage items like milk, pop (various brands), chocolate milk, fresh juice, frozen juice, fruit-flavoured drinks, and water.

• Use grocery store flyers or visit a grocery store to price the items and find out the weight or volume of each item.

• Determine the cost per kg or cost per litre of your items.

• Draw bar graphs to compare each of your food items.

• For each unprocessed item, find or determine its processed counterpart's price per unit.

• Process food yourself at home to find out how long the processing takes you.

• Determine the cost difference between processed and unprocessed items.

• Multiply the cost difference by the time in hours taken to process the food to determine your hourly wage for processing.

• A suggestion: compare the cost per kg for a block of mozzarella cheese vs. that for shredded mozzarella cheese used for pizza, or the cost of whole vs. chopped vegetables.

• Show your results to the rest of the class and discuss the implications.

Extensions

• If each student does a different food item the class can collate the results and create a graph using spreadsheet software for the whole class.

• Try weighing the liquid items so that all food items can be compared on a cost-per-kilogram basis.

2.7 Fruit vs. Vegetable—Around the World

Did you know?

In Nova Scotia apples and blueberries are the largest fruit crops, while carrots and onions are the largest vegetable crops.

Outcomes

SOCIAL STUDIES 6

- 6.2.1 compare climate and vegetation in different types of physical regions of the world

- identify and locate on a world map types of physical regions, such as polar regions, rainforests, deserts, and grasslands

- 6.2.3 compare the use of resources and sustainability practices between Canada and a selected country

- give examples of similarities and differences in the use of resources and sustainability practices between Canada and the selected country

- explain reasons for different perspectives on the use of resources and sustainability practices

Questions

- What are the differences between fruits and vegetables?

- Are some of the foods we eat really fruits, although we call them vegetables, and vice versa?

- Before discovering the botanical definitions of fruits and vegetables, what criteria were you using to classify them?

- Discuss the implications of using the botanical definitions of fruits and vegetables.

- What features made samples easy or more difficult to categorize as fruit or vegetable?

- What samples were incorrectly categorized, and what evidence did you use to help you determine where to place the samples?

- What fruits and vegetables travelled the shortest distance to get from farm to plate? Which ones travelled farthest?

- What factors influence where stores get their produce?

- Discuss the advantages of buying locally produced fruit and vegetables. Are there any disadvantages to "buying local"?

Background

Fruits and vegetables are important to our diet. Nova Scotia farmers produce a wide variety, but many fruits and vegetables grown in other parts of the world are not grown here at all. For various reasons, including consumer choice, climate, acreage, shelf life, and storability, farmers cannot supply all that we consume, and so many fruits and vegetables are imported into Nova Scotia.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Apples and Other Tree Fruit, p. 22
- Blueberries, p. 33
- Cranberries, p. 40
- Fruit Crops (Other), p. 54
- Greenhouse Industry, p. 68
- Grapes and Wine, p. 65
- New and Specialty Crops, p. 80
- Vegetable Crops, p. 97

Materials

- Samples of fruits and vegetables grown both locally and elsewhere.
- Globe or map of the world with distance scale.
- Knife to cut fruit and vegetables.
- Botanical definitions of fruit and vegetables.

Procedure

Procure some fresh fruits and vegetables from local farmers and the grocery store. These could include:

FRUITS	VEGETABLES
tomato	potato
squash (zucchini, pumpkin)	lettuce
apples	onion
oranges	Swiss chard
grapes	broccoli
peas (in pods)	cauliflower
cucumber	carrot
green beans	garlic
peppers	radish

• Determine origin of the fruits and vegetables in the store. This will help for the part of the activity to do with the distance food travels. Try to get samples of the same fruits and vegetables from different places or countries of origin.

• If possible, include tropical fruit, such as star fruit and bananas.

• Have students develop definitions for fruits and vegetables.

FRUIT:
developed from flowers containing seeds that may grow into a new plant.
(Note: there are seedless varieties.)

VEGETABLE:
any part of a plant that is not fruit, usually consisting of roots, stems, leaves, and undeveloped flowers.

• Lay all the samples out on a clean table and ask the students to sort them into two groups, fruit or vegetable.

• Ask students if they need to reorganize the groups.

• Cut open any sample that is in question as to its group and look for evidence of seeds. (Some fruits, such as grapes and bananas, do not always have seeds, but since they are developed from flowers they are considered fruit.)

• Create a list of the fruits and a list of the vegetables and record the place of origin for each item. Use the map of the world or the globe to estimate the distance travelled for each fruit and vegetable.

Extensions

• Using software, such as Google Maps, determine the approximate distance each fruit or vegetable travelled.
• Investigate how various fruits and vegetables are handled for long-distance shipping.

Activity Sheet 2.7A

PRODUCE	FRUIT OR VEGETABLE?	PLACE OF ORIGIN	DISTANCE TRAVELLED (KM)

3.1 Controlled Ecosystems

Did you know?

Nova Scotia farmers are constantly improving their agricultural practices to make their operations more efficient and effective.

Outcomes

SCIENCE 7

• identify the roles of producers, consumers, and decomposers in a local ecosystem and describe both their diversity and their interactions (304-2)

• identify questions, investigate, and record collected data on the ecosystem's components, using materials effectively (208-2, 208-3, 210-1)

• describe interactions between biotic and abiotic factors in an ecosystem (306-3)

• describe how matter is recycled in an ecosystem and evaluate potential applications of energy transformations (306-2, 210-2)

• describe how energy is supplied to, and how it flows through, the structures and interactions in a natural system, using charts, diagrams, and terminology (306-1, 111-6, 210-3)

• describe essential conditions to the growth and reproduction of plants and microorganisms in an ecosystem, providing examples related to aspects of the human food supply (304-3, 111-1)

Questions

• What environmental conditions do farmers control or manipulate to grow their products?

• How does control or manipulation improve agriculture?

• In general terms, what are five or six conditions that farmers attempt to manage?

• Are there some conditions that are not manageable by farmers? What might be some reasons for this?

• What are some advantages to controlling environmental conditions? For farmers? For livestock? For consumers?

• What are some disadvantages to controlling environmental conditions? For farmers? For livestock? For consumers?

Background

Farm ecosystems are different from natural ecosystems because many of the conditions are controlled to maximize production, address animal welfare, and improve food quality and safety. Farming is a competitive business, and farmers are quick to adopt improvements in agricultural practices to ensure the best use of resources and provide the best possible growth conditions for crops and livestock. What works in other places does not necessarily work well in Nova Scotia.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Agricultural Sectors, pp. 21–102

Materials

• On Nova Scotia Farms: A Teacher's Guide
• Access to the Internet

Procedure

• Make a list of environmental conditions that farmers might try to control, such as temperature, amount of light, oxygen or carbon dioxide levels, water quantity, etc.

• Investigate the conditions that farmers try to manage, control, or manipulate in hatching chicks or turkeys; operating a poultry growing barn, cattle barn, and pig barn; rearing fur-bearing animals; and growing and storing cereal crops, forage crops, vegetable crops, fruit crops, and greenhouse crops.

• Design a recording page that will suit your needs. (List the commodity on the vertical axis and the conditions on the horizontal axis.)

Extensions

• Design and build a model of one of the controlled agricultural systems.

3.2 Tools for Precision Farming

Did you know?

Nova Scotia farmers use Global Positioning Systems (GPS) and Geographic Information Systems (GIS) to understand and manage their fields and infrastructure on the farm. Precision agriculture is a method that provides tools to improve agricultural practices on the farm, making operations more efficient and effective.

Outcomes

SCIENCE 8

• provide examples and a course of action of how science and technology affect personal and community needs (111-1, 113-2)

TECHNOLOGY EDUCATION 8

• 3.4 examine and communicate the importance and impact of invention and innovation

GEOGRAPHY 10

• 1.2 explain how geographers use field techniques such as surveying landscape, sampling the landscape,and recording the land use

Questions

• What are GPS and GIS?

• What is precision agriculture?

• What attributes of an environment might you want to collect if you were a farmer interested in precision agriculture?

• What effects can GPS and GIS have on modern agriculture?

Background

The Global Positioning System (GPS) is a navigation system that utilizes satellites to provide location information. This information is stored and can be managed and displayed using Geographic Information Systems (GIS).

Farmers use GPS and GIS systems in precision farming for site-specific crop management, as well as for the locations of farm buildings and fields, and for information about these resources and planning purposes.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Environmental Stewardship on Nova Scotia Farms, pp. 103–119

Materials

• Garmin GPS Unit(s)

(Other brands may be used if waypoint data can be converted to a KML file type for use with Google Earth.)

• USB connection cable

• Computer

• Internet access

• Software

Google Earth: http://www.google.com/earth/index.html

DNRGPS: http://www.dnr.state.mn.us/mis/gis/DNRGPS/DNRGPS.html

Procedure

1. REVIEW THE GPS UNITS TO COLLECT WAYPOINTS.

a. Demonstrate collecting a waypoint.
b. At the map window, press and hold ENTER to collect a waypoint.
c. Depending on the model, you can change the label for the waypoint.
d. Have the students stand at the location for 10–20 seconds per feature.
e. Save the waypoint.
f. Move to the next location.

2. INSTRUCT THE STUDENTS TO COLLECT WAYPOINTS IN A GIVEN AREA.

a. Use features such as trees, light poles, rocks, etc.
b. If possible, change the labels of waypoints to correspond to the feature at the waypoint.

3. AFTER COLLECTING WAYPOINTS DOWNLOAD THE DATA USING DNRGPS.

a. Connect the GPS unit to the computer with the data transfer cable.
b. Use the software to connect to your type of Garmin GPS.
c. Select the waypoints to download.
d. Save the waypoints as a Keyhole Markup Language (KML) file.

4. EXPORT WAYPOINTS IN KML FORMAT TO USE IN GOOGLE EARTH.

a. Remember the name and location of the KML file to use in Google Earth.

5. OPEN GOOGLE EARTH AND THE KML FILE.

6. ZOOM IN TO YOUR AREA AND SEE THE SPATIAL DATA COLLECTED BY YOUR STUDENTS.

Extensions

• Identify problems that arose while using GPS, such as multipath effects, satellite availability, satellite geometry, obstruction by tree canopy, etc.

• Identify specific applications of GPS technology to agricultural production.

3.3 Asexual vs. Sexual Reproduction in Plants

Did you know?

In Nova Scotia, plant nurseries produce 35 million strawberry plants annually through asexual reproduction.

Outcomes

SCIENCE 9

• identify questions and investigate, in the laboratory, the reproduction of plants and communicate findings (208-2, 211-2)

• distinguish between sexual and asexual reproduction in representative organisms (305-2)

• compare sexual and asexual reproduction in terms of their advantages and disadvantages (305-3)

Questions

• What are the various means of propagating plants?

• What parts of plants can be used to produce new plants?

• Why do we use asexual propagation?

• Are these cuttings genetically identical to the mother plant?

• What are the advantages and disadvantages of sexual and asexual reproduction in plants?

Background

Generally speaking there are two methods of reproduction in plants: sexual and asexual.

Sexual reproduction is the result of pollination and the production of seed. It is referred to as sexual because of the genetic contribution of both male and female gametes in producing new plants.

Asexual reproduction uses the vegetative parts of a plant to produce new plants. The new plants are genetically identical to the plant from which they are derived. Although the process may vary from plant to plant, a number of vegetative plant parts may be used in asexual propagation, such as bulbs, cloves, tubers, rhizomes, stolons, slips, and crowns. In their natural environment, not all plants can reproduce asexually, but some that naturally reproduce by sexual means may be reproduced using artificial methods of asexual reproduction, such as cutting, layering and grafting.

Most of our vegetable crops are started from seed or through sexual reproduction. Some crops, such as wild blueberries, cranberries, apple trees and many landscape ornamentals, are propagated asexually.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Apples and other tree Fruit, p. 22
- Biomass Crops, p. 29
- Blueberries, p. 33
- Cranberries, p. 40
- Forage Crops, p. 51
- Fruit crops (other), p. 54
- Grain, p. 62
- Grapes and Wine, p. 65
- Greenhouse Industry, p.68
- New and Specialty Crops, p. 80
- Nursery Sod, p. 84
- Vegetable Crops, p. 97

Materials

- Growing media (potting mix)
- 5 cm–10 cm pots (You can use 1 or 2-litre milk cartons with the tops cut off. Make sure there are a few small holes in the bottom of the pot for drainage.)
- Clear plastic
- Seeds (radish, lettuce, beans, sunflower, etc.)
- Seed potatoes or potatoes from grocery store
- Garlic bulb
- Strawberry plant or spider plant
- Vegetable plants, house or garden plants
- Sharp knife or pruners
- Rooting hormone
- A bright window sill or artificial light source

Procedure

- Procure various seeds and plant parts for propagation.
- Students may work individually or in groups.
- Wet growing media and fill pots.

SEXUAL REPRODUCTION

Have students explore the process of plant sexual reproduction that resulted in seed formation.

- Fill pots to within 2 cm of top with moistened potting soil.
- Plant seeds of each plant type in pots. Seeds should be planted to a depth approximately 4 times the seed diameter.
- Place in a bright warm location.
- Water as necessary, keeping soil moist.

ASEXUAL REPRODUCTION

FROM TUBERS—POTATO

- If you cannot obtain seed potatoes, you can use potatoes from the grocery store. These may take longer to sprout as a result of treatment with a sprout inhibitor.
- Small potatoes can be planted directly. Larger potatoes can be cut into egg-size pieces, so long as they have at least one "eye" per piece.
- Pieces can be planted directly but should be left to dry for 3–4 days before planting. Plant 4–5 cm deep with eyes or sprouts facing up.
- Place in a bright warm location.
- Water as necessary, keeping soil moist.

FROM A BULB—GARLIC

- Break apart whole garlic bulbs into cloves.
- Plant each clove approximately 2.5 cm deep, with the pointed end up.
- Place in a bright warm location.
- Water as necessary, keeping soil moist.

FROM STOLONS—STRAWBERRY OR SPIDER PLANT

- Strawberry and spider plants (mother plants) will grow runners that will produce daughter plants at the tips.
- Fill a small pot with potting mixture.
- Place the daughter plant on the potting mixture in the small pot.

• Anchor down with bent wire or bobby pin to ensure contact is maintained with potting mixture.

• Place in a warm bright location.

• Water as needed, keeping potting mixture moist.

• After a week, check by carefully lifting the daughter plant to look for root formation.

• Cut the runners when the daughter plant becomes well established.

FROM LEAF CUTTINGS—VARIOUS HERBACEOUS PLANTS

• Remove an entire mature leaf from plant.

• Cut leaf stem at an angle. Dipping the cut end in rooting hormone will increase possibility of success.

• Place moistened potting mixture in a small pot.

• Make a narrow hole in the potting mix and place the leaf petiole in the hole up to the bottom of the leaf blade.

• Firm the potting mix around it.

• Cover with clear plastic and place in a warm, bright location with indirect sunlight. Plantlets will form at the end of the cut petiole.

• After 2–4 weeks roots will have begun to form.

• In a few months the plantlets will be ready to be separated and repotted.

Extensions

• What are some other methods of asexual reproduction?

• Investigate what crops are grown in Nova Scotia. Which ones are produced through asexual reproduction and which through sexual reproduction?

3.4 Cow Patties to Kilowatts

Did you know?

Anaerobic digestion (AD) technology provides a means of generating renewable energy on farms and reducing greenhouse gas emissions, while treating manure to reduce odours and pathogens and to make more nutrients available to plants.

Outcomes

EXPLORING TECHNOLOGY 10

• 2.3 design and construct a model renewable energy system

• 2.4 manipulate and test a renewable energy system

SCIENCE 10

• design and carry out experiments, controlling variables and interpreting patterns, to illustrate how factors can affect chemical reactions (212-3, 213-2, 321-3, 214-5)

ENERGY, POWER, AND TRANSPORTATION TECHNOLOGY 11

• 4.15 distinguish the four different types of biomass and summarize how biomass can be used as an energy resource (especially wood)

• 4.17 relate the application of an alternative source of energy

• 5.1 describe how Nova Scotians produce power from the three basic energy source groups

Questions

• What agricultural sectors can contribute materials or feedstock for AD?
• What other organic materials can be used for AD?
• What are the uses of the products from AD?

Background

Anaerobic digestion mimics the biological processes that take place in the rumen of the ruminant animal's stomach. During anaerobic digestion (AD), microorganisms break down organic materials in the absence of oxygen to produce biogas, which consists primarily of methane along with other gases or impurities. Livestock farms provide a significant source of organic materials for AD, but other sources are available through the growth of energy crops and the sorting of municipal solid waste.

Throughout the 1970's energy crisis, numerous AD systems were installed on farms across North America. The majority of these systems failed. It is generally accepted that these systems were designed to be too intricate, requiring far more management and expertise than producers were willing to invest. Current systems require less management and can be fitted to monitor processes from remote locations.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Biomass Crops, p. 29
- Environmental Stewardship on Nova Scotia Farms, p. 103
- Nutrient management, p. 116
- Waste Management, p. 118

Materials

- Computer
- Internet access
- Materials to build biodigester (dependent on design)

Procedure*

- Go to YouTube at youtube.com.
- Search for "make a simple biodigester."
- Review various designs and select elements to incorporate into your design.
- Make note of necessary materials.
- Collect materials and assemble.

**The intention of this exercise is to build a model; however, the model will produce biogas through the anerobic digestion process if filled with appropriate feedstocks under the proper conditions. Biogas, which is primarily methane, is a flammable gas and requires appropriate precautions.*

Extensions

- Are anaerobic digesters being used in Nova Scotia, in other parts of Canada, and around the world?
- Are there other opportunities for renewable energy production on Nova Scotia farms?

3.5 Agricultural Issues

Did you know?

Nova Scotia agriculture has undergone important changes in the past century, which include the trend toward consolidation and specialization, the growth of a non-farming population in rural areas, and the role of technology in the development of a global marketplace.

Outcomes

Agriculture/Agri-Foods 11

- synthesize information and present your findings on the effects on farming and production from policies, regulations, and career regulations (AG-19)
- identify questions to investigate that include economy, environment, culture, and social aspects (AG-24)
- design an investigation, identifying and controlling major variables, that collects evidence from various perspectives (AG-25)
- select an investigation and use appropriate tools to perform and record information (AG-26)
- present the investigation's findings and propose a course of action, taking into account various needs (AG-27)

Questions

What are some of the issues that face the agriculture industry in the 21st century?

Background

Agriculture is a dynamic industry and a major contributor to healthy, economically viable communities across Nova Scotia. While agriculture presents many opportunities, it also faces challenges related to labour, environmental regulations, land use, markets, food security, climate change, food safety, and bio-fuels, to name a few.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Industry Overview, p. 5
- Biomass Crops, p. 29
- Environmental Stewardship on Farms, p. 103

Materials

• Computers and access to the Internet

• On Nova Scotia Farms: A Teacher's Guide, newspapers, magazine articles, pamphlets, or books relevant to the topics for discussion

Procedure

Students working in groups of 3–4 may research and discuss the problems and possible solutions associated with one of the topics listed below.

1. Is it important to produce enough food in Nova Scotia to feed our own population? Can this even be done?

2. Should our best agricultural land be set aside for food production, prohibiting cities, roads, and recreational areas from occupying those places?

3. Should the practices farmers use on their land be regulated?

4. Should farms close to cities and towns be allowed to spread manure near homes and businesses?

5. Are we paying enough for food to provide farmers with an adequate income?

6. Direct marketing is one option open to farmers. What are the implications of this?

7. Should multinational corporations be allowed to control agricultural commodities, resources, and trade around the world?

8. If we have surplus food, should we give the surplus to the poor of other countries?

9. What are the implications of a global threat to the food supply, such as BSE or Avian Flu?

10. The average age of a farmer in Nova Scotia is 55.4 (2011 Census of Agriculture). Why is this a concern and what can be done about it?

Make a point-form, short list of problems and possible solutions for your topic to share with others in your class.

Extensions

• Collect an article relevant to each topic and make a scrap book of the articles with an editorial response to each one.

3.6 Environmental Stewardship

Did you know?

Approximately 80% of registered farms in Nova Scotia have an Environmental Farm Plan.

Outcomes

AGRICULTURE/AGRI-FOODS 11

• compare and contrast the production of various farms (AG-11)

• discuss how effective management increases efficiency and responsible farming practices (AG-13)

• compare the risks and benefits to society and the environment of production while maintaining health, preventing pests and diseases, and supply and demand (AG-14)

• describe how management, production, and marketing has evolved locally and globally (AG-16)

• synthesize information and present your findings on the effects on farming and production from policies, regulations, and career regulations (AG-19)

• identify questions to investigate that include economy, environment, culture, and social aspects (AG-24)

Questions

• What practices used by Nova Scotia's farmers demonstrate environmental stewardship and will benefit farming long into the future?

Background

The Environmental Farm Plan (EFP) promotes environmental stewardship on Nova Scotia farms by educating farmers about management practices that reduce environmental impact. It is a voluntary program that helps farmers identify and assess environmental risks on their property and bring environmental considerations into everyday business decisions.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

• Environmental Stewardship on Nova Scotia Farms, pp. 103–121

Materials

- On Nova Scotia Farms: A Teacher's Guide
- Information about environmentally sound practices used in Nova Scotia
- Computer with Internet access

Procedure

You have been asked to write a news release that will inform the public about the benefits of a particular environmentally sound agricultural practice. Choose from one of the following topics:
a) Integrated pest management
b) Riparian zones and buffer strips
c) Zero tillage
d) Nutrient management
e) Waste management
f) Organic farming

Your news release should be approximately 400 words long and related to the practice—so include only the most important details. Think of a catchy headline to get the reader's attention. The opening paragraph should present what you want noticed about the topic, while more information is provided in the ensuing paragraphs. Provide a concise conclusion. Do not use unnecessary words, but support your message with statistics and/or quotations. Explain to the reader what the practice is, how the practice is environmentally sustainable, and how it will benefit agriculture. Include a photograph or illustration related to your topic that will attract the reader's attention.

Submit your news release in print-ready format (one or two columns wide, with a photograph or illustration and a catchy headline).

Although you have written a news release that promotes the beneficial aspects of a sustainable practice, are there any negative aspects to the practice?

Read actual news releases about practices other than your own. Are there any themes common to all practices for media releases visit novascotia.ca/agri and nsfa-fane.ca/news-events/media-releases-2/

Extensions

- Make a poster for one of the topics, with large illustrations and key statements about the sustainable practice.

3.7 Potato to Potato Chips

Did you know?

The agriculture sector employs about 5,200 Nova Scotians directly, and an additional 4,700 are employed in the food and beverage manufacturing sector (excluding fisheries).

Outcomes

AGRICULTURE/AGRI-FOODS 11

- identify and provide examples of Nova Scotia agricultural commodities, activities, and careers, and make connections to their lives and local to national to international communities (AG-04)

FOOD SCIENCE 12

- identify and describe science- and technology-based careers related to food science

Questions

- Who lives in your community and is directly or indirectly involved in the production, processing, and/or marketing of a food commodity?
- What does each of these people do in their work?
- Identify some of the things each person in the "potato to potato chip chain" might do as part of their job.
- Identify people who live in your local community and in your province who do these jobs.

Background

The agri-food industry provides many career opportunities. While we need more farmers, farming is not necessarily for everyone. The wide range of jobs in the Nova Scotia agri-food industry can provide a rewarding career for almost anyone.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Environmental Stewardship on Nova Scotia Farms, pp. 103–121

Materials

- Bag of potato chips as a prop
- Potato as a prop
- Career cards from Activity sheet 3.7

Procedure

• Cut out the career cards.

• Distribute one to each student in the class.

• Have the students arrange themselves in a sequence that reflects the steps required to go from having potatoes in the field to potato chips in the consumer's hand.

• Fill in the blank cards with other steps in the sequence if they arise in discussion. Some cards (such as that for a truck driver) may be needed in several places.

• Investigate and write about what each of the people represented do in their work.

Extensions

• Working in small groups, choose another commodity, such as a dairy product, and on paper develop a possible distribution sequence from producer to consumer.

• Job shadow someone with an agriculture/agri-food career, and report to the class.

• Write a cover letter for a job application in the agriculture/agri-food industry. Include the following information: the job description, your education, the reasons you are seeking the position, the qualifications and skills you possess that would make you a suitable candidate, previous experience, and the salary you expect.

Activity Sheet 3.7

Career Cards: "Potato to Potato Chips"

PRODUCER	NEW PRODUCT DEVELOPER INSPECTOR	BANKER	FOOD SAFETY	TRUCK DRIVER
QUALITY INSPECTOR	PACKAGE DESIGNERS	SHELF-STOCKER WORKER	MACHINERY MAINTENANCE DESIGNER	PROCESSING MACHINE
PROCESSING MACHINERY WORKER	SALES PERSON	ADVERTISING PERSON	BUILDING MAINTENANCE WORKER	INFORMATION TECHNOLOGY SUPPORT
WAREHOUSE WORKER	INGREDIENT	ACCOUNTANT SUPPLIER	CASHIER	STORE CLERK
STORE MANAGER	FRESH STORAGE WORKER	PACKAGING MATERIAL PRODUCTION WORKER	FUEL SUPPLIER	FIELD LABOURER
COOKS	MARKET PURCHASER	CONSUMER	MARKETING SPECIALIST	PROCESSING PLANT WORKER

3.8 What's in a Package?

(Design and construct a package for a food item.)

Did you know?

There are approximately 140 food manufacturing businesses (excluding seafood) in Nova Scotia.

Outcomes

FOOD SCIENCE 12

• 3.4 identify psychological factors used to market and develop food products

• 3.6 explain how well a product is designed to meet consumer wishes

• 4.1 explain the functions and considerations for food packaging

• 4.3 design, develop, make, and present a food product, identifying and anticipating major variables that may impact on the final quality of the product

PRODUCTION TECHNOLOGY 11/12

• 3.6 explain and demonstrate various ways of packaging, promoting, and selling a product

• 3.9 develop and implement plans for the packaging, promotion, and sale of at least one product

• 4.7 be aware that the appearances of products and their relationship to their environment is important to the consumer

Questions

• What kind of package design considerations must be made in new product development? Can these considerations be incorporated into packaging?

• Have a student panel (company executives) decide which package they will choose from all the groups' designs for the company's new product. Explain why the panel chose a particular package.

• Another way to rate the packages is to develop a rubric so that students can rate them and collate the results.

Background

Almost all of the food we eat has been processed in some way and requires packaging for a number of reasons, which include product and consumer protection, containment, portion size, convenience, marketing objectives, and the need to convey product information.

Materials

• Heavy card stock or Bristol board
• Pictures of Nova Scotia products (blueberries, strawberries, and apples) used in the pie being marketed
• Art materials for illustrating the product on a box
• Ruler or measuring tape
• Scissors
• Glue

Procedure

• The company you work for has developed a new frozen, ready-to-bake pie made from blueberries, strawberries, and apples.

• Your Package Development work group at the company has been given the task of making a prototype box for the new pie.

• On the package, you must include cooking instructions, an ingredients list, nutritional information, the weight of the product, and advertising information (pictures and text), as well as a catchy name for the product to encourage customers to buy it.

• The grocery store display case stands the box on edge, slightly tilted back so that the customer can see the whole front of the box.

Extensions

• Other product packages for new Nova Scotia products could be developed, such as frozen meat products, breakfast items, new dairy products, etc.

3.9 Importance of Agricultural Trade

Did you know?

International exports are a significant driver for the Nova Scotia agri-food sector (non-fishery), at $348 million in 2012

Outcomes

GLOBAL GEOGRAPHY 12

- 4.1 Analyse factors that affect the global production and distribution of food

AGRICULTURE/AGRI-FOODS 11

- identify and provide examples of Nova Scotia agricultural commodities, activities, and careers, and make connections to their lives and local to national to international communities (AG-04)
- compare and contrast what can be produced locally with a different global climate (AG-07)
- explore how supply and demand can affect the production of the commodity (AG-08)
- describe how funding, regulations, and quotas affect farming (AG-15)
- describe how management, production, and marketing has evolved locally and globally (AG-16)
- identify and discuss products that are produced locally and compare with similar products globally (AG-22)

Questions

- What is the extent of Nova Scotia's agricultural trade with the rest of Canada? With the rest of the world?

Background

Nova Scotia exports agricultural products to over 60 countries around the world. While the United States is our most important export destination, China is catching up and is consuming more Nova Scotia exports than all 27 European Union countries combined.

Materials

- Printed Statistics Canada reports with relevant data or access to the Statistics Canada website: www.statcan.gc.ca
- A copy of An Overview of the Nova Scotia Agriculture and Agri-Food Industry, or visit www.novascotia.ca/agri/AO0102-2010-NS-Ag-Overview-w-Appendices.pdf

Procedure

- Work as individuals or together in small groups on separate commodities.
- Using the Internet or printed reports, gather data about various agricultural commodities that are traded between Nova Scotia and the rest of Canada, and between Nova Scotia, or Canada, and other countries.
- As a class, create a concept map (either on paper or using computer software) that shows our trading partners.
- Rank Nova Scotia's or Canada's agricultural trading partners by importance (highest value to lowest), by commodity, and by total trade.

Extensions

- Data could be collected on a spreadsheet and then illustrated in a bar graph.
- Visit a grocery store or obtain grocery store flyers and find out where imported products come from. Is this information easy to obtain?
- How can we increase the export of Nova Scotia agricultural products?

3.10 I Want to Farm!

Did you know?

The average age of farmers in Nova Scotia in 2011 was 55.4 years. We must attract new people into farming to maintain and increase our current production.

Outcomes

AGRICULTURE/AGRI-FOODS 11

• identify and provide examples of Nova Scotia agricultural commodities, activities, and careers, and make connections to their lives and local to national to international communities (AG-04)

• compare the risks and benefits to society and the environment of production while maintaining health, preventing pests and diseases, and supply and demand (AG-14)

• identify and describe careers and technologies that rely on and develop to aid industries and production of the commodity (AG-09)

• describe how management, production, and marketing has evolved locally and globally (AG-16)

• identify and describe processes on how to get the product to the consumer (AG-17)

ENTREPRENEURSHIP 12

• 2.2 gather information, evaluate entrepreneurial ideas for a business or venture, and make informed decisions

Questions

I want to farm—what is involved?

Background

Agriculture contributes significantly to Nova Scotia's economy. Growth in demand for locally produced food and demand abroad for high-quality, high-value agricultural exports are creating more opportunities than ever before.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Agricultural Sectors, p. 21–102
- Environmental Stewardship on Nova Scotia Farms, pp. 103–121

Materials

• Computer and access to Internet

• On Nova Scotia Farms: A Teacher's Guide—available online at www.novascotia.ca/agri/programs-and-services/educational-resources/teacher-resources/

• Think Farm Guide for Beginning Farmers available online at www.novascotia.ca/agri/programs-and-services/business-development/thinkfarm/

• Presentation software, Bristol board or display board

• Paper

• Coloured markers or coloured pencils

• Glue

Procedure

• In groups of three or four, review On Nova Scotia Farms: A Teacher's Guide and Think Farm for ideas about possible crops and/or livestock that may be farmed in Nova Scotia.

• Choose a commodity you are interested in growing on a farm and report your idea to your teacher. Each group should have a different commodity.

• Your group may then:

• develop a farm name and logo

• draw a farm map to scale, with buildings and field locations suited to your commodity

• list the environmental stewardship practices you will be following on your farm

• make up a seasonal calendar indicating events on your farm, such as "early spring—prepare fields for planting corn"; "early summer—make winter feed (hay)"; "fall—pick apples"

• list some challenges you expect to face

• create a list of contacts and resources to learn more about your commodity

• create a marketing plan for your commodity

• prepare a display of your information for others in the class to view —free-standing (similar to a science fair display), poster, or digital slides

• As a class, develop an evaluation plan for assessing each project. This should be done prior to starting the project so that everyone knows what to expect.

• Have an "Open Farm Day" for your classmates, during which the groups visit one another's displays and use the evaluation form to provide feedback.

Extensions

• Develop a formal business plan for your farm. See Think Farm Guide for Beginning Farmers, page 7. www.novascotia.ca/agri/documents/thinkfarm/beginnin-farmers-guide.pdf

• If you have the opportunity, visit a farm with similar features to the one your group has developed.

3.11 Becoming Sustainable

Did you know?

The agriculture industry is active in all of Nova Scotia's 18 counties and has long been the social and economic backbone of many rural communities.

Outcomes

AGRICULTURE/AGRI-FOODS 11

• identify and describe careers and technologies that rely on and develop to aid industries and production of the commodity (AG-09)

• explain the relationships among the variables (space, food, population, and health) for livestock and/or plant farming (AG-10)

• discuss how effective management increases efficiency and responsible farming practices (AG-13)

• compare the risks and benefits to society and the environment of production while maintaining health, preventing pests and diseases, and supply and demand (AG-14)

GLOBAL GEOGRAPHY 12/ADVANCED GLOBAL GEOGRAPHY 12

• 4.1 analyse factors that affect the global production and distribution of food

• 6.2 investigate/analyse the extent to which the environment has been/is affected by cultural attitudes and practices

• 6.3 examine the actions of individuals who have demonstrated responsible global citizenship

Questions

• What does sustainable agriculture mean?
• Which agricultural practices are sustainable, and which are not?
• What works and what doesn't?

Background

The primary goals of sustainable agriculture include promoting environmental stewardship, meeting human needs for food and fibre, reducing reliance on synthetic materials, providing profitable farm income, and promoting stable, prosperous farm families and communities.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Agricultural Sectors, p. 21–102
- Environmental Stewardship on Nova Scotia Farms, pp. 103–121

Materials

• On Nova Scotia Farms: A Teacher's Guide—available online at www.novascotia.ca/agri/programs-and-services/educational-resources/teacher-resources/

• Poster board

• Magazine photos or drawings of agricultural practices

Procedure

• Individually, find and write out a definition for sustainable agriculture.

• In pairs or groups, make a list of agricultural practices that are sustainable.

• Make a list of agricultural practices that you think are not sustainable.

• Make an illustrated poster of your lists. For one half of the poster, use the heading "SUSTAINABLE" and on the other, "NOT SUSTAINABLE."

• Below each heading, provide appropriate illustrations of ideas you have on your lists.

• Compare your own lists with those of your classmates.

Extensions

• The same exercise can be done by making computer-generated posters and projecting them onto a screen.

3.12 Value-Added Commodity

Did you know?

The Perennia Innovation Centre is a product development facility near Truro that creates new business opportunities in the agriculture and agri-food sector.

Outcomes

FOOD SCIENCE 12

• 3.2 select and use different resources and materials to collect information about their commodity

• 4.3 design, develop, make, and present a food product, identifying and anticipating major variables that may impact on the final quality of the product

ENTREPRENEURSHIP 12

• 2.2 gather information, evaluate entrepreneurial ideas for a business or venture, and make informed decisions

• 4.5 identify the potential for local businesses or ventures in the global market

Questions

• What does "value-added product" mean?

• Are there some Nova Scotia commodities that can be developed into new "value-added products" which can be marketed locally and exported out of the province?

Background

Primary agriculture produces many high-quality products and contributes significantly to the Nova Scotia economy. In today's globalized marketplace we need entrepreneurs to produce high quality products and develop high-quality, value-added market opportunities. When a farm expands into processing it requires a range of expertise, including product development, recipe testing, food and factory safety, inventory management, and product packaging and labeling.

FOR MORE INFORMATION *ON NOVA SCOTIA FARMS: A TEACHER'S GUIDE*

- Agriculture in Nova Scotia: Agricultural Marketing Opportunities in Nova Scotia, p. 4
- Nova Scotia Agricultural Sectors, pp. 21–102

Materials

• On Nova Scotia Farms: A Teacher's Guide—available online at www.novascotia.ca/agri/programs-and-services/educational-resources/teacher-resources/

• Nova Scotia commodity information

• Card board or card stock

• Coloured markers

• Glue

• Materials to make a value-added product

Procedure

• Divide into groups of two or three.
• Find out what the phrase "value-added product" means.
• Assign or have groups choose a Nova Scotia commodity to research.
• Make a list of ways your commodity is currently marketed.
• Identify current value-added products your commodity represents.
• Brainstorm to determine if there is a possibility for a new value-added product.
• Choose a product you would like to develop and make a sample.

Some suggestions: combine several fruits and dehydrate them; make a frozen consumer-ready main course; come up with a new dessert, breakfast product, or healthy snack. Also, consider developing a non-food value-added product, from products such as wool, bones, or feathers.

• Design and construct a package and labeling that includes a list of ingredients.
• Have a Nova Scotia value-added product show in class.
• Have students determine a means of evaluating products.
• As a group, rate the various products.

Extensions

•Develop an advertising campaign to sell your product. Make a commercial about your new product.

3.13 Now, That's Quality!

Did you know?

While many Nova Scotia products are available year-round, some are at their peak during specific seasons. Visit selectnovascotia.ca to find out what is in season.

Outcomes

FOOD SCIENCE 12

- 3.4 identify psychological factors used to market and develop food products
- 3.5 collect and compare sensory data
- 3.6 explain how well a product is designed to meet consumer wishes
- 4.1 explain the functions and considerations for food packaging

Questions

• What visual criteria are important for consumers who wish to choose quality food?

Background

The Canadian Agricultural Products Act and the Nova Scotia Agriculture and Marketing Act regulate, assure the quality of, and provide standards, grades, and inspection of agricultural products.

While consumers have personal preferences, there are many factors to consider in assessing the quality of an agricultural product, which may include colour, shape, size, texture, defects, and ripeness.

Materials

• Each group will require at least 4 samples (having more is better) of the same food product. For example, a group selecting apples would need 4 apples, a potato group would need 4 potatoes, or a potato chip group would need 4 small bags of plain potato chips from different manufacturers. (Other possible foods may be oranges, green beans, lettuce, radishes, tomatoes, eggs, carrots, jars of pickles, etc.)

Procedure

Working in groups of three:

• Select a food or food product, a different one for each group.

• Discuss and identify 3–5 key criteria for the visual quality of your group's food item. Consider, for example, the colour of a certain apple variety, the shapes and sizes of potato chips, the straightness of green beans. There will, of course, be different criteria for different foods.

• Once your group has determined your criteria for visual quality, prepare a chart with the criteria listed down the left side. Across the top of the chart write: 1. Meets ideal criteria, 2. Close to meeting ideal criteria, 3. Acceptable, 4. Unacceptable.

• Rate each sample of your specific food item for its visual quality and record the rating on your chart. If a larger number of samples is required, visit a grocery store and ask if you may observe samples in-store. (Remember, if you handle the food you should wash your hands before and after doing so.)

• Graph the results of your food item survey. A larger number of samples surveyed will give a better idea of the overall visual quality of the food group.

• Present your findings to the rest of the class.

• Identify visual quality criteria common to all food items.

Extensions

• Conduct a similar survey for taste/smell/flavour of food. This is more difficult because of the higher level of subjectivity involved.

• Find out how the food industry uses/markets/discards unacceptable food items.

• Visit a food science facility at a university to find out more about food quality.

• Invite someone from the Canadian Food Inspection Agency to speak to the class about food quality.

• Have groups use each other's visual quality criteria to determine how well the chosen criteria work. Provide feedback to the originating group.


NOVA SCOTIA