

Food Studies 30

The Science of Nutrition



Foundational & Learning Objectives

Nutrition - The Right Balance

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objectives

To appreciate how understanding nutrition can benefit your body.

Nutrients, Nutrients, Nutrients

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objectives

To recognize that nutrients work in combinations in the body.

There's Healthy Fats In Those Canola Seeds!

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objectives

To understand fats and their role in the diet.



This Teacher’s Guide is designed to provide the teacher with a comprehensive resource that will assist students in learning about canola. The information provides a context for both teaching and learning. The student activities give the teacher direction for using the facts about this important crop in the Canadian economy. The Guided Inquiry tool should be used to guide your students towards asking these questions on their own.

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Nutrition - The Right Balance

Lesson

This lesson is designed to educate students about the new daily oil requirement and how to incorporate oil into their daily diet.

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objective

To appreciate how understanding nutrition can benefit your body.

Guided Inquiry

1. Does the human body need nutrients to survive and work properly?
2. How can nutritional knowledge be used to evaluate daily eating patterns and food choices?

Materials

1. Student copies of BLM 1, BLM 2, BLM 3, BLM 4.
2. Ingredients for making soup and salad: baby spinach leaves, dried cranberries, shaved almonds, green onions, light feta cheese, canola oil, balsamic vinegar, poppy seeds, sugar, salt, pepper, onion, white mushroom shiitake mushrooms, garlic, chicken stock, milk, bay leaves, and parsley.

Assignment

1. Students read BLM 1.
2. Students complete first half of their assignment in BLM 4.

Activity

1. Use the table in BLM 3 to discuss a healthy, 2000 calorie/day diet.
2. Split the class into two groups. One group will prepare the soup; one group will prepare the salad.
3. All students with taste both the soup and salad and complete the second half of their assignment in BLM 4.

Assessment

1. Assess answers to questions for accuracy and completion.
2. Assess comparison sheets for thoughtful answers and completion.



Nutrition: The Right Balance

By Ellen Hinz of The SaskCanola Post

“Observe a plant before and after watering and relate these benefits to your body and brain.”

Just as a car runs best with a full tank of gas, your body needs the right kind of “nutritional fuel” for peak performance. Eating well can be very simple. You do not need special foods or supplements. It is important to fuel

your body with a balance of carbohydrates, proteins, fats and oils, vitamins, minerals, and water.

The body’s essential nutrients are composed of chemical elements found in food and used by the body to perform many different functions. Food provides heat, promotes growth, repairs tissue, and regulates body processes.

Carbohydrates are a major source of human energy and can be easily digested. Carbohydrates should make up 40-50% of your daily diet.

Proteins make up the basic components of all body cells, are essential for building and repairing tissue, regulating body functions, and providing energy and heat. Proteins should make up 10-15% of your daily diet on a caloric basis.

Fats and oils provide the most concentrated form of energy, maintain body temperature by providing insulation, cushion organs and bones, and aid in the absorption of fat soluble vitamins. Fats and oils should make up 25-30% of your daily diet on a caloric basis.

Vitamins are organic (living) compounds that are essential to life. Vitamins are important for metabolism, tissue building, and regulating body processes. Vitamins allow the body to use the energy provided by carbohydrates, fats and oils, and proteins. A well balanced diet usually supplies adequate amounts of vitamins.

Minerals are inorganic (non living) elements found in all body cells. Minerals regulate body fluids, assist in various body functions, contribute to growth, and aid in building tissues.

Water is found in all body tissues. Water is essential for the digestion (breakdown) of food, makes up most of the blood plasma, helps body tissues absorb nutrients, and helps move waste material through the body. The average person should try to drink 6 to 8 glasses of water per day.

Regular meals and healthy snacks will help fuel your body. It is important to give your body enough of the right fuel in order to feel good and have the energy you need to be the best you can be. By following the recommendations in Canada’s Food Guide, you can be assured that you will meet your daily requirements for vitamins, minerals and other nutrients, helping you to achieve overall health and vitality.

The Canada Food Guide has used a range of evidence to shape the revised Food Guide. Nutrient standards and prevention of chronic disease were key scientific inputs.

Canada’s Food Guide also outlines a number of servings we should eat from each of the four food groups and provides guidance on portion sizes. The recommended number of serving sizes is based on age and gender. Remember that it is just the average amount that people should try to eat each day.

Aside from the four groups, the revised Food Guide recommends that you include a small amount - 30 to 45 mL (2 to 3 Tbsp) - of unsaturated fat each day. This includes oil used for cooking, salad dressings, margarine, and mayonnaise. Use vegetable oils such as canola, olive, and soybean. Choose soft margarines that are low in saturated and trans fats. Limit butter, hard margarine, lard, and shortening.

Achieving a balance between activity and nutrition is important for overall health. Use Canada’s Food Guide to find the right balance and take control of your life and your future. You will feel better and improve your ability to live a full and active life.



Cranberry Spinach Salad with Poppy Seed Dressing

Ingredients:

1 (10 oz) bag of baby spinach leaves
1 cup dried cranberries
2/3 cup shaved toasted almonds
4 green onions
1/3 cup crumbled light feta cheese
2/3 cup canola oil
2 Tbsp balsamic vinegar with raspberry
juice vinegar
1 Tbsp poppy seeds
2 tsp granulated sugar
1/2 tsp salt
1/4 tsp pepper

Directions:

In a large salad bowl, combine spinach, cranberries, almonds, green onions, and feta cheese.

In a separate small bowl, combine canola oil, balsamic vinegar, poppy seeds, sugar, salt, and pepper. Mix well. Pour dressing on top of salad ingredients and toss lightly. Serve immediately.

Yield: 6 servings.



Creamy Wild Rice Soup

Ingredients:

2 Tbsp canola oil
1 medium onion, finely chopped
3 cups white mushrooms, slice thick
1 cup shiitake mushrooms
1 clove garlic, minced
1 1/2 cups chicken stock
2 1/2 cups milk
1 bay leaf
1/2 tsp parsley
3 Tbsp all purpose flour
1/2 tsp salt
1/2 tsp ground pepper
1 1/2 - 2 cups cooked wild rice

Directions:

Heat canola oil in frying pan. Saute onion, mushrooms, and garlic until tender. Remove from heat.

In medium saucepan, mix together chicken stock and milk over medium heat until it comes to a boil. Add mushroom mixture, bay leaf, parsley, flour, salt, pepper, and wild rice to milk mixture. Stir occasionally and simmer for 20 to 30 minutes. Remove bay leaf and serve.

Yield: 6-8 servings.



Based on a 2000 Calorie / Day Diet

	% of calories	grams
Carbohydrates	40 - 50 %	200 - 250 g
Proteins	10 - 15 %	50 - 75 g
Fats	25 - 30 %	40 - 70 g

Recognizing that:

Carbohydrates = 4 calories/gram

Proteins = 4 calories/gram

Fats = 9 calories/gram



Nutrition - The Right Balance

Name: _____

Read the article & answer the following questions:

1. What is the new daily oil requirement and how can we incorporate oil into our daily diet?
2. What does food provide to our bodies?
3. Name the six important nutrients.

Salad & Soup Assessment

Taste test both the salad and the soup, then assess.

1. Explain the color and appearance of both food items.
2. Explain the taste of each food item.
3. Note the texture and density of each food item.
4. Do you prefer one food item better than the other? Why?



Nutrients, Nutrients, Nutrients

Lesson

This lesson focuses on nutrients in our diet. The discussion examines the relationship between carbohydrates, fats, and proteins that are used to provide energy for the body.

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objective

To recognize that nutrients work in combinations in the body.

Guided Inquiry

1. What role do nutrients play in the body?
2. What is the relationship among carbohydrates, fats, and proteins used to provide energy for the body?

Materials

1. Student copies of BLM 5, BLM 6, and BLM 7.
2. Ingredients for making roasted vegetables and smoothies: canola oil, maple syrup, red pepper, green pepper, cauliflower, sweet potato, acorn squash, parsnips, carrots, garlic, red onion, salt, pepper, dried basil, banana, blueberries, strawberries, green tea, and cranberry juice.

Assignment

1. Students read BLM 5.
2. Students complete first half of their assignment in BLM 7.

Activity

1. Split the class into two groups. One group will prepare the vegetables; one group will prepare the smoothies.
2. All students will taste both the vegetables and smoothies and complete the second half of their assignment in BLM 7.

Assessment

1. Assess answers to questions for accuracy and completion.
2. Assess comparison sheets for thoughtful answers and completion.



Nutrients, Nutrients, Nutrients

By Ellen Hinz of The SaskCanola Post

A **nutrient** is a chemical that an organism needs to live and grow or a substance used in an organism's metabolism which must be taken in from its environment. Nutrients are the substances that enrich the body. Nutrients build and repair tissues, give heat and energy, and regulate body processes.

Organic nutrients include carbohydrates, fats, proteins, vitamins, and minerals. A nutrient is essential to an organism if it cannot be synthesized by the organism in sufficient quantities and must be obtained from an external source. Nutrients needed in large quantities are called macronutrients; nutrients needed in small quantities are called micronutrients.

Micronutrients and macronutrients from food are absorbed by the body as it passes through the digestive system. Although nutrients can work alone, each depends upon the others to be the most effective.

Let's talk vitamins and minerals! Vitamins are organic chemicals that a living organism requires in small quantities for good health. Vitamins and minerals do not provide energy on their own, but macronutrients depend on vitamins and minerals to regulate the release of energy from food.

Let's talk carbohydrates! Carbohydrates provide energy for the body. Carbohydrates also protect your muscles and help regulate the amount of sugar circulating in your blood so that all the cells get the energy they need.

An average healthy adult needs 200-250 grams of carbohydrates per day. Carbohydrates come in two forms: simple and complex. Both are composed of units of sugar. The difference is how many sugar units they contain, and how they link together. Simple carbohydrates are sugars that give you instant energy and typically have no nutritional value. These include sweets, candy, and soda. Complex carbohydrates release energy slowly and often contain fiber. These "healthier" forms of carbohydrates include bread, pasta, rice, potatoes, cereals, and legumes.

Most Canadians do not get enough fiber in their diet. Choosing whole grain options like brown rice or whole wheat pasta, increases fiber intake.

Let's talk protein! Protein is used by the body to build new cells, maintain muscle, and regulate cell function.

About half of the protein consumed daily is converted into enzymes. Enzymes work in the body to regulate the speed of biological reactions, permit it to digest food, and assemble or divide molecules to make new cells and chemical substances. To perform these functions, enzymes often need specific vitamins and minerals.

Twenty two different amino acids are required to make all the proteins that the body needs. Nine are essential and are not synthesized by the body so they must be obtained from food. Our bodies can produce the other thirteen non-essential amino acids from fats, carbohydrates, and amino acids.

An average healthy adult needs 50-75 grams of protein per day. Good sources of protein can be found in meat, poultry, fish, eggs, cheese, nuts, legumes, and soy.

Let's talk fats! Fats aid in energy production, cell building, oxygen transport, blood clotting, and the production of extremely active hormone-like substances called prostaglandins.

Fats can be saturated, polyunsaturated, and monounsaturated. Monounsaturated and saturated fats can be produced by our bodies. Polyunsaturated fats, or essential fatty acids, cannot be synthesized by the body so they must be obtained from our diet.

An average healthy adult needs 40-70 grams of fat per day, with most fats coming from sources of polyunsaturated and monounsaturated fatty acids, such as fish, nuts, and vegetable oils. All vegetable oils and animal fats are a mixture of unsaturated and saturated fats; it is the amounts of monounsaturated, polyunsaturated, and saturated that determine which are healthier oils. The more unsaturated, the more healthy the oil. Canola oil and olive oil are good sources of monounsaturated fats.

The advantage of eating specific nutrient rich foods is that the body can readily absorb and utilize the contents without having to remanufacture or convert refined ingredients. The less work the body has to do to nourish itself, the better!



Maple Roasted Vegetables

Ingredients:

- 1/3 cup canola oil
- 1/3 cup maple syrup
- 1 each red and green peppers, cubed
- 1/2 head cauliflower, cut into florets
- 1 sweet potato, cubed
- 1 acorn squash, peeled and cubed
- 4 parsnips, peeled and cut lengthwise
- 4 carrots, peeled and cut lengthwise
- 1 head of garlic, peeled and separated
- 1 large red onion, cut into eighths
- 1 tsp salt
- 1 tsp pepper
- 1 Tbsp dried basil

Directions:

Preheat oven to 425 F (220 C).

In a large bowl, mix together canola oil, maple syrup, peppers, cauliflower, sweet potatoes, squash, parsnips, carrots, garlic, red onion, salt, pepper, and basil. Place mixture on a baking pan lined with parchment paper.

Bake for 40-45 minutes, stirring occasionally until veggies are tender.

Yield: 10 servings.



Berry Good For You Smoothie

Ingredients:

- 1 medium banana
- 1/2 cup blueberries
- 1/2 cup strawberries
- 1/2 cup green tea, cooled
- 1/2 cup cranberry juice
- 4 ice cubes
- 2 tsp canola oil

Directions:

In a blender, add banana, blueberries, strawberries, green tea, cranberry juice, ice cubes, and canola oil. Blend until combined. Serve immediately.

Yield: 2 cups for 2 servings of 1 cup.



Nutrients, Nutrients, Nutrients

Name: _____

Read the article & answer the following questions:

1. What is a nutrient?
2. What is the difference between micronutrients and macronutrients?
3. What can we eat to increase our fiber intake?

Vegetable & Smoothie Assessment

Taste test both the vegetables and the smoothie, then assess.

1. Explain the color and appearance of both food items.
2. Explain the taste of each food item.
3. Note the texture and density of each food item.
4. Do you prefer one food item better than the other? Why?



There's Healthy Fats In Those Canola Seeds!

Lesson

This lesson focuses on fat in our diet. The discussion centers on the nutritional benefits of canola oil.

Foundational Objective

To understand the importance of the science of nutrition.

Learning Objective

To understand fats and their role in the diet.

Guided Inquiry

1. What are fatty acids and why are they important for good health?
2. What are some foods that are high in fat?
3. What are some of the health risks associated with too much fat in the diet?

Materials

1. Student copies of BLM 8, BLM 9, BLM 10, BLM 11.
2. Ingredients for making brownies: canola cooking spray, sugar, flour, vanilla extract, baking powder, salt, eggs, semi-sweet chocolate chips, cocoa, canola oil, and butter.

Assignment

1. Students read BLM 8.
2. Students answer the questions in BLM 11.

Activity

1. Use the table of dietary fats to explore the composition of dietary fats and review the canola oil baking substitution chart.
2. Split the class into two groups. Each group will prepare a brownie recipe; one group with butter and one group with canola oil.
3. All students will taste each brownie and complete the second half of their assignment in BLM 11 .

Assessment

1. Assess answers to questions for accuracy and completion.
2. Assess comparison sheets for thoughtful answers and completion.



There's Healthy Fats In Those Canola Seeds!

By Ellen Hinz of The SaskCanola Post

One of the reasons canola is popular as an oilseed crop is its nutritional properties. Canola is rapidly gaining acreage on the Canadian prairies because of the strong demand for its healthy oil.

Most oilseeds contain much the same balance of protein, fibre and other types of carbohydrates - mainly from the hull of the seed - and fats. Fats are made up of various types of fatty acids and glycerine. The key difference between the various oils you'll find on the grocery shelf is their composition of fatty acids.

Some fatty acids are essential nutrients, meaning they can't be produced from other compounds and need to be consumed in small amounts. Fats play a vital role in maintaining healthy skin and hair, insulating body organs against shock, maintaining body temperature, and promoting healthy cell function. Fats also serve as energy stores for the body, containing about 9 calories per gram of fat. Vitamins A, D, E, and K are fat soluble vitamins meaning they can only be digested, absorbed, and transported in conjunction with fats.

Fats are determined to be healthy or unhealthy based on their fatty acid composition. Fats and oils are composed of fatty acids. Fatty acids are chains of carbon molecules with hydrogen attached, they vary in length and the amount of saturation which affect how they are named.

The three main types of fats are: unsaturated fat, saturated fat, and trans fat. There are two kinds of unsaturated fats: monounsaturated and polyunsaturated.

Unsaturated fats are called good fats because they can improve blood cholesterol levels, ease inflammation and stabilize heart rhythms.

Unsaturated fats are mostly found in foods from plants, such as vegetable oils, nuts, and seeds. They are liquid at room temperature. Monounsaturated fats are found in vegetable oils such as canola, olive and peanut oils, nuts, seeds, and avocados. Polyunsaturated fats are found in vegetable oils such as canola, safflower, flaxseed, corn, and hemp seed; fish is also a good source.

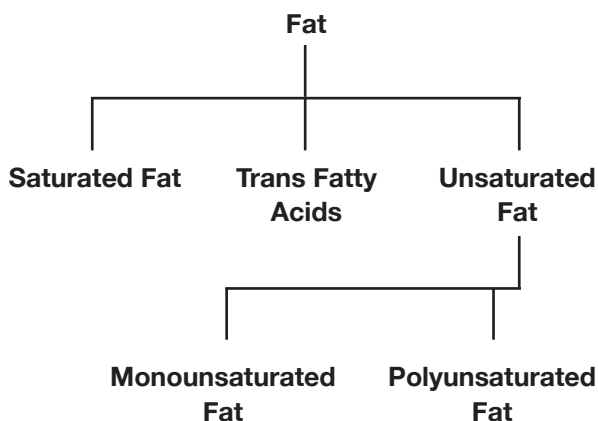
There are two types of polyunsaturated fats: omega-3 and omega-6 — the number refers to the position of the first double bond of the carbon chain, which means it's unsaturated. Omega-3 fats are an important type of polyunsaturated fat because the body can't make these, so these essential fatty acids must come from food. Good sources of omega-3 fats are found in vegetable oils such as canola, soybean and flaxseed oil, chia seeds, flax seeds, walnuts, and fish. Omega-3 fatty acids are also known to offer significant health benefits: Alpha-linolenic and other omega-3s may reduce the risk of cardiovascular disease—a heart attack or stroke.

Saturated fats are chiefly found in animal sources such as meat fat, milk fat, and butter, as well as, coconut and palm oil. High intake of saturated fats has been linked to higher blood cholesterol, which has been associated with higher risk of cardiovascular diseases.

Trans fats are made by adding hydrogen to heated liquid oils, a process called hydrogenation. Partially hydrogenating vegetable oils changes them to be more like saturated fats, such as, butter. Trans fats also appear in large amounts in some processed foods due to the use of hydrogenated oils. Trans fats are thought to increase the body's bad cholesterol, which has been linked to cardiovascular disease.

The problem with fat is that most Canadians eat too much of it and too much of the wrong kinds. The good news is that some fats play important roles in maintaining your health and the better oilseeds, such as canola, deserve a place on your pantry shelf!

The Skinny on Fats



Brownies - With Canola Oil

Ingredients:

canola cooking spray
1 1/2 cups granulated sugar
1 cup all purpose flour
3/4 cup cocoa
1 tsp baking powder
1/4 tsp salt
3/4 cup canola oil
2 tsp vanilla extract
4 egg whites, beaten until stiff
1/2 cup semi-sweet chocolate chips

Directions:

Preheat oven to 350°F (180°C). Prepare 8 inch square pan by spraying with canola cooking spray.

Combine sugar, flour, cocoa, baking powder and salt. Form a well in the center of dry ingredients, stir in canola oil and vanilla. Fold in egg whites. Fold in chocolate chips. Pour batter in prepared pan. Bake until brownies are puffed in the center and the edges are beginning to brown, about 30 minutes. The center of the brownies will look quite soft.



Brownies - With Butter

Ingredients:

canola cooking spray
1 1/2 cups granulated sugar
1 cup all purpose flour
3/4 cup cocoa
1 tsp baking powder
1/4 tsp salt
1 cup butter
2 tsp vanilla extract
4 egg whites, beaten until stiff
1/2 cup semi-sweet chocolate chips

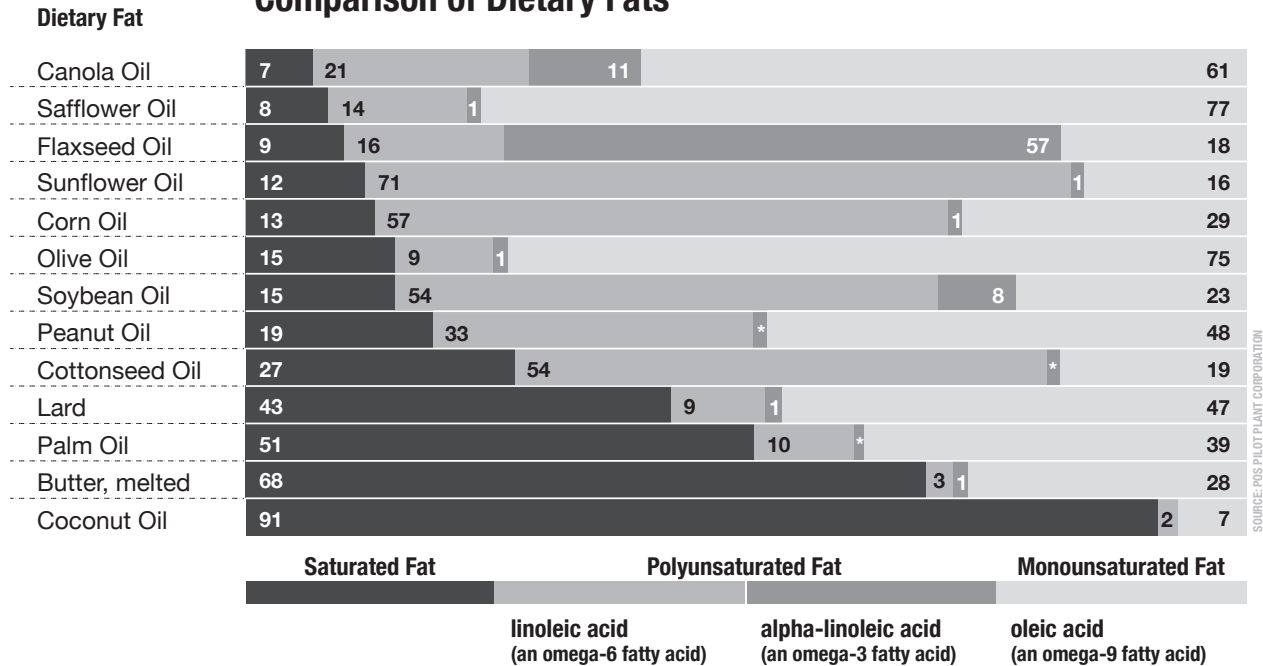
Directions:

Preheat oven to 350°F (180°C). Prepare 8 inch square pan by greasing with butter.

Combine sugar, flour, cocoa, baking powder and salt. Form a well in the center of dry ingredients, stir in butter and vanilla. Fold in egg whites. Fold in chocolate chips. Pour batter in prepared pan. Bake until brownies are puffed in the center and the edges are beginning to brown, about 30 minutes. The center of the brownies will look quite soft.



Comparison of Dietary Fats



SOURCE: POS PILOT PLANT CORPORATION

Canola Oil Baking Substitution Chart

If a recipe calls for this much solid fat . . . try making it with this much canola oil.

Solid Fat	>	Canola Oil
1 cup (250 mL)	>	3/4 cup (175 mL)
3/4 cup (175 mL)	>	2/3 cup (150 mL)
1/2 cup (125 mL)	>	1/3 cup (75 mL)
1/4 cup (50 mL)	>	3 Tbsp (45 mL)
1 Tbsp (15 mL)	>	2 tsp (10 mL)
1 tsp (5 mL)	>	3/4 tsp (4 mL)

Not only will you eliminate trans and reduce saturated fats - you will also reduce the total amount of fat in the recipe by about 20 to 25%! This conversion works well for cakes, loaves, and muffin recipes.



There's Healthy Fats In Those Canola Seeds!

Name: _____

Read the article & answer the following questions:

1. What is the role of fat in our diet?
2. Why has fat in our diet become an issue?
3. What are the three types of fats we consume? Where do you we get them?

Brownie Comparison

Taste test each brownie, one with canola oil and one with butter, then compare.

1. Compare the color and appearance of each brownie.
2. Compare the taste of each brownie.
3. Compare the texture and density of each brownie.
4. Do you prefer one brownie better than the other? Why?





For More Information

There are many websites where you can find more information about canola in Canada. Below is a list of national websites. Each of the national websites has links to provincial and territorial websites.

SaskCanola
www.saskcanola.com

Agriculture in the Classroom
www.aitc.ca

Canola Council of Canada
www.canolacouncil.org

CanolaInfo
www.canolainfo.org

SaskCanola would like to thank Ellen Hinz for her work in developing this Food Studies 30 Lesson Package.

Additional copies of this Food Studies 30 Lesson Package can be obtained from SaskCanola.

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Thanks for taking the time to learn about canola.

