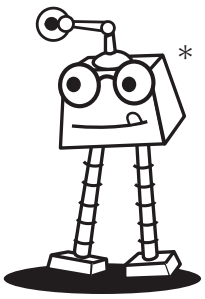
Grades 4-5
TEACHER NOTES



BODY FUEL

The body needs energy from food for the brain to think, for muscles to work, for the heart to beat and for the lungs to breathe. Three different macronutrients in food - carbohydrates, fats and proteins - provide the body with the energy it needs.

Carbohydrates

Carbohydrates (sugars and starches) are the body's preferred fuel. Starches are made up of chains of sugars. During digestion, starches are broken down into sugars such as glucose. Glucose is absorbed and travels in the bloodstream to provide the body and brain with energy. Other important nutrients in foods like B vitamins and the mineral iron also help the body use the food energy (calories) from carbohydrates.

About half of our energy (or calories) should come from carbohydrates each day. The best sources of carbohydrates include Grain Products and Vegetables and Fruit. That's one of the main reasons ***Canada's Food Guide*** encourages Canadians to emphasize vegetables and fruit, cereals, breads and other grain products. Milk, yogurt and cheese naturally contain lactose, a type of sugar. Meat alternatives such as dried peas, beans and lentils, nuts and seeds also provide carbohydrates.

Fats

Fats are a key source of energy for children's healthy growth, development and activity. Fats help the body absorb some of the nutrients that are essential for good health, such as vitamins A, D, E and K. Everyone needs fat, but many Canadians eat more fat than they need for good health.

During childhood there should be a gradual transition from the higher fat diet needed in infancy (50% of calories from fat) to the lower fat diet recommended for adults (20-35% of calories from fat). Children should be encouraged to enjoy lower fat choices including grain products (especially whole grain products) such as cereals, bread, pasta, rice and other grains, vegetables and fruit and dried peas, beans and lentils. However, nutrient rich foods such as peanut butter and cheese should not be restricted during childhood because of concerns about fat.

Proteins

Proteins help the body grow and develop. The body breaks down proteins into building blocks, called amino acids, that cells use to build and repair tissue like muscle, skin, hair and nails. Proteins can also be used to make glucose for energy, but the body prefers to use carbohydrates for energy and reserve proteins for maintaining body structure. Eating a higher protein diet does not help build extra muscle.

Animal products like milk, yogurt, cheese, meat, poultry, fish and eggs are sources of complete protein that provide all of the amino acids that you need for life. Soy protein is also a complete protein. Meat alternatives such as peanut butter, dried peas, beans and lentils are sources of incomplete protein that provide some of the essential amino acids. Grain products such as cereal, bread, rice and pasta also provide some incomplete protein in smaller amounts. Most people get plenty of protein by eating a variety of foods.

Grades 4-5
TEACHER NOTES (Continued)

VITAMINS AND MINERALS

Essential vitamins and minerals work together with carbohydrates, fats and proteins to help the body grow and go. A healthy variety of foods provide the nutrients that cells need to grow, repair themselves and do the jobs they are supposed to do.

Bone Builders

The minerals calcium and phosphorous help build strong bones and teeth. Vitamin D helps the body absorb the calcium and phosphorous it needs. The mineral zinc is also needed for growth and to help the body fight infections. Milk provides all of these nutrients. Meats and Alternatives also supply phosphorous and zinc. Vitamin D is known as the "sunshine" vitamin because of the body's natural ability to make this nutrient when exposed to sunlight. However, food is the most important source of Vitamin D for Canadians, especially those living at Northern latitudes and who use sunscreen during the summer.

Energy Releasers

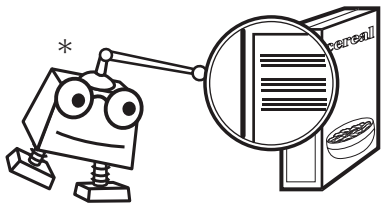
Iron carries oxygen in the blood and helps the body and brain make use of food energy. Iron deficiency or anemia can leave the body feeling tired and weak and may have a negative effect on learning ability. B-vitamins are also needed to help the body use the energy from foods. The best sources of iron and B-vitamins include lean meats, dried peas, beans and lentils, green leafy vegetables, dried fruit and cereals.

Cell Vitalizers

A number of vitamins are needed to keep cells throughout the body healthy. Vitamin C is important for healthy cells, helps cuts heal and contributes to healthy gums and teeth. Vitamin A helps cells in the eye adjust to the dark and helps keep skin cells healthy. Vitamin K helps the blood clot to stop cuts from bleeding. Dark green leafy vegetables and orange vegetables and fruit are the primary sources of these vitamins. Vitamin E, found mainly in vegetable oils, nuts, sunflower seeds, sweet potatoes and avocadoes also helps maintain healthy cells and fight infections.

FOOD LABELS

Nutrition labelling regulations make it mandatory for most packaged food products to provide nutrition information in the Nutrition Facts panel. Nutrition information on food labels can be used with the list of ingredients and nutrition claims to make informed food choices.



Nutrition Information

The nutrition information or Nutrition Facts panel tells you how much energy a serving of food provides and how much carbohydrate, protein and fat it contains. The % Daily Values can be used to see if a food has a lot or a little of a nutrient relative to the daily requirements of an average person.

Grades 4-5
TEACHER NOTES (Continued)

Ingredient List
Every packaged food product must have a list of all ingredients. This is especially useful for people with food allergies. Ingredients are listed in order according to their weight in the product. The ingredient there is most of is listed first, the next most is listed second and so on. Note that even the last ingredient on the list can be very important to your health. Information on allergies and anaphylaxis is available at:

- Calgary Allergy Network - School Related Resources www.calgaryallergy.ca/Article.html#school
- Allergy and Asthma Information Association: www.aaia.ca
- Anaphylaxis Canada at www.anaphylaxis.ca or ph: 1-866-785-5660

Nutrient Content Claims
The main nutritional benefits of foods are often featured on the label in the form of nutrition content claims such as: "high in fibre", "low in fat" and "source of 7 essential nutrients".

Health Claims
Health claims are statements on food labels about the relationship between general diet patterns and disease when such relationships are supported by sound science. An example of what a health claim might look like is, "A healthy diet rich in a variety of fruits and vegetables may help reduce the risk of some types of cancer."

EXPLORING BODY SYSTEMS
Healthy eating and physical activity helps all of the body's systems stay healthy. For example eating plenty of fibre, drinking plenty of fluids and being active helps keep food moving through the digestive system smoothly. Calcium, phosphorous, vitamin D and weight bearing exercises help to build and maintain strong bones.

Focus on Fibre
Fibre from plant foods helps to keep food moving through the body as digestion occurs. Since fibre intakes in North America are generally low, a good starting point for children is to aim for a minimum amount of fibre equal to their "age plus five". For example a 10 year old should try to eat at least 15 grams of fibre a day. Recent data suggest that recommended fibre intakes may be even higher than this. Foods with fibre include whole grain breads and cereals, vegetables, fruit, nuts, dried peas, beans and lentils.

Water Wise
Canada's Food Guide encourages Canadians to drink water regularly to satisfy thirst. It's important to drink more water in hot weather and when you are very active. Water helps to transport nutrients through the body and to maintain body temperature. Water quenches thirst, is inexpensive, helps prevent tooth decay and doesn't ruin children's appetite for food. Most beverages and many foods, such as fruit, are also sources of water. Nutrient dense fluids such as milk, juices and soups also make a positive contribution to fluid intakes. Although pop, fruit flavoured drinks, sports drinks and punches contribute to fluid intakes, they tend to be high in sugar and therefore should be limited.

Grades 4-5
TEACHER NOTES (Continued)

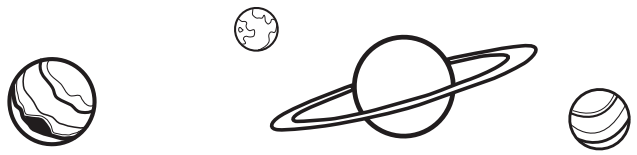
EXPLORING FOOD CHOICES

The following are key concepts from ***Canada's Food Guide***.

Recommended Number of Food Guide Servings

Different people need different amounts of food depending on factors such as age, gender, body size and activity level. Eating the amount and type of food recommended in ***Canada's Food Guide*** can help you meet your needs for essential nutrients, reduces the risk of obesity and chronic diseases and contributes to overall health and vitality. The recommended number of Food Guide Servings per day for children (males and females) aged 9 to 13 years old is:

Vegetables and Fruit (6 Food Guide Servings per day)
Grain Products (6 Food Guide Servings per day)
Milk and Alternatives (3 to 4 Food Guide Servings per day)
Meat and Alternatives (1 to 2 Food Guide Servings per day)



Food Guide Serving Sizes

Canada's Food Guide shows examples of Food Guide Serving sizes for a variety of foods in each food group.

Make Each Food Guide Serving Count

Canada's Food Guide recommends making each Food Guide Serving count, wherever you are - at home, at school, at work or when eating out. Some of the key messages include:

- Vegetables and Fruit: eat at least one dark green and one orange vegetable each day; choose vegetables and fruit prepared with little or no added fat, sugar or salt; and, have vegetables and fruit more often than juice.
- Grain Products: make at least half of your grain products whole grain each day; and, choose grain products that are lower in fat, sugar or salt.
- Milk and Alternatives: drink skim, 1%, or 2% milk each day; have 500 mL (2 cups) of milk everyday for adequate vitamin D (or fortified soy beverages if you do not drink milk); and, select lower fat milk alternatives like yogurts or cheeses.
- Meat and Alternatives: have meat alternatives such as beans, lentils and tofu often, eat at least two Food Guide Servings of fish each week; and, select lean meat and alternatives prepared with little or no added fat or salt.

Less Healthy Food Choices

Canada's Food Guide encourages people to limit less healthy food and beverage choices that are high in calories, fat, sugar and salt (sodium). These include cakes, pastries, chocolate, candies, cookies, granola bars, doughnuts, muffins, ice cream, frozen desserts, french fries, potato chips, nachos, other salty snacks, fruit flavoured drinks, soft drinks, sports drinks and sweetened hot or cold drinks. These foods should be limited but can be enjoyed at times.

FOOD GUIDE FACTS

For more background information for educators visit the Health Canada web site: www.healthcanada.gc.ca/foodguide

- *Eating Well with Canada's Food Guide - A Resource for Educators and Communicators*
- *My Food Guide - An interactive tool that will help you personalize the information found in Canada's Food Guide.*

For additional resources on healthy eating or to find a dietitian in your area visit the Dietitians of Canada web site at www.dietitians.ca or contact your local health department.

MISSION NUTRITION

Assessment Rubric

	Level 1	Level 2	Level 3	Level 4
Understanding of concepts	demonstrates little or no understanding of central ideas and concepts	demonstrates partial but limited understanding of central ideas and concepts	demonstrates essential understanding of central ideas and concepts	demonstrates full understanding and use of central ideas and concepts
Class discussion	minimal effort to participate	sometimes answers questions but rarely contributes relevant information	answers questions and usually contributes some relevant information	consistently answers questions and always contributes relevant information
Class activities	participates actively only with constant encouragement	sometimes participates in class activities with occasional encouragement	requires no encouragement to participate actively	enthusiastically participates in all activities and encourages others
Student activity sheet	with assistance completes activity sheet with frequent errors and does not apply new knowledge learned	completes activity sheet with partial application of concepts taught with a few errors	completes activity sheet with minor errors and applies most of the new knowledge learned	completes activity sheet independently with accuracy and thorough application of all concepts taught
Homework completion	does little of the required work at home and does not return materials to school	does some of the required work at home but materials are not returned on time	does the required work at home and usually returns materials on time	does all the required work at home and goes beyond expectations; materials are always returned promptly

MISSION NUTRITION*

Adventures in learning, created by Canadian dietitians

MISSION PLANS FOR GRADES 4-5

MISSION 1

EXPLORING BODY FUEL

Students explore the roles of key nutrients including carbohydrates, fats and proteins and the need for a healthy variety of foods from the four food groups in Canada's Food Guide.

Learning Expectations:

1. Identify the different roles of carbohydrates, fats and proteins.
2. Understand the need for a healthy variety of foods from the four food groups in *Canada's Food Guide.*

Subject Links:

Health, Science, Language, Physical Education

Materials & Resources:

- *Canada's Food Guide* Visit www.healthcanada.ca/foodguide or call 1-800 O CANADA
- A large glass jar with a lid, 30 mL (2 tbsp) lemon juice, 200 mL (3/4 cup) water , 5 mL (1 tsp) sugar, 2 crackers, 1 slice of bread, a handful of high fibre cereal, 1 slice of luncheon meat, 1 slice of cheese (Incredible Food Processor Experiment)
- Electric kettle, water, glass bowl, cup, egg, fork (Stringy Soup Experiment)
- Small samples of a variety of foods and brown butcher paper or brown paper bags (non-waxed) (Fat Finding Experiment)

See the Teacher Notes at the back of this resource (on pages 23-26) for more information on this mission.

Class Discussion:

Our bodies need food energy for our brains to think, for our muscles to work, for our heart to beat and our lungs to breathe. The following scenarios can help students appreciate how eating well and being active can help them feel good. Ask them how they think they would feel if:

- They woke up late and skipped breakfast before school?
- They forgot to bring a lunch to school or gave it away?
- They spent the day sitting at their desk with no movement or activity?

Teaching Tip:

Following *Canada's Food Guide* helps to provide a healthy balance of the three macronutrients that supply food energy - carbohydrates, fats and proteins. Use the *Teacher Notes* to review the role of each of these nutrients as you do the experiments outlined in this unit.

Activities:

The *MISSION NUTRITION** Team wants to know about how humans get energy from the food we eat. The following food experiments explore how the body uses carbohydrates, the structural role of proteins and which foods supply fat. Whenever experiments with food are undertaken in the classroom, sensitivity to allergies, customs and religious orientation is necessary for the safety and wellbeing of class members.

1. Incredible Food Processor Experiment (Carbohydrates)

This experiment demonstrates how carbohydrates are the body's preferred source of food energy. Provide small groups of students with the materials to conduct this experiment (each group will need the materials listed for this experiment under *Materials and Resources*) or demonstrate it for the whole class. In the large glass jar, mix the lemon juice and water. This acidic liquid helps to break down food to simulate digestion by stomach juices. Cut or break food samples into small bits. This step is like the job that teeth do before breaking foods into smaller pieces that are easier to digest. Add each food in turn to the juices in the jar and seal with a lid. Have students observe and record the appearance of each sample after 1, 5 and 15 minutes. Ask them to note which foods changed the most and which changed the least.

Continued

Students should observe that carbohydrate rich foods are broken down quickly and foods that contain a lot of protein or fat are broken down more slowly. Empty the contents of the jar into a toilet to discard them at the end of this experiment.

2. **Stringy Soup Experiment (Proteins)** Make a batch of this 'stringy soup' to illustrate the primary structural role of protein which provides the building blocks for tissue growth and maintenance. Boil two cups of water in an electric kettle. Pour the water into the glass bowl and wait for the bubbles to subside. While you wait, break an egg into a cup and beat it with a fork. Then slowly trickle the egg into the water in a thin stream and swirl the 'soup' gently with the fork as you pour. Observe what happens to the egg. You should see long stringy strands of protein. Explain that eggs are made up of a bunch of twisted proteins, like a ball of string that's all curled up. Heat untwists the proteins and they form long stringy strands. Discard the 'soup' when students have finished observing.

3. **Fat Finding Experiment (Fats)** Find the fat in a variety of foods with this simple fat finding test. Explain that we all need fat - for energy and to help absorb some important nutrients. Collect small samples of a variety of foods from each food group to test. Choose:
   - Vegetables and Fruit such as carrots, bananas and french fries.
   - Grain Products such as cereal, bread, muffins and crackers.
   - Milk and Alternatives such as regular fat cheese and lower fat cheese.
   - Meat and Alternatives such as lentils, ham and hot dogs.
   - Snack foods that are higher in fat such as chips, cookies and chocolate.

   Divide the class into 5 groups to test these different foods. Provide each group with a piece of brown butcher paper or brown paper bag and some food samples to test. Ask them to place the samples on the paper and write the food name under each sample.

After 10 minutes, students remove each sample and observe whether it left a spot on the paper. Hold the paper up to a light source to see if light shines through it. Explain that the more light showing through, the more fat the food contains. Within each group students can then determine which foods have the most and least fat and share their results with the class.

Allergy Awareness: To ensure safety, always check with students and their parents for any food allergies before activities that involve bringing foods or food packaging into the classroom. The ingredient list found on food labels is especially useful for identifying ingredients that may cause an allergic reaction.

Allergy and Anaphylaxis Resources:
- Calgary Allergy Network - School Related Resources www.calgaryallergy.ca/Article.html# school
- Allergy and Asthma Information Association: www.aaia.ca
- Anaphylaxis Canada: www.anaphylaxis.ca or ph: 1-866-785-5660

Student Mission 1: What's In It For Me?
Ask students to complete the *What's In It For Me?* activity sheet after conducting the carbohydrate, protein and fat experiments and discussing the roles of each. Their mission is to identify the different roles of carbohydrates, fat and protein.

Home Connection:
Creating a "Healthy Living" brochure can help students communicate some of their ideas for healthy eating and activity with their family.

In Class: Have students create a brochure that promotes healthy eating and physical activity. The brochure could include:
- how eating well and being active helps you feel good
- the importance of a healthy variety of foods from the four food groups
- suggestions for enjoying a variety of foods
- ways to be active and stay fit

At Home: Students can share their "Healthy Living" brochures with their family.