“The Science of Nutrition”

to support
Module 17 of Food Studies 10/30
Saskatchewan Ministry of Education

A project of the Saskatchewan Organic Directorate’s Food Miles Campaign, with the financial assistance of Saskatchewan’s Ministry of Environment
Acknowledgements
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Introduction, Modules and Foundational Objectives
- Rationale for these resources
- Current Food Issues
- The Science of Nutrition
- Make Mine Quick and Healthy

The Science of Nutrition

- Nutrition for Living
- Nutrients for Energy and Growth
- Vitamins and Minerals - Micronutrients
- What About Macronutrients?
- Water for Life
- Searching for Good Nutrition

For information about the relationships among the pillars of sustainable development and local, organic foods, please refer to FMC web pages for information on the following:
- The Pillars of Sustainable Development
- The Big Picture, Localism and Food
- Food Miles and the Call for Local Food
- Principles of Local, Organic Food in Saskatchewan
- An Invitation to Explore Saskatchewan Organic Foods
Introduction and Foundational Objectives

Rationale for these resources
The Saskatchewan Organic Directorate (SOD) has produced these materials to help learners explore the challenges and advantages of local food production and the preparation of tasty dishes based on Saskatchewan local, organic products.

The following modules* from the Ministry of Education Food Studies 10/30 are developed within these materials.

Note: There are significant changes in Saskatchewan’s Ministry of Education curriculum with the introduction of outcomes and indicators of learning objectives. The design phase of the renewal process for Food Studies 10, 30 is currently planned for the 2012-2013 school year and scheduled for introduction the year following (2013-14). Until then, those responsible for teaching Food Studies 10/30, will continue using the 1999 document, Renewal Curricula: Understanding Outcomes, in preparation for the coming renewal.

Current Food Issues
Foundational Objectives:
- To develop the desire and ability to access knowledge about issues and obtain factual information before forming opinions about food related issues.
- To be aware of and practice environmental protection through conservation and recycling.

Common Essential Learnings: Foundational Objectives
- To explore present technology and its relationship to the world’s food supply (TL)
- To explore the relationships between culture and the social and geographical influences on food customs. (PSVS)

The Science of Nutrition
Foundational Objectives
- To understand the importance of the science of nutrition
- To better understand the social and cultural aspects of food for all people.
- To develop the desire and ability to access knowledge about issues and obtain factual information before forming opinions about food related issues.

Common Essential Learnings: Foundational Objectives
- To understand and use the vocabulary related to diet, food and food preparation. (COM)
- To interpret data and tables for nutritional value of foods. (NUM)
- To apply knowledge when making independent decisions regarding food choices and preparation. (CCT, IL)

Make Mine Quick and Healthy
Foundational Objectives
- To be creative when applying knowledge about nutrition to food preparation.

Common Essential Learnings: Foundational Objectives
- To gain the knowledge and develop the skills required to make appropriate food choices and to become discriminating consumers. (CCT)

*NOTE: Corresponding modules in Food Studies 10/30 (SK Ministry of Education)
Make Mine and Healthy—Module 16
The Science of Nutrition—Module 17
Current Food Issues—Module 27
The Science of Nutrition

Foundational Objectives

- To understand the importance of the science of nutrition
- To better understand the social and cultural aspects of food for all people.
- To develop the desire and ability to access knowledge about issues and obtain factual information before forming opinions about food related issues.

Common Essential Learning’s Foundational Objectives

- To understand and use the vocabulary related to diet, food and food preparation. (COM)
- To interpret data and tables for nutritional value of foods. (NUM)
- To apply knowledge when making independent decisions regarding food choices and preparation. (CCT, IL)
Nutrition for Living

Learning Objectives

- To recognize the relationship between science, food, and health.
- To appreciate how understanding nutrition can benefit your body.
- To demonstrate learning through active participation.

Resources and Materials

- Leslie Beck, Registered Dietician - [http://www.lesliebeck.com/](http://www.lesliebeck.com/) - a good, general source of up-to-date information about nutrition and health
- Health Canada PowerPoint about nutrition labeling
- Health Canada Interactive Nutrition Label Quiz
- Comparison chart of definitions of science, nutrition and health (attached)
- newsprint and markers
- a selection of pre-packaged foods, with nutrition labels, on display
- Internet access for students

Assessment

- Observe students during group work, class discussions and individual and group work. Do they illustrate a commitment to and understanding of the role of nutrition in their health?
- Record comments/reflections on the attached anecdotal record sheet.
- Have students self-assess their knowledge of nutrition labeling and ways that their thinking about nutrition has developed and/or changed.

Learning Event

Set

1. Have advance organizer on display with the following items:
   - Nutrition for Living
   - nutrition as a science for health
   - discovering nutrition in foods
   - What about all the claims made in the media?
2. selection of pre-packaged foods on display

Method

1. Introduce the class to the module topic by letting them know that they will focus on nutrition, the reasons for understanding its role in our lives, the nutritional content of various foods, and how we can make good food decisions for our health.
2. First, brainstorm definitions of “nutrition”. Write on board for the class to refer to during the class.
3. Place students into small groups and provide them with the attached chart of definitions of science, nutrition and health.
4. The group task is to compare and contrast the definitions and to arrive at a description about what connects
the three concepts. Create a Venn diagram (as below) on newsprint, to illustrate the commonalities and differences. Debrief.

4. Discuss how the concepts connect and how the class’ definitions of “nutrition” relate to those provided on the chart. Ensure that students understand that nutrition, as a foundation of health, is understood by the scientific study of nutrient needs within the human body and also the various food sources of those nutrients.

5. What is a nutrient? Ask students to describe a nutrient as in the example below:

6. Draw the discussion to a conclusion with a summary statement such as “All living organisms require nutrients for energy, growth and healing, and these nutrients exist in food sources.”

7. Go to the Health Canada PowerPoint about nutrition labeling, and, using the speaker notes and slides, review the history of nutritional labeling, how the label is currently laid out, and how to read the label for necessary information pertaining to individual nutrition needs. Have students take notes.

8. Review the nutrition labels on the foods on display and determine their value to nutrition. Examine the ingredients list to assess what is in the products. Compare nutrition data for two similar products and determine which is a better choice. Which vitamins and minerals are noted (i.e. vitamin A, vitamin C, calcium and iron, because they are especially important)? How many specific nutrients are noted?

9. Have students take the short Health Canada Interactive Nutrition Label Quiz, to assess how well they can read a label.

10. Research and examine various organic certification labels, and identify and discuss the assurance they provide.

11. Have students, on their own, visit the Purdue University web page “Understanding Nutritional Information” to explore the thinking skills needed to assess and evaluate the plethora of information people are exposed to through the media and various health reports.

12. After they finish, they are to consider how their thinking about nutrition has changed or developed, and write a summary of their assessment. Gather these, and use them for assessing student needs and interests.
### Instructions
1. Compare and contrast the definitions given to “Science”, “Nutrition”, and “Health”.
2. Write a summary description of how “Nutrition” and “Health” are connected to or related to “Science”.

<table>
<thead>
<tr>
<th>SCIENCE</th>
<th>NUTRITION</th>
<th>HEALTH</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science (from the Latin scientia, meaning &quot;knowledge&quot;) is, in its</td>
<td>the scientific study of food and drink (especially in humans)</td>
<td>the general condition of body and mind; &quot;his delicate health&quot;; &quot;in poor</td>
</tr>
<tr>
<td>broadest sense, any systematic knowledge-base or prescriptive practice</td>
<td>wordnetweb.princeton.edu/perl/</td>
<td>health&quot;; &quot;in poor health&quot;;</td>
</tr>
<tr>
<td>that is capable of resulting in a correct prediction, or</td>
<td>webwn</td>
<td>&quot;a rosy healthy baby&quot;;</td>
</tr>
<tr>
<td>reliably-predictable type of outcome. ...</td>
<td>Nutrition (also called nourishment or aliment) is the provision,</td>
<td>&quot;staying fit and healthy&quot;</td>
</tr>
<tr>
<td>en.wikipedia.org/wiki/Science</td>
<td>to cells and organisms, of the materials necessary (in the form of</td>
<td></td>
</tr>
<tr>
<td></td>
<td>food) to support life. Many common health problems can be</td>
<td></td>
</tr>
<tr>
<td></td>
<td>prevented or alleviated with a healthy diet.</td>
<td></td>
</tr>
<tr>
<td>The collective discipline of study or learning acquired through the</td>
<td>the consumption and utilization of a diet. To varying degrees,</td>
<td></td>
</tr>
<tr>
<td>scientific method; the sum of</td>
<td>anxiety disorders can be affected by nutritional issues.</td>
<td></td>
</tr>
<tr>
<td>knowledge gained from such methods and discipline; A particular</td>
<td>anxiety-panic.com/dictionary/en-</td>
<td></td>
</tr>
<tr>
<td>discipline or branch of learning, especially one dealing with</td>
<td>dictn.htm</td>
<td></td>
</tr>
<tr>
<td>measureable or systematic principles rather than intuition or natural</td>
<td></td>
<td></td>
</tr>
<tr>
<td>en.wiktionary.org/wiki/science</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The systematic study of humans and their environment based on</td>
<td>A process or series of processes by which the living organism as a</td>
<td></td>
</tr>
<tr>
<td>the deductions and inferences which can be made, and the</td>
<td>a whole (or its component parts or organs) is maintained in its</td>
<td></td>
</tr>
<tr>
<td>general laws which can be formulated, from reproducible observations</td>
<td>normal condition of life and growth. <a href="http://www.ventria.com/">www.ventria.com/</a></td>
<td></td>
</tr>
<tr>
<td>and measurements of events and parameters within the</td>
<td>glossary.asp</td>
<td></td>
</tr>
<tr>
<td>universe. (Macquarie Dictionary) <a href="http://www.arc.gov.au/general/">www.arc.gov.au/general/</a></td>
<td></td>
<td></td>
</tr>
<tr>
<td>glossary.htm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>systematically acquired knowledge that is verifiable.</td>
<td>The study of the materials that nourish an organism and of the</td>
<td></td>
</tr>
<tr>
<td>oregonstate.edu/instruct/</td>
<td>manner in which the separate components are used for</td>
<td></td>
</tr>
<tr>
<td>anth370/gloss.html</td>
<td>maintenance, repair, growth, and reproduction. <a href="http://www.blue-">www.blue-</a></td>
<td></td>
</tr>
<tr>
<td></td>
<td>mountain.net/feed/terminology.htm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>The sum of processes by which one takes in and utilizes nutrients.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ncp.aspenjournals.org/cgi/content/full/20/2/281</td>
<td></td>
</tr>
</tbody>
</table>
## Anecdotal Record Template

**Class** __________________________ **date** ______________________________

**Instructions:** Record the names of students in the sections, and comment on their movement towards the intended outcomes.

If needed, create a legend to rate progress:

<table>
<thead>
<tr>
<th>5</th>
<th>4</th>
<th>3</th>
<th>2</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

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Nutrients for Energy and Growth

Learning Objectives
- To appreciate how understanding nutrition can benefit your body.
- To recognize that nutrients work in combination in the body.
- To interpret data and tables for nutritional value of foods.
- To demonstrate learning through active participation.

Resources and Materials
- Canadian Nutrient File: a searchable, online data base that illustrates nutrients in foods.
  Click on “Search online for foods in the Canadian Nutrient File, version 2007b.”
- Health Canada "Canada Food Guide"
- Canada’s Food Guide’s "My Food Guide"
- Chart for students to record nutrients in food choices

Assessment
- As students share their food nutrient research, and they have been asked to draw lessons from the picture created, observe the students to assess their skill and knowledge development. Using the Anecdotal Record Template on page 8 for recording assessment data.

Learning Event
Set
1. Advance organizer:
   - Nutrients for Energy and Growth
   - Checking out the food we ate yesterday
   - My Food Guide
   - Getting the right nutrients
2. To provide a basis to discuss essential nutrients for youth, have students individually record the food that they consumed the day before. Not using names, have them record this information on a large class chart as below.

<table>
<thead>
<tr>
<th>Student number</th>
<th>meats and alternatives</th>
<th>dairy and alternatives</th>
<th>breads and cereals</th>
<th>fruits and vegetables</th>
<th>liquid</th>
<th>snacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>............</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. When this is done, examine the chart to ascertain the types of information it provides regarding nutrition.

Method
1. Using the Internet, have students visit Health Canada’s "Canada Food Guide" and review the types of foods that are parts of complete nutrition. How does the class compare and contrast with what is considered good
nutrition? What is well done by students and what more is needed?

2. Then, have them go to Canada’s Food Guide’s “My Food Guide”, and fill out the questionnaire to determine their optimum nutrition needs and intake. Ask students to make choices based on what they have or could have available to them.

3. Refer to “My Food Guide” and ask students to:
   - describe the range of foods they are to have each day (i.e. following the Canada Food Guide) to be adequately nourished, and why there is a range of suggested intake (e.g. activity level of person).
   - tell why people are to choose from each of the foods groups each day (i.e. because different foods have different essential nutrients).
   - list the six key nutrient classes (carbohydrates, protein, fats, vitamins, minerals, and water).

4. Ask students to choose 3-4 foods from different food groups from their food guides. For each food (for example: almonds, potatoes, pork), research the type of key nutrients that are in that food. They will find numerous sources of information online. The Canadian Nutrient File is a comprehensive source that contains this basic information within a detailed analysis. Record information on the chart on the next page.

5. In the next class, have students put these nutrient breakdowns on display. The class will have a picture of what specific nutrients are in foods they consume. What does this picture teach us (e.g. that some foods have many nutrients; some have a lot one of or two nutrients; and so on).

![My Food Guide](image-url)

example of individual printable action sheet, for a 14-18 year old girl, developed with “My Food Guide”
<table>
<thead>
<tr>
<th>Nutrients in My Food Choices</th>
<th>water</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>minerals</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>vitamins</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>fats</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>protein</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>carbohydrates</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>food</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Recommended Daily Intake for Vitamins and Mineral Nutrients

<table>
<thead>
<tr>
<th>Vitamin or Mineral Nutrient</th>
<th>Units</th>
<th>Persons 2 years of age or older</th>
<th>Infants and Children less than 2 years old</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A</td>
<td>RE&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1000</td>
<td>400</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>µg&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>mg&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>mg</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Thiamin, Thiamine or Vitamin B&lt;sub&gt;1&lt;/sub&gt;</td>
<td>mg</td>
<td>1.3</td>
<td>.45</td>
</tr>
<tr>
<td>Riboflavin or Vitamin B&lt;sub&gt;2&lt;/sub&gt;</td>
<td>mg</td>
<td>1.6</td>
<td>.55</td>
</tr>
<tr>
<td>Niacin</td>
<td>NE&lt;sup&gt;d&lt;/sup&gt;</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;6&lt;/sub&gt;</td>
<td>mg</td>
<td>1.8</td>
<td>.7</td>
</tr>
<tr>
<td>Folacin or Folate</td>
<td>µg</td>
<td>220</td>
<td>65</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt;</td>
<td>µg</td>
<td>2</td>
<td>.3</td>
</tr>
<tr>
<td>Pantothenic Acid or Pantothenate</td>
<td>mg</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>µg</td>
<td>80</td>
<td>30</td>
</tr>
<tr>
<td>Biotin</td>
<td>µg</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Calcium</td>
<td>mg</td>
<td>1100</td>
<td>500</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>mg</td>
<td>1100</td>
<td>500</td>
</tr>
<tr>
<td>Magnesium</td>
<td>mg</td>
<td>250</td>
<td>55</td>
</tr>
<tr>
<td>Iron</td>
<td>mg</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Iodide</td>
<td>µg</td>
<td>160</td>
<td>55</td>
</tr>
<tr>
<td>Selenium</td>
<td>µg</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Copper</td>
<td>mg</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Manganese</td>
<td>mg</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Chromium</td>
<td>µg</td>
<td>120</td>
<td>12</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>µg</td>
<td>75</td>
<td>15</td>
</tr>
</tbody>
</table>

<sup>a</sup> RE = retinol equivalents  
<sup>b</sup> µg = micrograms  
<sup>c</sup> mg = milligrams  
<sup>d</sup> NE = niacin equivalents

source: [Canadian Food Inspection Agency (CFIA)](https://www.inspection.gc.ca/)

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**Recommended Daily Intake for Vitamins and Mineral Nutrients**

<table>
<thead>
<tr>
<th>Vitamin or Mineral Nutrient</th>
<th>Units</th>
<th>Persons 2 years of age or older</th>
<th>Infants and Children less than 2 years old</th>
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<tbody>
<tr>
<td>Vitamin A</td>
<td>RE&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1000</td>
<td>400</td>
</tr>
<tr>
<td>Vitamin D</td>
<td>µg&lt;sup&gt;b&lt;/sup&gt;</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>mg&lt;sup&gt;c&lt;/sup&gt;</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>mg</td>
<td>60</td>
<td>20</td>
</tr>
<tr>
<td>Thiamin, Thiamine or Vitamin B&lt;sub&gt;1&lt;/sub&gt;</td>
<td>mg</td>
<td>1.3</td>
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</tr>
<tr>
<td>Riboflavin or Vitamin B&lt;sub&gt;2&lt;/sub&gt;</td>
<td>mg</td>
<td>1.6</td>
<td>.55</td>
</tr>
<tr>
<td>Niacin</td>
<td>NE&lt;sup&gt;d&lt;/sup&gt;</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;6&lt;/sub&gt;</td>
<td>mg</td>
<td>1.8</td>
<td>.7</td>
</tr>
<tr>
<td>Folacin or Folate</td>
<td>µg</td>
<td>220</td>
<td>65</td>
</tr>
<tr>
<td>Vitamin B&lt;sub&gt;12&lt;/sub&gt;</td>
<td>µg</td>
<td>2</td>
<td>.3</td>
</tr>
<tr>
<td>Pantothenic Acid or Pantothenate</td>
<td>mg</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Vitamin K</td>
<td>µg</td>
<td>80</td>
<td>30</td>
</tr>
<tr>
<td>Biotin</td>
<td>µg</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Calcium</td>
<td>mg</td>
<td>1100</td>
<td>500</td>
</tr>
<tr>
<td>Phosphorus</td>
<td>mg</td>
<td>1100</td>
<td>500</td>
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<tr>
<td>Magnesium</td>
<td>mg</td>
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<td>Iron</td>
<td>mg</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Zinc</td>
<td>mg</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Iodide</td>
<td>µg</td>
<td>160</td>
<td>55</td>
</tr>
<tr>
<td>Selenium</td>
<td>µg</td>
<td>50</td>
<td>15</td>
</tr>
<tr>
<td>Copper</td>
<td>mg</td>
<td>2</td>
<td>.5</td>
</tr>
<tr>
<td>Manganese</td>
<td>mg</td>
<td>2</td>
<td>1.2</td>
</tr>
<tr>
<td>Chromium</td>
<td>µg</td>
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<td>12</td>
</tr>
<tr>
<td>Molybdenum</td>
<td>µg</td>
<td>75</td>
<td>15</td>
</tr>
</tbody>
</table>

<sup>a</sup> RE = retinol equivalents  
<sup>b</sup> µg = micrograms  
<sup>c</sup> mg = milligrams  
<sup>d</sup> NE = niacin equivalents

source: [Canadian Food Inspection Agency (CFIA)](https://www.inspection.gc.ca/)
Vitamins and Minerals-Micronutrients

Learning Objectives

- To recognize that nutrients work in combinations in the body.
- To determine the adequate requirements for nutrients.
- To appreciate how understanding nutrition can benefit our body.
- To examine the functions of the common nutrients and identify sources.

Resources and Materials

- Chart, attached, for Recommended Daily Intake (RDI) of many nutrients - from Canadian Food Inspection Agency (CFIA), on PowerPoint or overhead.
- Internet access

Assessment

- Assess students’ written assignment in light of the lesson objectives. Record this on an anecdotal record template.

Learning Event

Set

1. Advance organizer:
   - **Vitamins and Minerals**
     - Recommended Daily Intake (RDI)
     - What nutrients do we need?
     - How much do we need?
     - How do they benefit us?
     - Where do we get them?

1. Examine the student food nutrition charts from the previous day, noting the range of nutrients from various food types. Focus on the vitamins and minerals they discovered in several of their food choices in the Food Guides. Note that only 4 of the possible nutrients are listed on nutrition labels because they are key. However, there are many other nutrients that are also important.

Method

1. Examine the chart from the Canadian Food Inspection Agency (CFIA). It summarizes most, but not all nutrients that benefit the human body. The Canadian government has established guidelines for health, and terms them Recommended Daily Intakes, or RDI. Of these, the class has already noted several as important. On nutrition labels the RDI is expressed in a %, based on a 2,000 calorie diet.

2. Explain that their assignment will be, in pairs, to research one or more of the nutrients and to present their findings to the class. They can use a form as on the next page to record their information.

3. Debrief the results of student research.

4. Ask students to examine the reports carefully and note any foods that have multiple vitamins and/or minerals. Make a “master list” of foods that nourish. Compare and contrast these with My Food Guide choices done in a

Micronutrients are vitamins and minerals that are required for our body in minute amounts to fight diseases, to support metabolic activities and protect against infections. These are essential for maintenance of health and longevity.

source: TamilNadu Agricultural University Coimbatore -641003, India
previous lesson.

**vitamin and mineral nutrients**

<table>
<thead>
<tr>
<th>nutrient</th>
<th>RDI</th>
<th>What does it do in our bodies?</th>
<th>what foods are good sources of this nutrient?</th>
<th>Are combinations recommended for effectiveness?</th>
</tr>
</thead>
<tbody>
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</table>

5. Have students create a list of foods, for each food group, from which to choose to meet My Food Guide principles. Once they have made their lists, have them explain, in a written assignment:
   - their rationale for their choices.
   - a plan of action to make nutritional improvements*

Submit the lists and the written assignment.

**IMPORTANT:** * Food security and the expense of some foods may be issues in some students' lives. Because of this, note the module “Make Mine Quick and Healthy” to discover inexpensive ways to provide nourishment. For more information about food security and the cost of healthy eating in Saskatchewan, please visit Food Secure Saskatchewan at the link below and also the module “Current Food Issues”, specifically the lesson “The Right to Food”.

www.foodsecsuresaskatchewan.ca
What About Macronutrients?

Learning Objectives

- To understand what carbohydrates are and to distinguish between the various types of carbohydrates.
- To understand fats and their role in the diet.
- To examine and evaluate the role of cholesterol in the body and its implications for good health.
- To examine the role of protein in the body.

Resources and Materials

- Internet access
- PowerPoint creation
- instructions for group research and presentations (attached)
- Dieticians of Canada– Eat Well-Live Well

Assessment

- group presentations - presentation rubric
- rubric can be used by teacher and/or peers

Learning Event

Set

1. Advance organizer:
   - **What About the Macronutrients?**
   - naming them
   - group research
   - PowerPoint presentations

Method

1. Refer back to nutrition labels and what information is included. Recall that vitamins and minerals are called “micronutrients” because very small amounts are needed for nutrition. The students will now research macronutrients, the carbohydrates, fats and cholesterol, and protein that provide energy. In research groups their task will be to research one type of macronutrient and prepare a PowerPoint to teach the class about it and its role in human nutrition.
2. Assign groups and provide the attached assignments sheets and a copy of the presentation rubric to each group.
3. Provide adequate time to research, summarize, and create PowerPoints. Have groups create handout masters of their presentations
4. During class presentations, have audience take notes on their handouts.
5. Assessment can be done by peers and / or teacher.

*Macronutrients give energy in the form of kilocalories (KCal). The nutrients namely carbohydrate, protein and fat are collectively known as macronutrients.*

*source: TamilNadu Agricultural University
Coimbatore -641003, India*
Group Assignment:

- Research “carbohydrates” as an area of nutrition and create a PowerPoint that addresses each of the slides noted below.
- You may add additional slides and information as you wish.
- Be sure to include a list of references on the last slide.

PowerPoint Slide number

1. Title page

2. define carbohydrate, name 3 types, why carbohydrates are important and recommended daily intake for youth (as in % of total calories)

3. explain complex carbohydrates and give examples

4. explain types of simple carbohydrates (sugars) and examples of each

5. chemical structures of various carbohydrate molecules and composition

6. importance of fiber in diet and good sources of fiber

7. examples of processed foods, types of carbohydrates, nutritious? why? why not?

8. examples of processed foods, types of carbohydrates, nutritious? why? why not?

9. examples of processed foods, types of carbohydrates, nutritious? why? why not?

10. survey of favourite carbohydrate foods among 20 random students and type of carbohydrates (simple, complex, processed)

11. analysis of research group’s previous day’s food intake regarding:
   - percentage of total calories from carbohydrates
   - analysis of types of carbohydrates consumed

12. conclusion and lessons learned

13. references
Group Assignment

- Research "fats" as an area of nutrition and create a PowerPoint that addresses each of the slides noted below.
- You may add additional slides and information as you wish.
- Be sure to include a list of references on the last slide.

PowerPoint Slide Number

1. Title page

2. define the types of fat (saturated, monounsaturated, and polyunsaturated), why fat is important in diet, and recommended amounts for youth

3. define essential fatty acids (EFAs), why they are important to health, how much people need of EFAs, why it is a health concern, and the foods that contain EFAs

4. examine the current trend for low fat foods. Define "low-fat", "lite", "light", and "no-fat"

5. show advertising claims for each definition in #4

6. health risks of too much dietary fat, and how excess fat is deposited in the bodies of males and females

7. show nutritional data from various foods and illustrate the combination of saturated and unsaturated fats in those foods, noting what we can learn from this data

8. using a selection of common foods students eat, rub small quantities of each on plain brown paper (like a grocery bag), let dry and hold to light to see if there is a stain from fat. In this slide, summarize your search for hidden fat.

9. have a group of 10 students record the food eaten in one day and use a computer program to assess total calories, carbohydrates, fat and protein. A free site that does the analysis for you is available at www.sparkpeople.com. Chart the results and determine the percentage of fat relative to other nutrients. How do the results compare with recommended amounts?

10. survey the class for favourite breakfast foods, assess for types of fat, report in this slide

11. what about fat substitutes?- assess recent information and determine whether these substances are neutral, beneficial or hazardous to health

12. get nutritional information for common fast foods and processed foods, determine amounts of fat and create a visual representation of the amounts of fat, and how they compare to recommended portions

13. references
1. Title
2. define and explain its role in health, note sources of cholesterol
3. LDL—what is it, how is it connected to human health, HDL—what is it, how does it connect to human health
4. research article re LDL cholesterol and health, summarize findings on slide
5. research article re LDL cholesterol and health, summarize findings on slide
6. research article re HDL cholesterol and health, summarize findings on slide
7. research article re HDL cholesterol and health, summarize findings on slide
8. non-dietary effects on cholesterol levels
9. explain process of hydrogenation and production of trans fats, compare and contrast trans fats with saturated fats
10. trans fats in our diets—what’s the problem? trans fats in common foods—search processed grocery items’ nutrition labels and list items found to have trans fats
11. which fats are high in cholesterol, evaluate the dietary implication
12. list of ways to lower harmful fats and fats generally
13. references
PowerPoint Slide Number

1. Title
2. what is the role of protein for human health, what is the daily recommendation for youth
3. explain amino acids, essential and non-essential amino acids list examples of each
4. explain complete and incomplete protein list examples of each
5. explain how amino acids combine to make different proteins
6. use of amino acid supplements by body-builders– why– are they effective?
7. protein diet-what is it, what does it do to the body, is it healthy
8. protein use in another country and sources country 1
9. protein use in another country and sources country 2
10. protein use in another country and sources country 3
11. define complementary protein and provide examples
12. list popular foods that can be combined to create complete protein
13. references
### Presentation Rubric

<table>
<thead>
<tr>
<th>criteria</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>organization of PowerPoint and oral presentation</strong></td>
<td>Audience cannot understand presentation because there is no sequence of information.</td>
<td>Audience has difficulty following presentation because presenters jump around.</td>
<td>Students present information in logical sequence which audience can follow.</td>
<td>Students present information in logical, interesting sequence which audience can follow.</td>
</tr>
<tr>
<td><strong>evidence of research and comprehension</strong></td>
<td>Students do not have grasp of information; students cannot answer questions about subject.</td>
<td>Students are uncomfortable with information and are able to answer only rudimentary questions.</td>
<td>Students are at ease with expected answers to all questions, but fail to elaborate at times.</td>
<td>Students demonstrate full knowledge (more than required) by answering all class questions with explanations and elaboration.</td>
</tr>
<tr>
<td><strong>conclusions linking nutrient category to human health</strong></td>
<td>Students have not clearly thought about the connection between assigned nutrient category and health and have no clear conclusion</td>
<td>Students demonstrate an understanding that nutrient category connects to human health but do not give clear and concise reasoning.</td>
<td>Students provide an argument connecting nutrient category to human health, providing clear reasoning.</td>
<td>Students have arrived at clear, concise conclusions that are well stated and supported with examples.</td>
</tr>
<tr>
<td><strong>visuals</strong></td>
<td>Students use superfluous graphics or no graphics</td>
<td>Students use graphics but do not support text and presentation. Some attempt was made to organize the visuals.</td>
<td>Students' graphics relate to text and presentation. Visuals are tidy and clearly connect to the presentation topic.</td>
<td>Students' graphics explain and reinforce text and presentation. Visuals are engaging and well done with care and attention to detail.</td>
</tr>
</tbody>
</table>

**NOTE:** This assessment can be completed by peers and/or teacher.
Water for Life

Learning Objectives
- To understand the importance of water for good health.
- To make environmentally sound decisions concerning drinking water.

Resources and Materials
- Health Canada Tap Water Survey
- Internet access
- Leslie Beck R.D. – article about drinking water
- World Bank – fact sheet and quiz about water – download and print copies
- a selection of liquids and foods
- anecdotal record template
- world map

Assessment
- From student writing in step 10, assess the degree to which individual students achieved the intended learning. Note this assessment on an anecdotal record template.

Learning Event
Set
1. Advance organizer:
   - Water for Life
   - the importance of water
   - How much do we drink, need and why?
   - What are good sources for most people?
   - What is the global water picture?
   - What have we learned?

2. Have on display a selection of liquids and food items (tap water in a glass, bottled water, various other drinks (such as coffee, tea, juice, soft drink) various fruits and vegetables, bread, crackers).
3. Tell students that they will explore the importance of water for health and also examples of environmentally sound decisions concerning water.

Method
1. Brainstorm with students about what would be affected, and how, if their community suddenly did not have access to clean water. Probe answers.

   - bathing
   - cooking
   - brushing teeth
   - swimming pool
   - making coffee or tea
   - water fountain
   - hospital

   no water
2. Have students calculate the average amount of water they drink daily, by having them think back to the previous day's water consumption. How does this compare the recommended 6-8 glasses per day?

3. Discuss the importance of adequate water intake and record responses (e.g. because the human body is mostly water, water helps to rid the body of wastes and so on).

4. List health problems that may occur if there is insufficient water in the diet. You may have to ask students to research some of these problems.

5. Have students try to drink the required 6-8 glasses of plain water for several days. Evaluate the results. Was it easy? Why? Why not?

6. Ask students to examine the selection of liquids and foods on display and discuss the merits of each as additional sources of water (e.g. yes, soft drinks are mostly water but they also have a lot of sugar and the acids hurt the teeth, and so on).

7. Have students examine the bottled water and the glass of tap water. Discuss the relative benefits of each and which is the best choice for people and why.
   - bottled water label often says something like "cold mountain spring" water when it is from a tap perhaps in their own province
   - it is expensive
   - the number of plastic bottles is a huge environmental issue
   - tap water in Canada is considered very safe
   - some feel that tap water is not clean
   - people throw toxins into the water; and so on

2. Determine ways to improve the environmental concerns around water (e.g. use tap water instead of buying bottled water; educate about disposing of toxins into water, and so on).

3. Discuss the issue of water and water quality in different parts of the world. Download the short quiz and answer key about the global water picture from the World Bank's [fact sheet and quiz about water](#). After the students have completed the quiz and their answers checked with the answer key provided, ask them to consider the ways their lives compare and contrast to this information. What can we do in Canada to assist others?

4. Search for information about current water issues globally. Brainstorm keywords that students can use for Internet searches. Reference pertinent information (so that the source can be found again), summarize discoveries, and share as a class. Note areas on world map.

5. As a concluding activity, give them a writing assignment, to be submitted for assessment, in which they are:
   - to explain the importance of water to their health
   - to describe how we can best ensure water quality now and into the future for all citizens.

---

**Should I be concerned about the safety of my tap water?**

No. Drinking water in Canada is amongst the safest in the world. All provinces and territories have comprehensive regulatory regimes in place to ensure the safety of drinking water, including appropriate treatment. This survey is part of Health Canada's routine monitoring processes.

*Health Canada Tap Water Survey*
Searching for Good Nutrition

Learning Objectives

- To apply previous learning to making better consumer choices regarding nutrition
- To begin to assess the relationships between nutrient quality and production methods
- To explore the debate concerning conventional and organic food production systems.

Resources and Materials

- Organic Agriculture Centre of Canada: Consumer Research-Behaviour and Marketing
- Organic Agriculture Centre of Canada: Consumer Health and Safety
- The Learning Channel (TLC): "How Organic Food Works"
- Dieticians of Canada: Eat Well-Live Well

Background

- There is a debate about conventional and organic production, about the relative merits of each. This last lesson in “The Science of Nutrition” will challenge students to explore the foundations of this debate and arrive at their own tentative conclusions as to best consumer choices.

Assessment

- Have students examine the evidence that the class has researched and discussed and, combining this knowledge with that from other lessons in this module, have them create an article about what the focus on nutrition has taught them about sound consumer choices and how their individual choices have been altered.

Learning Event Set

1. Advance Organizer:
   - Searching for Good Nutrition
     - Organic? Conventional? What’s the best choice and why?

2. Briefly review the lesson topics of the module thus far, stating then that the last focus is to think about, research and discuss where the best sources are for nutrients. For example, do all carrots have the same nutrients? Why might they differ?

3. This lesson will ask the class to explore and contrast organic food production with conventional food production, and draw their own conclusions as to how to search for good nutrition.

Method

1. Divide the class into two groups, Assign each group one of the two approaches to food production and ask them to find out as much as they can about the approach, under the general headings and questions posed on the next page. They may search sites such as those noted in this lesson, interview producers, and use library resources. Students can work individually or in pairs. They are to record their sources on page 2.

2. Once the students have had time to find information, gather as a class and fill in a master chart that illustrates the approaches. Examine the master chart and discuss similarities and differences.

3. At the close of the discussion, give students an expository writing assignment in which they are to create an article about what the focus on nutrition has taught them about sound consumer choices from production to consumption.
Compare and Contrast Organic and Conventional Food Production. Page 1

<table>
<thead>
<tr>
<th>approach and definition</th>
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<table>
<thead>
<tr>
<th>When did it begin?</th>
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<th>Why did it begin?</th>
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<tr>
<th>What people and businesses are involved? Why?</th>
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<th>What are the guiding principles?</th>
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<th>How is the land and soil viewed with this approach?</th>
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<th>How is the approach applied?</th>
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<tr>
<th>What are some of the claims and issues with this approach?</th>
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### Sources of Information

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8. 

9. 

10.
Extending the lesson

- Incorporate a taste test of a selection of foods.
- Check the cost of inputs by comparison.
- Look at the results of mono culture in regards to disease in the plants.
- Review the module “Current Food Issues” to assess ecological footprints.