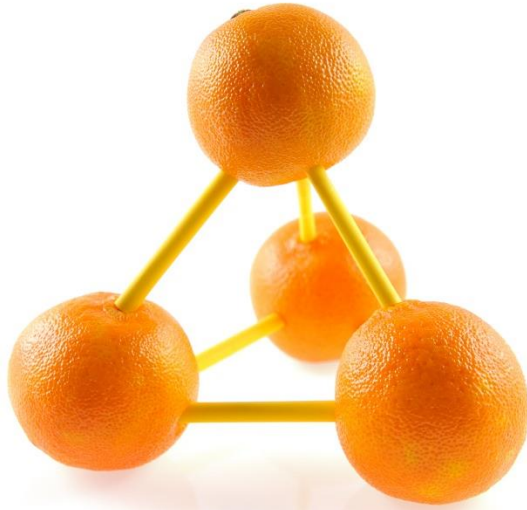


TEACHING NUTRITION IN SASKATCHEWAN



Health Science 20

Developed by: Saskatchewan Health Authority Public Health Nutritionists

The purpose of *Teaching Nutrition in Saskatchewan: Concepts and Resources* is to provide credible Canadian based nutrition information and resources based on the Saskatchewan Health Education Curriculum (2010).

The **Nutrition Concepts and Resources** section identifies nutrition concepts and resources relating to grade-specific provincial Health Education curriculum outcomes. These lists only refer to the curriculum outcomes that have an obvious logical association to nutrition. They are only suggestions and not exclusive.

The **Nutrition Background Information** section provides educators with current and reliable Canadian healthy eating information.

For more information, email the Population Health Department at:
populationhealth@saskhealthauthority.ca

Table of Contents

	Page
Nutrition Related Outcomes - Concepts and Resources	
– <u>Career Exploration (CE1)</u>	3
– <u>Human Body (HB1 & 2)</u>	4
– <u>Human Nutrition (NU1 & 2)</u>	7
Nutrition Background Information	
– <u>Nutrition Related to Diabetes and Heart Disease (HB2)</u>	15
– <u>Nutrients in Foods and Health Risks: What does the research say? (NU1)</u>	18
– <u>Foods and Eating Habits Linked to Good Health (NU2)</u>	23
– <u>Accessing Health Information Online (NU2)</u>	30
– <u>Reading Health Studies (NU2)</u>	31
– <u>Evolution of Canada’s Food Guide (NU2)</u>	34
– <u>Planning a Healthy Menu (NU2)</u>	36
– <u>Healthy Eating for Active Youth (NU2)</u>	39
– <u>Nutrition Trends/Fad Diets</u>	42
– <u>Opportunities and Barriers to Healthy Eating (NU2)</u>	47
o <u>Activity: Food Environment Assessment (NU2)</u>	50
– <u>Processed Foods (NU2)</u>	52
– <u>Weight Bias (NU2)</u>	54
– <u>Body Composition and Health Risks in Youth (NU2)</u>	56

Health Science 20

Career Exploration

Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
HS20-CE1 Analyze and explore health-science related occupations in Saskatchewan, Canada and the world.	What is a Registered Dietitian (RD)?	<ul style="list-style-type: none"> • <i>Dietitians</i>. Dietitians of Canada: unlockfood.ca • <i>What is a Dietitian?</i> Video from Unlock Food, Dietitians of Canada. unlockfood.ca • <i>Is there a difference between a Dietitian and a Nutritionist?</i> Dietitians of Canada dietitians.ca • <i>Dietitian vs. Nutritionist vs. Holistic Nutritionist</i>. Dietetic Directions dieteticdirections.com
	Becoming an RD	<ul style="list-style-type: none"> • <i>Become a Dietitian</i>. Dietitians of Canada dietitians.ca • <i>Becoming an RD in Saskatchewan</i>. Saskatchewan Dietitians Association saskdietitians.org • <i>Nutrition Program Information</i>. University of Saskatchewan admissions.usask.ca
	Where do RDs Work?	<ul style="list-style-type: none"> • <i>Dietitians Make a Difference</i>. Dietitians of Canada. dietitians.ca • <i>What does the early career look like for new graduates?</i> dietitians.ca • <i>About Dietetics; Why Choose a RD; Where do RDs Work</i>. Saskatchewan Dietitians Association saskdietitians.org

Human Body		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-HB1 Analyze the anatomy and physiology of a healthy human.</p>	<p>Anatomy and physiology of healthy systems</p>	<p>Crash Course</p> <ul style="list-style-type: none"> • Anatomy and Physiology Preview • Digestive System: Part 1 , Part 2 , Part 3 • The Excretory System From Your Heart to the Toilet • The Urinary System: Part 1 ,Part 2 <p>Ted Ed Animations</p> <ul style="list-style-type: none"> • How do our kidneys work? • What does the pancreas do?
<p>HS20-HB2 Investigate the effects of various injuries, disorders and diseases on human cells, tissues, organs and systems</p>	<p>Nutrition-Related Disease <i>Diabetes</i></p>	<p>Background Information: Nutrition Related to Diabetes and Heart Disease p. 17</p> <ul style="list-style-type: none"> • Diabetes Canada: www.diabetes.ca • <i>Canadian Clinical Practice Guidelines</i>. Diabetes Canada guidelines.diabetes.ca • <i>Understanding Type 2 diabetes</i>. youtube.com • <i>Diabetes mellitus (type 1, type 2) & diabetic ketoacidosis (DKA) - causes & symptoms</i>. osmosis.org • <i>Type 1 Diabetes: The Basics for Teachers & School Staff</i> diabetesatschool.ca • <i>Dealing with Feelings about Diabetes</i>. Teens Health kidshealth.org

Human Body		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
HS20-HB2 Investigate the effects of various injuries, disorders and diseases on human cells, tissues, organs and systems	Nutrition-Related Disease Diabetes	<i>Diabetes in Indigenous populations</i> <ul style="list-style-type: none"> • <i>Type 2 Diabetes and Indigenous People</i>. Diabetes Canada. diabetes.ca • <i>Diabetes in Canada: Facts and Figures - Diabetes among First Nations, Inuit, and Métis populations</i>. Public Health Agency of Canada. phac-aspc.gc.ca • <i>Diabetes epidemic in Indigenous populations' highlights disparity</i>. CBC News. cbc.ca
	Cancer	<ul style="list-style-type: none"> • <i>Lowering your Risk for Cancer</i>. unlockfood.ca • <i>Eating Well</i>. Canadian Cancer Society. cancer.ca
	Kidney Disease	<ul style="list-style-type: none"> • <i>Nutrition and kidney disease</i>. The Kidney Foundation of Canada kidney.ca • <i>Kidney disease information</i>. Teens Health. kidshealth.org
	Heart Disease and High Blood Pressure	Background Information: Nutrition Related to Diabetes and Heart Disease p.17 <ul style="list-style-type: none"> • Heart Disease and Stroke. Canadian Heart and Stroke Foundation heartandstroke.com. • Hypertension Canada hypertension.ca High blood pressure <ul style="list-style-type: none"> • <i>How Blood Pressure Works</i>. youtube.com • <i>Hypertension</i>. Osmosis osmosis.org Advanced animation of basics of hypertension • <i>High blood pressure the basics</i>. Centers for Disease Control and Prevention (CDC) youtube.com • <i>Treating High Blood Pressure</i>. CDC youtube.com • Hypertension: How to Prevent and Treat the Silent Killer - Unlock Food

Human Body		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-HB2 Investigate the effects of various injuries, disorders and diseases on human cells, tissues, organs and systems</p>	Osteoporosis	<ul style="list-style-type: none"> • What is Osteoporosis? Osteoporosis Canada • <i>Lower your risk for osteoporosis.</i> unlockfood.ca
	Food Allergy and Celiac Disease	<ul style="list-style-type: none"> • <i>What is a Food Allergy?</i> Food Allergy Canada - foodallergycanada.ca • <i>What is the difference between food allergies and intolerances?</i> unlockfood.ca • <i>Understanding Food Allergies</i> - The National Institute of Allergy and Infectious Diseases youtube.com • <i>What is the difference between food allergies and intolerance?</i> youtube.com • Canadian Celiac Association - celiac.ca • <i>Celiac Disease.</i> Teens Health kidshealth.org • <i>Celiac Disease: how it's caused and how it's treated.</i> youtube.com • <i>What's the big deal with gluten anyways?</i> Ted-Ed youtube.com <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>About Food Allergy.</i> Food Allergy Canada. Instructional-activities-and-lesson-plan.pdf (foodallergycanada.ca)

Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU1 Assess the importance of macronutrients (i.e., carbohydrates, proteins and fats) and micronutrients (e.g., vitamins, minerals and phytochemicals) in maintaining human health.</p>	<p>Macronutrients</p> <ul style="list-style-type: none"> • Fat • Carbohydrate • Calories 	<p>Macronutrients</p> <ul style="list-style-type: none"> • <i>Biological Molecules - You Are What You Eat: Crash Course Biology #3.</i> Crash Course youtube.com <p>Fats</p> <ul style="list-style-type: none"> • <i>Facts on Fats.</i> Dietitians of Canada. unlockfood.ca <p>Carbohydrate</p> <ul style="list-style-type: none"> • <i>Carbohydrate and sugar.</i> Dietitians of Canada. unlockfood.ca • <i>Sugar Intake Recommendations.</i> World Health Organization. who.int • <i>Sugar, hiding in plain sight.</i> youtube.com • <i>What are Prebiotics and What Foods Contain Them?</i> Unlock Food. unlockfood.ca <p>Calories</p> <ul style="list-style-type: none"> • <i>What is a calorie?</i> youtube.com <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>In Search of Essential Nutrients.</i> National Agriculture in the Classroom. In Search of Essential Nutrients (Grades 9-12) National Agriculture in the Classroom (agclassroom.org)
	<p>Micronutrients:</p> <ul style="list-style-type: none"> • Vitamins and Minerals 	<p>Vitamins and Minerals</p> <ul style="list-style-type: none"> • <i>Dietary Reference Intakes.</i> Health Canada. canada.ca • <i>Consumer's Guide to the DRIs.</i> Health Canada. canada.ca • <i>Functions and Food Sources of some Common Vitamins.</i> unlockfood.ca • <i>How do vitamins work?</i> Ginnie Trinh Nguyen youtube.com

Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU1 Assess the importance of macronutrients (i.e., carbohydrates, proteins and fats) and micronutrients (e.g., vitamins, minerals and phytochemicals) in maintaining human health.</p>	<p>Phytochemicals and antioxidants</p>	<p>Phytochemicals</p> <ul style="list-style-type: none"> • <i>Phytochemicals 101: What you need to know about these tiny super-nutrients.</i> Globe and Mail. theglobeandmail.com • <i>Phytochemicals' Role in Good Health.</i> Today's Dietitian. todaysdietitian.com • <i>What are Phytochemicals?</i> Nucific. phytochemicals.info <p>Antioxidants</p> <ul style="list-style-type: none"> • <i>What you need to know about antioxidants.</i> Unlock Food, Dietitians of Canada. unlockfood.ca <p><i>Antioxidants: More is not always Better.</i> Consumer reports consumerreports.org</p>

Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</p>	<p>Finding Credible Nutrition Information</p>	<p>Backgrounder: Accessing Health Information Online p.32 and Reading Health Studies p. 33</p> <ul style="list-style-type: none"> • <i>How to find food and nutrition information you can trust.</i> Dietitians of Canada unlockfood.ca <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Reality Check: Getting the Goods on Science and Health.</i> Media Smarts. mediasmarts.ca • <i>Fad Diet Detectives.</i> PHE Canada. 7-12 Healthy Eating Round 2 (phecanada.ca) • <i>Authentication Beyond the Classroom; Break the Fake: Verifying Info Online. Consensus or Conspiracy?; Reality Check: Getting the Goods on Science and Health.</i> Media Smarts. mediasmarts.ca • <i>Hoaxes and Fakes.</i> Common Sense Education. commonsense.org

Human Nutrition

Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</p>	<p>Canada’s Food Guide</p>	<p>Background Information: Evolution of Canada’s Food Guide p. 36</p> <ul style="list-style-type: none"> • <i>Canada’s Food Guide</i> and <i>Canada’s Food Guide First Nations, Inuit Metis</i>. Health Canada. canada.ca • <i>Canada’s Food Guide</i>. Government of Canada. food-guide.canada.ca • <i>Review of the evidence behind the guidance:</i> canada.ca <p>Sample Activities</p> <p>Dairy Farmers of Canada (SK) Registered Dietitians:</p> <ul style="list-style-type: none"> • <i>How to teach Canada’s Food Guide</i> dairyfarmersofcanada.ca; <i>A Guided Discovery of Canada’s Food Guide</i> A Guided Discovery of Canada’s Food Guide (teachnutrition.ca); <i>Canada’s Food Guide Plate</i> Canada’s Food Guide Plate (teachnutrition.ca); <i>Eat Meals with Others</i> Eat Meals with Others (teachnutrition.ca); <i>Mindful Eating</i> Mindful Eating (teachnutrition.ca); <i>Enjoy your food</i> Enjoy Your Food (teachnutrition.ca); <i>Cook More Often</i> Cook More Often (teachnutrition.ca)
	<p>Other Country Food Guidelines</p>	<ul style="list-style-type: none"> • <i>Dietary Guidelines around the World</i>. Dietitians Pantry. thedietitianspantry.com • <i>Brazil’s New Food-based dietary guidelines</i>. Food and Agriculture Organization. fao.org • <i>Summarized – Brazil’s new dietary guidelines: food-based!</i> Food Politics. foodpolitics.com
	<p>Dietary Reference Intakes</p>	<ul style="list-style-type: none"> • <i>Dietary Reference Intakes Tables</i>. Government of Canada. canada.ca • <i>Consumer’s Guide to the DRIs</i>. Government of Canada. canada.ca

Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
HS20-NU2 <u>Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</u>	Food Labeling	<ul style="list-style-type: none"> • <i>Percent daily value.</i> Government of Canada. canada.ca • <i>10 “Healthy” Food labels exposed.</i> CBC Marketplace. youtube.com • <i>Understanding Food Labels in Canada.</i> Unlock Food, Dietitians of Canada. unlockfood.ca; <i>Decoding the Nutrition Label.</i> unlockfood.ca <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Understanding Nutrition Labels.</i> Teach Nutrition – Dairy Farmers Canada. Understanding Nutrition Labels (teachnutrition.ca) • <i>Label Reading Activity.</i> Heart and Stroke. Healthy Eating Activity Label Reading Practice pages (heartandstroke.ca)
	Meal Planning	<p>Background Information: Planning a Healthy Menu p. 40</p> <ul style="list-style-type: none"> • <i>My Menu Planner.</i> Unlock Food, Dietitians of Canada unlockfood.ca <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Canada’s Food Guide Plate.</i> Teach Nutrition-Dairy Farmers Canada. Canada’s Food Guide Plate (teachnutrition.ca) • Planning a Healthy Menu p. 40
	Personal Lifestyle Choices	<p>Local Foods and sustainable food systems</p> <p><i>Gardens for Learning: Linking gardens to school curriculum – Collective School Garden Network.</i> csgn.org</p> <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Activity 1: The Story of Food; Food and Ecosystems.</i> Nourish Curriculum nourishlife.org • <i>What is Organic.</i> Edible Schooyard Project. What is Organic? The Edible Schooyard Project • <i>Food Sustainability Lessons.</i> FANLit. www.fanlit.org/food-environment-lessons-2 • <i>Connecting Eating and the Environment; Adventures of the Banana; Homegrown Specialties.</i> PHE Canada. phecanada.ca

Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</p>	<p>Personal Lifestyle Choices</p>	<p>Vegetarian Diets</p> <ul style="list-style-type: none"> • <i>Vegetarian and Vegan Diets</i>. Unlock Food, Dietitians of Canada. unlockfood.ca <p>Sport Nutrition</p> <p>Background Information: Healthy Eating for Active Youth p. 44; Fad Diets p. 47</p> <p>Fad Diets</p> <ul style="list-style-type: none"> • <i>Get the Facts on Fad Diets</i>. Unlock Food, Dietitians of Canada. unlockfood.ca • <i>How to spot a fad diet</i>. Mia Nacamulli. youtube.com • <i>What's the big deal with gluten anyways?</i> Ted-Ed. youtube.com <p>Sample Activity</p> <ul style="list-style-type: none"> • <i>Fad Diet Detectives</i>. PHE Canada. 7-12 Healthy Eating Round 2 (phecanada.ca)
	<p>Non-Dieting Approach to Healthy Eating</p>	<ul style="list-style-type: none"> • <i>What's the best diet?</i> – Doc Mike Evans. youtube.com • <i>Eating Competence</i>. Ellyn Satter Institute. ellynsatterinstitute.org <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Family Meal Focus, Size Acceptance</i>. Ellyn Satter Institute. ellynsatterinstitute.org • <i>Weight and See</i>. Body Liberation workshop series – week one lesson plan. foodshare.net
	<p>Opportunities and Barriers to Healthy Eating</p>	<p>Background Information: Opportunities and Barriers to Healthy Eating p. 52</p> <ul style="list-style-type: none"> • <i>Della: Hurdles to Health</i>. Promoting Health Equity Project (poverty in Saskatoon, SK – Social Determinants of Health). youtube.com • <i>The Impact of Food Insecurity on Health</i>. PROOF: Food Insecurity Policy Research. proof.utoronto.ca

Human Nutrition

Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p><u>HS20-NU2</u> <u>Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</u></p>	<p>Opportunities and Barriers to Healthy Eating (cont'd)</p>	<p>Sample Activities:</p> <ul style="list-style-type: none"> • Food Environment Assessment p. 55 • <i>Food for Thought: Hunger around the World.</i> Learning to Give. learningtogive.org • <i>Take Care Curriculum Guide – What’s Up with Food? (p. 50).</i> Girls Action Foundation. girlsactionfoundation.ca. • <i>Cook what you Love, Love what you Eat: a Food Justice Series with lesson plans.</i> FoodShare. Cook What You Love, Love What You Eat: A Food Justice Workshop Series - FoodShare • <i>Global Schools; Program; Shop til You Drop; Building Blocks for a Good Life; Respect the Water; Breaking the Cycle; Developing Rights; Shop Til You Drop.</i> [Search resource in] Resources for Rethinking. resources4rethinking.ca • <i>The Impact of Food Insecurity on Health.</i> PROOF: Food Insecurity Policy Research. proof.utoronto.ca
	<p>Processed Foods, Food Additives and Preservatives</p>	<p>Background Information: Processed Foods p. 57</p> <ul style="list-style-type: none"> • <i>Are preservatives bad for you?</i> Eleanor Nelsen. youtube.com • <i>What you need to know about food preservatives.</i> Unlock Food, Dietitians of Canada. unlockfood.ca • <i>Facts on Food Additives.</i> Unlock Food, Dietitians of Canada. unlockfood.ca • <i>The Safety of Food Additives.</i> Health Canada. hc-sc.gc.ca; <i>Food Additives.</i> canada.ca; <i>Aspartame.</i> Health Canada. canada.ca • <i>Understanding Organic Foods.</i> Unlock Food, Dietitians of Canada. unlockfood.ca; <i>Understanding Genetically Modified Foods.</i> unlockfood.ca • <i>Ethical and Political Concerns of GMOs.</i> Garden Organic. gardenorganic.org.uk

Human Nutrition

Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</p>	<p>Body Image and disordered eating</p> <ul style="list-style-type: none"> • Body Composition Measurement Tools • Weight Bias 	<p>Background Information: Weight Bias p. 59 and Body Composition and Health Risks in Youth p. 61</p> <ul style="list-style-type: none"> • The National Eating Disorder Information Centre (NEDIC). nedic.ca • <i>Our Message to Educators</i>. Obesity Canada. obesitycanada.ca • <i>Dealing with feelings when you're overweight (student information)</i>. Youth Health teenshealth.org • <i>Eating Disorders</i>. Dietitians of Canada unlockfood.ca • <i>Applying Mindful Eating to Your Life. Bridge Point Webinar Series</i>. Janine Wagar. youtube.com <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Kellogg's Special K Ads</i>. Media Smarts. mediasmarts.ca • <i>Healthy Youth, Healthy Community (9-12)</i>. Learning to Give. learningtogive.org • <i>Body Positive Ads; Exposing Gender Stereotypes</i>. Media Smarts. mediasmarts.ca • <i>Body Liberation Workshop Series</i>. FoodShare. foodshare.net • <i>Body Image: Size Discrimination</i>. Alberta Health Services. Junior High Mental Health Kit albertahealthservices.ca
	<p>Cultural and Religious Food Practices</p>	<ul style="list-style-type: none"> • <i>First Nations and Metis Traditional Practices and Foods-downloadable PDF</i>. Government of Saskatchewan. publications.saskatchewan.ca • <i>Cultures, food traditions and healthy eating</i>. Government of Canada. food-guide.canada.ca <p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Activity 3 – Food Traditions (p. 35)</i>. Nourish Curriculum Guide. nourishlife.org • <i>The Stories our Food Tells Us (p. 43)</i>. Girls Action Foundation. Take Care Curriculum Guide. girlsactionfoundation.ca • <i>Bannock: More than Bread</i>. FANLit. fanlit.org

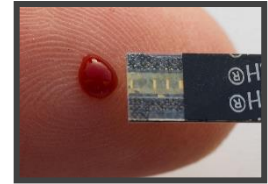
Human Nutrition		
Outcomes	Nutrition Concepts	Background Information, Resources, Videos, Sample Activities
<p>HS20-NU2 Analyze dietary choices based on personal and cultural beliefs and scientific understanding of nutrition.</p>	<p>Cultural and Religious Food Practices (cont'd)</p>	<p>Sample Activities</p> <ul style="list-style-type: none"> • <i>Table Talk; Food Skills Expert.</i> PHE Canada. phecanada.ca • <i>Interview a Community Member; Indigenous Agriculture: Intercropping; Pan de los muertos; The Edible School Yard Project.</i> edibleschoolyard.org

Background Information

Nutrition Related to Diabetes and Heart Disease

Diabetes (1)

Diabetes is a chronic disease in which the body cannot properly use and store food for energy. This happens when the body cannot produce insulin or cannot use the insulin it produces. Insulin is a hormone that controls the amount of sugar (glucose) in the blood. The body needs insulin to use sugar as an energy source. Diabetes leads to high blood sugar levels, which can damage organs, blood vessels and nerves.



The fuel that your body needs is glucose, which is a form of sugar. Glucose comes from foods that naturally contain sugar such as fruit, milk, some vegetables and grain products, as well as foods in which sugar and other sweeteners such as honey, molasses and concentrated fruit juice are added. To control blood glucose (sugar), it is important to eat healthy and be active. Medication may need to be taken also. A variety of high fibre foods from Canada's Food Guide are important for adequate nutrition. Limiting foods with added sugar such as pop, candies, and baked goods is helpful since these foods can increase blood sugar levels significantly, but do not offer many vitamins and minerals.

There are 2 main types of diabetes:

- **Type 1 diabetes** occurs when no, or very little, insulin is released into the body. As a result, sugar builds up in the blood instead of being used as energy. About five to 10 per cent of people with diabetes have type 1 diabetes. Type 1 diabetes generally develops in childhood or adolescence, but can develop in adulthood. Type 1 diabetes is always treated with insulin. Meal planning, physical activity and stress management also help with keeping blood sugar at the right levels.
- **Type 2 diabetes** occurs when the body can't properly use the insulin that is released (called insulin insensitivity) or does not make enough insulin. As a result, sugar builds up in the blood instead of being used as energy. About 90 per cent of people with diabetes have type 2 diabetes. Type 2 diabetes develops more often in adults, but children can be affected. Depending on the severity of type 2 diabetes, it may be managed through physical activity and meal planning, or may also require medications and/or insulin to control blood sugar more effectively.

Because diabetes is a complex disease it is imperative that individuals manage the disease with support from a medical team including a physician, diabetes nurse and registered dietitian.

Eating healthy and being physically active may help to maintain a healthy body weight, and in turn, reduce the risk of getting diabetes; however, there are many risk factors for the condition other than weight. For example, having a family history of diabetes, being over the age of 40, being a member of a

high-risk group (Aboriginal, Hispanic, South Asian, Asian, or African descent), or taking certain medications increases a person's risk of getting diabetes.

Heart Disease (2)

Heart disease describes several different heart conditions. **Coronary artery disease (CAD)**, the most common of these conditions, occurs when blood vessels in the heart become blocked or narrowed. This prevents the oxygen-rich blood from reaching the heart. It can cause chest pain (called angina) or even a heart attack.



CAD is caused by plaque building up along the interior walls of arteries. *Plaque* is a sticky, yellow substance made of fatty substances like cholesterol, as well as calcium and waste products from your cells. It narrows and clogs the arteries, slowing the flow of blood. This condition is called *atherosclerosis*, which may begin as early as childhood. It can occur anywhere in the body, but it usually affects large and medium-sized arteries.

Early symptoms of CAD can include: fatigue, chest pain and dizziness. If left untreated, this disease can lead to other serious problems such as *heart attack*, *stroke* or even death.

There are various risk factors for coronary artery disease including diabetes, high blood pressure (hypertension) and high cholesterol (hyperlipidemia).

- **Hypertension:** Blood pressure is a measure of the pressure or force of blood against the arterial walls when the heart contracts or when it is at rest. High blood pressure, also called hypertension, can be caused by factors such as smoking, inactivity and poor eating habits. Research has shown that hypertension risk can be reduced by following an eating pattern rich in vegetables, fruit, low fat dairy products whole grains, protein from plant sources (lentils and beans) and low in saturated fat. There is some evidence that indicates that eating less than 2300mg of sodium a day helps to lower blood pressure. Sodium is found in most foods, however, is especially high in convenience and fast foods, smoked and cured meat.
- **Blood cholesterol:** Cholesterol is a fat found in the blood. It is naturally made and used by the body; however, it is also influenced by foods consumed. There are two main types of blood cholesterol:
 - **HDL cholesterol:** referred to as 'good' cholesterol because it helps to remove excess cholesterol from the body.
 - **LDL cholesterol:** referred to as 'bad' cholesterol that can form plaque or fatty deposits on your artery walls. If your LDL level is high it can block blood flow to the heart and brain.

Foods that contain saturated fat (processed foods, fatty meat and dairy products, butter, lard) and trans fat (partially hydrogenated margarine, deep fried foods and packaged and baked goods) impact blood cholesterol more than foods that contain cholesterol.

References:

1. Diabetes Canada. About Diabetes. 2017 [cited 2017 Aug 1]. Available from: www.diabetes.ca/
2. Heart and Stroke Foundation. Heart. 2017 [cited 2017 Aug 1]. Available from: www.heartandstroke.ca/

Nutrients in Foods and Health Risks: What Does the Research Say?

The overall pattern of food that a person eats is more important to a healthy diet than focusing on single foods or individual nutrients (1).

The dietary patterns that are linked to positive cardiovascular disease outcomes, show some protection against cancer, can help reduce the risk of developing type 2 diabetes, and can impact mental health and mood (2)(3) characterized by:

- *higher* consumption of vegetables, fruits, whole grains, low-fat dairy, and seafood;
- *lower* consumption of red and processed meats, refined grains, and sugar-sweetened foods and beverages

All foods are okay to eat occasionally. The amount and frequency the foods are eaten has the greatest impact on our health. It is also important to remember that our health is not determined by food alone, but also by how much activity and sleep we get as well as how we manage stress.

Trans fats

Recommendation: Trans-fat is not needed for a healthy diet and in fact can be harmful. (4)(5)(6).

Trans fats...

- are a type of fat found in foods that are known to raise bad (LDL) cholesterol and lower good (HDL) cholesterol in the blood. This effect on cholesterol increases the risk for developing heart disease (5).
- occur naturally in small amounts in some meat and dairy products, including beef, lamb and butterfat. There are not sufficient studies to determine whether these naturally occurring *trans*-fats have the same negative effects on cholesterol levels as *trans*-fats that have been industrially manufactured (7).

The issue of trans-fats is being addressed through a prohibition of partially hydrogenated oils in Canada. (8)(29).

Saturated Fats

Recommendation: Less than 10% of total energy intake. Replace foods that contain mostly saturated fat with foods that contain mostly unsaturated fat (9)(6).



- Saturated fats are naturally found in meat, chicken, fish, dairy products and some plant products such as coconut and palm oil.
- Recent research (2016) has found that "Eating more saturated fats raises risk of early death," and "swapping saturated fat and / or trans-fats for polyunsaturated fat such as olive oil could reduce the

risk of dying by 27% (9)(10).” This is in contrast to a 2015 a rigorous summary of research which found no link between saturated fats and death (11) - The difference in the conclusions could be because the 2015 previous summary of research could not say what people who ate less saturated fat ate instead. In a Western diet people who eat less saturated fat might eat more sugar or *refined* carbohydrates, which are known to be linked to [type 2 diabetes](#) and [cardiovascular disease](#). The 2016 study allowed researchers to calculate the effects of swapping one type of fat for another (9)(10).

- Eating a diet that is high in saturated fat can raise the level of cholesterol in the blood by increasing the formation of LDL in the plasma compartment and by decreasing LDL turnover by decreasing LDL receptor activity. Having high cholesterol increases the risk of developing [heart disease](#) (12).

Excess sodium

Recommendation: Because our diets in North America are generally so high in salt, everybody – even those with normal blood pressure – can benefit from reducing salt intake (13)(14). Less than 2300 mg per day – ages 14 and older.

- Humans need small amounts of sodium for proper body functioning, but eating too much sodium can increase the risk for high blood pressure, heart disease, and stroke. When there's extra sodium in the bloodstream, it pulls water into your blood vessels, increasing the total amount (volume) of blood inside the blood vessels. With more blood flowing through blood vessels, blood pressure increases (13)(14)(15)(16).
- High intakes of sodium can also reduce bone mineral density in adult men and women (17), increasing the risk for developing osteoporosis.

Excess Sugar

Recommendation: The World Health Organization (WHO) Guidelines: For general health, it is recommended to reduce daily intake of free sugars to less than 10% of total energy intake. For additional health benefits, reduce daily added sugar intake to below 5% or roughly 25 grams (6 teaspoons) per day (18).

- There is increasing concern that the intake of free sugars*, particularly in the form of sugary drinks, increases overall energy intake and may reduce the intake of foods containing more nutritionally adequate calories, leading to an unhealthy diet, weight gain, and increased risk of obesity and type 2 diabetes (18)(19)(28).
- Another concern is the association between intake of free sugars and dental cavities (18).

**Free sugars: all monosaccharides (glucose and fructose) and disaccharides (sucrose) added to foods and sugars naturally present in honey, syrups and unsweetened fruit juices. This does not include lactose (the sugar in milk) when naturally present in milk and milk products and the sugars in the cellular structure of foods (fruits and vegetables).*

Red and Processed Meat

Recommendations: Limit consumption of red meat and save processed meats for special occasions. Reducing consumption of these foods can reduce the risk of colorectal cancer, and help reduce sodium intake (6)(20)(21)(22).

The risk

- Research results show that those who eat a lot of processed meat have **around a 17 % higher** risk of developing bowel cancer, compared to those who eat less (23). So this means that in 1000 people who eat the most processed meat, there could be 66 who develop bowel cancer at some point in their lives – 10 more than the group who eat the least processed meat (25).
- Eating red and processed meat presents a relatively *lower* risk in developing cancer than smoking, obesity and inactivity.

For more information about cancer and nutrition visit: www.cancer.ca/en/?region=sk

How does red and processed meat increase the risk of getting cancer?

- The evidence so far suggests that it is probably the processing of the meat, or chemicals naturally present within it, that increases cancer risk (23)(6), but the exact mechanisms are still unclear. Some of these chemicals include:

N-Nitroso Compounds

- Haem, part of the red pigment in the blood, is broken down in our gut to form a family of chemicals called N-nitroso compounds. These compounds damage the cells that line the bowel, so other bowel lining cells have to replicate more in order to heal. And it's this 'extra' replication that can increase the chance of errors developing in the cells' DNA – the first step on the road to cancer (24).
- As well as being made from red meat, processed meats also contain added nitrites and nitrates which become nitrosamines in the gut (24).

Heterocyclic Amines (HCAs) and Polycyclic Aromatic Hydrocarbons (PAHs)

- Cooking meat at high temperatures, such as grilling or barbequing, can create HCAs and PAHs chemicals in the meat that *may* increase the risk of cancer. In laboratory experiments, HCAs and PAHs have been found to cause changes in DNA that may increase the risk of cancer. These chemicals are generally produced in higher levels in red and processed meat compared to other meats (24).

9. Wang, D., Y. Li, S. Chiuve, M. Stampfer, J. Manson, E. Rimm, W. Willett, and F. Hu. Association of Specific Dietary Fats with Total and Cause-Specific Mortality. *JAMA Intern Med* 2016; 176(8):1134-1145. Available from: jamanetwork.com/journals/jamainternalmedicine/fullarticle/2530902.
10. NHS Choices. Study finds link between saturated fats and early death. 2016 Jul 6 [Cited 2017 Apr 18]. Available from: www.nhs.uk/news/2016/07July/Pages/Study-finds-link-between-saturated-fats-and-early-death.aspx
11. de Souza, Russell J, A. Mente, A. Maroleanu, A. I. Cozma, V Ha, T Kishibe et al. Intake of saturated and trans unsaturated fatty acids and risk of all cause mortality, cardiovascular disease, and type 2 diabetes: systematic review and meta-analysis of observational studies. *BMJ* 2015; 351:h3978. Available from: www.bmj.com/content/351/bmj.h3978.
12. Fernandez, M., and K. West. Mechanisms by which dietary fatty acids modulate plasma lipids. *J Nutr.* 2005; 135(9):2075-8. Available from: www.ncbi.nlm.nih.gov/pubmed/16140878
13. Heart and Stroke Foundation. Salt. 2017 [cited 2017 Apr 18]. Available from: www.heartandstroke.ca/get-healthy/healthy-eating/reduce-salt .
14. Health Canada. Sodium in Canada. 2017 [cited 2017 Mar 24]. Available from: www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/sodium.html.
15. American Heart Association. Break up with salt. 2017 [cited 2017 Mar 17]. Available from: sodiumbreakup.heart.org/sodium_and_your_health
16. Hypertension Canada. What is High Blood Pressure. 2016 [cited 2017 Mar 24] Available from: www.hypertension.ca/en/hypertension/what-do-i-need-to-know/what-is-high-blood-pressure.
17. Teucher B, Fairweather-Tait S. Dietary sodium as a risk factor for osteoporosis: where is the evidence? *Proc Nutr Soc.* 2003 Nov; 62(4):859-66. Abstract available from: www.ncbi.nlm.nih.gov/pubmed/15018486
18. World Health Organization. Guideline: Sugar Intake for Adults and Children. 2015 [cited 2017 Mar 24]. Available from: apps.who.int/iris/bitstream/10665/149782/1/9789241549028_eng.pdf?ua=1.
19. Government of Canada. Evidence Review for Dietary Guidance: Summary of Results and Implications for Canada's Food Guide. 2016 [cited 2017Mar 24]. Available from: www.canada.ca/en/health-canada/services/publications/food-nutrition/evidence-review-dietary-guidance-summary-results-implications-canada-food-guide.html
20. Canadian Cancer Society. Red and Processed Meat. 2017 [cited 2017 Apr 18] Available from: www.cancer.ca/en/prevention-and-screening/live-well/nutrition-and-fitness/eating-well/red-and-processed-meat/?region=sk
21. WHO. Links between processed meat and colorectal cancer. 2015 [cited 2017 Apr 18]. Available from: www.who.int/mediacentre/news/statements/2015/processed-meat-cancer/en/
22. World Cancer Research Fund. A Closer Look at Red Meat: Infographic Fact Sheet. 2016 [cited 2017 Apr 18]. Available from: www.wcrf-uk.org/sites/default/files/closer-look-red-meat-factsheet.pdf.
23. Bouvard, Véronique et al. Carcinogenicity of consumption of red and processed meat. *The Lancet Oncology*, 2015; 16 (16): 1599 – 1600. Available from: [thelancet.com/journals/lanonc/article/PIIS1470-2045\(15\)00444-1/abstract](http://thelancet.com/journals/lanonc/article/PIIS1470-2045(15)00444-1/abstract).
24. National Cancer Institute. Chemicals in Meat Cooked at High Temperatures and Cancer Risk. 2015 [cited 2017 Apr 24]. Available from: www.cancer.gov/about-cancer/causes-prevention/risk/diet/cooked-meats-fact-sheet.
25. Cancer Research UK. Processed meat and cancer – what you need to know. 2015 [cited 2017 Mar 24]. Available from: scienceblog.cancerresearchuk.org/2015/10/26/processed-meat-and-cancer-what-you-need-to-know/
26. Dietitians of Canada. Alcohol: Evidence Summary. In Practice-Based Evidence in Nutrition [PEN] 2015 Apr 22 [cited 2017 Apr 18]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=1417&trcatid=42&trid=1963. Access only by subscription.
27. Zakhari, S. Alcohol and the Cardiovascular System: Molecular Mechanisms for Beneficial and Harmful Action. *Alcohol health & research world* 1997; 21(1). Available from: pubs.niaaa.nih.gov/publications/arh21-1/21.pdf.
28. Harvard School of Public Health. Alcohol: Balancing Risks and Benefits. 2017 [cited 2017 Apr 18]. Available from: www.hsph.harvard.edu/nutritionsource/alcohol-full-story/

Foods and Eating Habits Linked to Good Health

Eating Patterns

The overall pattern of food that a person eats is more important to a healthy diet than focusing on single foods or individual nutrients (1). Dietary patterns which are *high* in vegetables, fruits, whole grains, low-fat dairy, and seafood; and *low* in red and processed meats, refined grains, and sugar-sweetened foods and drinks have been linked to positive cardiovascular disease outcomes, show some protection against certain types of cancer, and can help reduce the risk of developing type 2 diabetes (2). The combination and amount of certain foods and nutrients eaten have effects on health and disease, including mental health. (3). Canada's Food Guide recommendations are based on the following scientific evidence.

Meat alternatives

Recommendation: Canada's Food Guide recommends that people choose plant-based protein foods more often (4).

- Eating meat alternatives frequently helps to minimize the amount of saturated fat in the diet. Also, diets rich in plant-based protein have been shown to help lower blood pressure in individuals with hypertension (4).

Tofu, tempeh, soy nuts and soy beans

- Research shows that dietary soy protein can help to lower LDL cholesterol levels in adults (5)(6)(7)(8). Sources of dietary soy protein include: soy beverages, tofu, miso, tempeh, nattō, soy cheese, soy nuts, isolated soy protein (ISP), soy protein concentrate (SPC), textured soy protein (TSP) and soy flour (SF) (6).
- In the past there have been claims that too much soy can increase risk of developing breast cancer and can decrease testosterone levels in men causing infertility, but these claims have not been proven true. Research has found no effect of the above claims on soy consumption (9).

Pulses (dried beans, chickpeas, lentils, peas)

- Pulses are sources of folate and fibre. They have a low glycemic index* and are nutrient-dense. Pulses are affordable foods that grow in a range of climates and can be a source of protein for those who limit or avoid animal products. There is growing research supporting the role of pulses in the management health cardiovascular health, diabetes, and weight management (10).



**The Glycemic Index (GI) is a scale that ranks carbohydrate-rich foods by how much they raise blood sugar compared to a standard food. Eating mostly high GI foods can increase the risk of type 2 diabetes.*

[https://www.diabetes.ca/resources/tools---resources/the-glycemic-index-\(gi\)](https://www.diabetes.ca/resources/tools---resources/the-glycemic-index-(gi))

- Regular consumption of a variety of pulses helps to lower total and LDL cholesterol and triglycerides while maintaining HDL cholesterol levels, and reduced blood pressure (11).

Nuts (almonds, peanuts, pecans, walnuts)

- Consuming nuts regularly helps to decrease total and LDL cholesterol (12)(13).
- Nuts contain unsaturated fatty acids; fibre; micronutrients including potassium, calcium, magnesium, and tocopherols; and phytochemicals such as antioxidants and phytosterols phenolic compounds, resveratrol, and arginine which all play a role in protective heart health (13). Replacing saturated fats with unsaturated fats can help reduce the risk for cardiovascular disease and related deaths (14). A high intake of calcium, magnesium and potassium, together with a low sodium intake, is associated with protection against bone demineralization, arterial hypertension, insulin resistance, and overall cardiovascular risk (15).

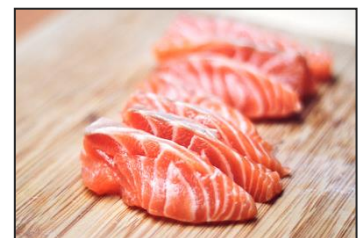
Seeds (flax, chia, hemp hearts, sunflower seeds, etc.)

- Flax seed consumption can reduce total and LDL cholesterol levels, particularly in adults with high cholesterol (16).
- Flax helps protect against CVD by altering the omega-3 fat content of cell membranes (17), by improving blood lipids and endothelial function through antioxidant, anti-inflammatory, anti-thrombotic effects (18).
- Seeds are good sources of fibre and unsaturated fatty acids (e.g. omega-6 and omega-3s) which can reduce the risk of cardiovascular disease and some cancers (5).

Fish*

Recommendation: Choose foods with healthy fats Try different types of fatty fish (4).

- Certain fish are good sources of omega-3 fatty acids
 - The regular consumption of omega-3s (EPA and DHA) from fish reduces serum triglyceride levels and blood pressure, decreases arterial stiffness, improves endothelial function, and inhibits inflammatory processes.
 - There are more consistent results found from eating fish rather than fish oil supplements (19).
 - In Western diets the ratio of omega-6-to omega-3 fatty acids is about 15 to 1. A lower ratio of omega-6/omega-3 fatty acids is better in reducing the risk of many of the chronic diseases (20).



- It is likely that not only the omega-3 fats, but also the other nutrients found in fish and the displacement of high fat foods, contribute to cardiovascular benefits. (4).
- Some fish are good, natural food sources of vitamin D, important for bone health and immunity.

**For information on fish that are more of a concern for high mercury levels visit: www.hc-sc.gc.ca/fn-an/securit/chem-chim/envIRON/mercur/cons-adv-etud-eng.php*

Whole Grains

Recommendation: Eat whole grain foods. Consume plant-based foods more often (4).

- Whole grains: There is some evidence that foods containing dietary fibre have some protective effects against colorectal cancer (21).
- Plant-based: shifting intakes towards more plant-based foods could also encourage lower intakes of processed meat and unsaturated fat, and encourage higher intakes of fibre

Vegetables and Fruit

- Eat plenty of vegetables and fruit (4).
- There is evidence that eating more vegetables and fruit can reduce the risk of high blood pressure (hypertension), heart disease, stroke, some cancers (23).
- Vegetables and fruit contain many antioxidants and phytochemical, which help protect against certain types of cancers. (see info on antioxidants below)



Phytonutrients are compounds naturally found in plants.

- **Antioxidants** Cell damage happens naturally as you age and when you are exposed to things like pollution or cigarette smoke and stress. Cell damage caused by unstable molecules known as free radicals can lead to common diseases like heart disease, diabetes and cancer. Antioxidants interact with and stabilize free radicals and may prevent some of the damage free radicals otherwise might cause. A diet rich in antioxidants can help lower your risk of these diseases (24).

You can get all the antioxidants you need from eating a variety of antioxidant rich foods like vegetables, fruit, whole grain bread, pasta and cereal, beans, lentils, nuts, seeds, vegetable oils, garlic and green tea.

- **Plant sterols** are naturally found in a variety of plants such as wheat bran and germ, peanuts and almonds, broccoli and Brussels sprouts. When taken in large amounts they can lower LDL cholesterol levels (25). Because it's hard to get enough from foods, food companies add plant sterols to some foods such as vegetable oil spreads, mayonnaise, yogurt, milk, cereals and snack bars (27).

- **Fibre** consists of the parts of plant foods that your body can't digest. Fibre can help to promote healthy digestion, improve constipation, lower blood cholesterol, manage blood sugar, and reduce the risk of some cancers (28). There are two main types of fibre it is important to get a variety of different types of fibre:
 - *Insoluble fibre*: helps to keep your bowels regular, can improve constipation, and promotes a healthy digestive system. Insoluble fibre is found in vegetables and fruit, whole grains and bran (28).
 - *Soluble fibre*: helps to lower cholesterol and control blood glucose. Soluble fibre is found in some vegetables and fruits, oats, barley, psyllium, and legumes like beans and lentils (28).

Oils and Fats

Recommendation: choose foods with healthy fats (4).

- Oils and fats supply calories and essential fats that help our bodies absorb fat-soluble vitamins.
- Good sources of unsaturated fatty acids include olive, canola, walnut, sunflower, safflower, avocado, etc.
- Replacing foods with mostly saturated fats in the diet with foods with mostly unsaturated fats can help reduce the risk for cardiovascular disease and related deaths (14).

Water

Recommendation: Make water your drink of choice (4).

- Water makes up 60% of human body weight. Water is a structural component to all cells and is essential to all bodily fluids such as blood, urine, and sweat. Water helps to transport nutrients and remove wastes from the body (4).
- Without adequate fluid intake, people can become dehydrated. This can lead to fatigue, weakness, headache, irritability, dizziness and even impaired physical performance (4).



Healthy drink options other than water can include white milk, unsweetened, lower fat milk), and unsweetened fortified plant-based beverages such as soy milk (4).

Protein foods such as lower fat dairy are an important part of healthy eating (4).

- Drinking milk while limiting soft drink intake is important to promote optimal bone health (29).
- Soy milk can help reduce cholesterol (6).

Probiotics found in yogurt, cheese and milk are healthy or good bacteria that multiply in the colon and help to keep a balance between the good and bad bacteria that live there (30).

Healthy Eating is more than the foods you eat

Recommendation: Eat meals with others (4).

Children and adolescents who frequently eat together with their family (31)(32):

- are less likely to have risky behaviours such as drug, tobacco and alcohol use as early sexual activity; have better social behaviours; eat better; learn more words and read better; have increased self-esteem, sense of well-being, and stronger family connections.

Food Skills and Food Literacy

Recommendation: Cook more often; use food labels; celebrate cultural and traditional food practices; be mindful of your eating habits

- Food literacy and food skills are needed to navigate the complex food environment and support healthy eating.
- When food is prepared and cooked at home using nutritious foods and cooking methods, the amount of highly processed products purchased and consumed.
- Using food labels helps individuals make informed choices. Food labels are changing to help make the healthy choice the easier choice.
- Cultural and traditional food practices can influence how food skills are learned and shared, what and when people eat and how food is acquired and prepared. Celebrating them can help keep them alive and build cultural identity. Traditional food improves diet quality among Indigenous Peoples.
- Being mindful of your eating habits, taking time to eat, and noticing when you are hungry and full can help you to: make healthier choices more often; make positive changes to routine eating behaviours; be more conscious of the food you eat and your eating habits; create a sense of awareness around your every day eating decisions; reconnect to the eating experience by creating an awareness of your:
 - feelings
 - thoughts
 - emotions
 - behaviours

References:

1. Academy of Nutrition and Dietetics. Total Diet Approach to Healthy Eating. 2013; 113(2): 307- 317. Available from: www.eatrightpro.org/resource/practice/position-and-practice-papers/position-papers/total-diet-approach-to-healthy-eating.
2. Office of Disease Prevention and Health Promotion. Scientific Report of the 2015 Dietary Guidelines Advisory Committee. 2017 [cited 2017 Apr 18]. Available from: health.gov/dietaryguidelines/2015-scientific-report/07-chapter-2/.
3. Dietary Guidelines Advisory Committee. Report of the Dietary Guidelines Advisory Committee on the Dietary Guidelines for Americans, 2010, to the Secretary of Agriculture and the Secretary of Health and Human Services: U.S. Department of Agriculture, Agricultural Research Service, Washington D.C.; 2010. Available from: www.cnpp.usda.gov/dietary-guidelines-2010.
4. Health Canada. Canada's Dietary Recommendations: For Health Professional and Policy Makers. January 2019 [cited 2019 Sept 6]. Available from: <https://food-guide.canada.ca/en/guidelines/>.
5. Dietitians of Canada. Cardiovascular Disease – Dyslipidemia. Key Practice Points (evidence review). In: Practice-based Evidence in Nutrition [PEN]. 2014 [cited 2017 Apr]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=2878&pqcatid=146&pqid=2601. Access only by subscription.
6. Health Canada – Food Directorate. Summary of Health Canada's Assessment of a Health Claim about Soy Protein and Cholesterol Lowering. 2015 [cited April 24 2017]. Available from: www.hc-sc.gc.ca/fn-an/alt_formats/pdf/label-etiquet/claims-reclam/assess-evalu/Sum-Assessment-Soy-April-2015-eng.pdf
7. Cho S., M Juillerat, and C. Lee. Cholesterol lowering mechanism of soybean protein hydrolysate. J. Agric Food Chem. 2007; 26; 55(26):10599-604. Available from: www.ncbi.nlm.nih.gov/pubmed/18052124
8. Jenkins, D. J. a., Mirrahimi, a., Srichaikul, K., Berryman, C. E., Wang, L., Carleton, a., ... Kris-Etherton, P. M. Soy Protein Reduces Serum Cholesterol by Both Intrinsic and Food Displacement Mechanisms. Journal of Nutrition, 2010; 140(12), 2302S–2311S. Available from: <http://doi.org/10.3945/jn.110.124958> .
9. Dietitians of Canada. Functional Foods/Nutraceuticals – Soy. Key Practice Points (evidence review). In: Practice-based Evidence in Nutrition [PEN]. 2014 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=4407&pqcatid=145&pqid=21812. Access only by subscription.
10. Diabetes Canada. The Glycemic Index. 2017 [cited 2017 Apr 24]. Available from: www.diabetes.ca/diabetes-and-you/healthy-living-resources/diet-nutrition/the-glycemic-index#sthash.YifCC58.dpuf.
11. Dietitians of Canada. Grains, Pulses and Seeds – Key Practice Points. In: Practice-based Evidence in Nutrition [PEN]. 2014 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=21548&pqcatid=146&pqid=21710. Access only by subscription.
12. Del Gobbo, L. C., Falk, M. C., Feldman, R., Lewis, K., & Mozaffarian, D. Effects of tree nuts on blood lipids, apolipoproteins, and blood pressure: systematic review, meta-analysis, and dose-response of 61 controlled intervention trials. *The American Journal of Clinical Nutrition*, 2015; 102(6), 1347–1356. Available from: doi.org/10.3945/ajcn.115.110965.
13. Ros, E. Health Benefits of Nut Consumption. *Nutrients*, 2010; 2(7), 652–682. Available from: doi.org/10.3390/nu2070652.
14. Wang, D., Y. Li, S. Chiuve, M. Stampfer, J. Manson, E. Rimm, W. Willett, and F. Hu. Association of Specific Dietary Fats With Total and Cause-Specific Mortality. *JAMA Intern Med*. 2016; 176(8):1134-1145. Available from: jamanetwork.com/journals/jamainternalmedicine/fullarticle/2530902 .
15. Segura, R., C. Javierre, M. Lizarraga, and E. Ros. Other relevant components of nuts: phytosterols, folate and minerals. *Br J Nutr* 2006; 96(2): 536-44.
16. Rodriguez-Leyva, D., Bassett, C. M., McCullough, R., & Pierce, G. N. The cardiovascular effects of flaxseed and its omega-3 fatty acid, alpha-linolenic acid. *The Canadian Journal of Cardiology*. 2010; 26(9), 489–496.
17. Harper CR, Edwards MJ, DeFilipis AP, Jacobson TA. Flaxseed oil increases the plasma concentrations of cardioprotective (n-3) fatty acids in humans. *J. Nutr*. 2006; 136: 83-87.
18. Bloedon LT, Szapary PO. Flaxseed and cardiovascular risk. *Nutr. Rev*. 2004; 62: 18-27.
19. Kromhout, D., Yasuda, S., Geleijnse, J. M., & Shimokawa, H. Fish oil and omega-3 fatty acids in cardiovascular disease: do they really work? *European Heart Journal*. 2012; 33(4), 436–443. Available from: <http://doi.org/10.1093/eurheartj/ehr362>.
20. The Center for Genetics, Nutrition and Health. The importance of the ratio of omega-6/omega-3 essential fatty acids. *Biomed Pharmacother*. 2002; 56(8): 365-79. Available from: www.ncbi.nlm.nih.gov/pubmed/12442909
21. Food Insight. Whole Grains Fact Sheet. 2014 [cited 2017Apr 24]. Available from: www.foodinsight.org/Whole_Grains_Fact_Sheet.
22. Dietitians of Canada. Cardiovascular Disease – Key Practice Points. In: Practice-based Evidence in Nutrition [PEN]. 2010 [cited 2017Apr 14]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=2671&pqcatid=146&pqid=8125. Access only by subscription.
23. Boeing, H., Bechthold, A., Bub, A., Ellinger, S., Haller, D., Kroke, A., Watzl, B. Critical review: vegetables and fruit in the prevention of chronic diseases. *European Journal of Nutrition*, 2012; 51(6), 637–663. Available from: doi.org/10.1007/s00394-012-0380-y.
24. Dietitians of Canada. Cancer – Colorectal - Key Practice Points. In: Practice-based Evidence in Nutrition [PEN]. 2012 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=4545&pqcatid=146&pqid=8900. Access only by subscription.
25. Dietitians of Canada. Cardiovascular Disease – Dyslipidemia - Key Practice Points. In: Practice-based Evidence in Nutrition [PEN]. 2014 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=2878&pqcatid=146&pqid=2601. Access only by subscription.
26. Food Insight. Functional Foods Fact Sheet: Plant Stanols and Sterols. 2007 [cited 2017 Apr 24]. Available from: www.foodinsight.org/Functional_Foods_Fact_Sheet_Plant_Stanols_and_Sterols.
27. Hamilton Health Sciences. Plant sterols - could they be right for you? 2012 [cited 2017 Apr 24]. Available from: www.hamiltonhealthsciences.ca/documents/Patient%20Education/PlantSterols-trh.pdf
28. Dietitians of Canada. Food Sources of Fibre. 2016 [cited 2017 Apr 26]. Available from: www.dietitians.ca/Your-Health/Nutrition-A-Z/Fibre/Food-Sources-of-Fibre.aspx.

29. Dietitians of Canada. Osteoporosis: Evidence Summary. In: Practice-based Evidence in Nutrition [PEN]. 2014 Jul 29 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=553&trid=5402&trcatid=42. Access only by subscription.
30. Eat Right – Academy of Nutrition and Dietetics. Prebiotics and Probiotics: Creating a Healthier You. 2016 [cited 2017 Apr 24]. Available from: www.eatright.org/resource/food/vitamins-and-supplements/nutrient-rich-foods/prebiotics-and-probiotics-the-dynamic-duo.
31. Dietitians of Canada. Healthy Lifestyle: Eating Together - Evidence Summary. In: Practice-based Evidence in Nutrition [PEN]. 2012 Apr 17 [cited 2017 Apr 24]. Available from: www.pennutrition.com/KnowledgePathway.aspx?kpid=6750&trid=6681&trcatid=42. Access only by subscription.
32. Public Health Nutritionists of Saskatchewan. Teaching Nutrition in Saskatchewan Grade 6 Health and Physical Activity. 2017 Aug 1. Available from: www.rqhealth.ca/department/health-promotion/nutrition-and-healthy-eating.
33. Government of Canada. Evidence Review for Dietary Guidance: Summary of Results and Implications for Canada's Food Guide. 2016 [cited 2017 Mar 24] Available from: www.canada.ca/en/health-canada/services/publications/food-nutrition/evidence-review-dietary-guidance-summary-results-implications-canada-food-guide.html

Accessing Health Information On-Line

We often get health information from the internet through social media and websites. It is hard to know which source is the best. It is important to inform students of ways to ensure the information from the website can be trusted.

Below are a few tips when looking for health information online:

1. Who hosts the website?

- Look for information from government authorities such as Health Canada, health authorities, or from national charities such as the Heart and Stroke Foundation, Canadian Cancer Society, or Diabetes Canada. These sources report reliable health information.
- Be wary of websites advertising or selling things that are supposed to improve your health. Many of these companies include false or misleading scientific claims to encourage you to buy their product.

2. Is the information reliable?

- Check the author's credentials. Not all information is written by qualified health professional. There are many phony health professionals making false claims on the Internet.
- Some qualified health professionals may also reference poor scientific studies with misleading information. It can be important to take a closer look at the articles backing up their claims (see backgrounder *Reading Health Studies* p. 20)
- Health information should be unbiased and based on solid evidence. The author should refer to and provide the specific links to this evidence.
- Be cautious about personal stories and opinions. They are not always objective or based on evidence.
- Some websites may even have a cautionary note or full disclaimers that the information provided is purely based on opinion and not on scientific evidence.

3. When was the information written?

- Look for websites with current health information. The date of the information is often at the bottom of the page. Look for information from the last 5 to 10 years.

4. Does the website offer quick and easy solutions to your health problems?

- Be careful of health information that claims that one pill or food will cure a lot of different illnesses.
- Be cautious of articles that try to make people fearful or recommends therapies which produce amazing or 'miracle' cures. Look for other reliable websites to see if they provide the same information.
- Talk with a trusted health care professional about what you learn online before making any changes in your health care or eating plan

Reading Health Studies

The study of how food and nutrition impacts human health is a fast growing field of science. As the popularity of nutritional science increases, so does the amount of inaccurate nutrition and health claims. These claims are often loosely based on poorly designed studies and distorted research findings.

To be able to find and interpret accurate nutrition and health information make sure to evaluate the evidence behind a specific nutrition or health claim and identifying poor reporting of scientific evidence.



4 Red Flags When Reading Health Studies (1)

- 1. Sensationalized headlines and misinterpreted results:** Media headlines are used to catch attention and elicit an emotional response, not necessarily to provide accurate scientific information. Reporters can over simplify or misinterpret the finding of studies. Even researchers and journal editors have misinterpreted results (2). It is important to interpret the original study with a critical eye to identify potential conflict of interest and sensationalized conclusions.

Example: In 1998, there was a study in which a vaccine was allegedly linked to autism. Later it was noted that the study was funded by families who wanted lawsuits against the vaccine company, and that the research was full of study flaws, so did not actually prove that link. The journal later removed the study and 10 out of 12 of the study researchers noted the interpretation of the results was wrong (2).

- 2. Conflict of interest:** Food companies and other industries will employ researchers to conduct and publish studies. Although this does not automatically indicate that the study will not be based on sound evidence, it is important to be cautious reading the study, since the research can be misrepresented for personal or financial gain.

Example: A food company paid researcher to publish evidence suggesting that a specialized chocolate milk prevented concussions (3).

3. Correlation instead of causation:

A correlation means there is a relationship between two or more things. This means when one thing changes, the other things change as well, but there is no way to tell one change caused the other changes. For example, researchers found a correlation between divorce rates and margarine consumption. This does not mean eating margarine causes divorce. It means there are changes in data that are similar (4).

Causation means that changes in one thing made a direct change in the other. For example, jumping off a cliff can cause more injury than jumping of a sidewalk. Researchers can measure the number of injuries that are occurred in people jumping off cliffs and sidewalks. When there are more injuries in the cliff jumping group, the researchers can say, jumping off a cliff causes more injuries than jumping off a side walk

4. Unrepresentative samples

Some people reference studies to support their beliefs or claims. Often these animal studies and do not mean the same as if they were conducted with humans. Even if the study was on humans the population of the study could be different than others. Example: rats may respond to a certain chemical differently than humans. If this is true, using a study of rats to support a claim is useless. Also, if a small group of males in Africa respond to an intervention, it doesn't mean it will work for Canadian women. For more red flags and information see infographic below and at www.compoundchem.com

References

1. Brunning A. A Rough Guide to Spotting Bad Science. 2014 Apr 2 [cited 2017 Aug 22]. Available from: <https://www.compoundchem.com/2014/04/02/a-rough-guide-to-spotting-bad-science/>
2. Moore A. Bad science in the headlines: Who takes responsibility when science is distorted in the mass media? EMBO Rep. 2006 Dec; 7(12): 1193–1196. Available from: www.ncbi.nlm.nih.gov/pmc/articles/PMC1794697/.
3. Healthnewsreview.org. U of Maryland review: researcher on flawed chocolate milk/concussions study failed to disclose big dairy donations. April 2016 [cited 2017 Sept 14]. Available from: <http://www.healthnewsreview.org/2016/04/u-of-maryland-review-researcher-on-flawed-chocolate-milk-concussions-study-failed-to-disclose-big-dairy-donations/>
4. Vigen, Tyler. Spurious Correlations. Available from: tylervigen.com/spurious-correlations

A Rough Guide to SPOTTING BAD SCIENCE

Being able to evaluate the evidence behind a scientific claim is important. Being able to recognise bad science reporting, or faults in scientific studies, is equally important. These 12 points will help you separate the science from the pseudoscience.

1. SENSATIONALISED HEADLINES



Article headlines are commonly designed to entice viewers into clicking on and reading the article. At times, they can over-simplify the findings of scientific research. At worst, they sensationalise and misrepresent them.

7. UNREPRESENTATIVE SAMPLES USED



In human trials, subjects are selected that are representative of a larger population. If the sample is different from the population as a whole, then the conclusions from the trial may be biased towards a particular outcome.

2. MISINTERPRETED RESULTS



News articles can distort or misinterpret the findings of research for the sake of a good story, whether intentionally or otherwise. If possible, try to read the original research, rather than relying on the article based on it for information.

8. NO CONTROL GROUP USED



In clinical trials, results from test subjects should be compared to a 'control group' not given the substance being tested. Groups should also be allocated randomly. In general experiments, a control test should be used where all variables are controlled.

3. CONFLICTS OF INTEREST



Many companies will employ scientists to carry out and publish research - whilst this doesn't necessarily invalidate the research, it should be analysed with this in mind. Research can also be misrepresented for personal or financial gain.

9. NO BLIND TESTING USED



To try and prevent bias, subjects should not know if they are in the test or the control group. In 'double blind' testing, even researchers don't know which group subjects are in until after testing. Note, blind testing isn't always feasible, or ethical.

4. CORRELATION & CAUSATION



Be wary of any confusion of correlation and causation. A correlation between variables doesn't always mean one causes the other. Global warming increased since the 1800s, and pirate numbers decreased, but lack of pirates doesn't cause global warming.

10. SELECTIVE REPORTING OF DATA



Also known as 'cherry picking', this involves selecting data from results which supports the conclusion of the research, whilst ignoring those that do not. If a research paper draws conclusions from a selection of its results, not all, it may be guilty of this.

5. UNSUPPORTED CONCLUSIONS



Speculation can often help to drive science forward. However, studies should be clear on the facts their study proves, and which conclusions are as yet unsupported ones. A statement framed by speculative language may require further evidence to confirm.

11. UNREPLICABLE RESULTS



Results should be replicable by independent research, and tested over a wide range of conditions (where possible) to ensure they are consistent. Extraordinary claims require extraordinary evidence - that is, much more than one independent study!

6. PROBLEMS WITH SAMPLE SIZE



In trials, the smaller a sample size, the lower the confidence in the results from that sample. Conclusions drawn can still be valid, and in some cases small samples are unavoidable, but larger samples often give more representative results.

12. NON-PEER REVIEWED MATERIAL



Peer review is an important part of the scientific process. Other scientists appraise and critique studies, before publication in a journal. Research that has not gone through this process is not as reputable, and may be flawed.



© COMPOUND INTEREST 2015 - WWW.COMPOUNDCHEM.COM | @COMPOUNDCHEM
Shared under a Creative Commons Attribution-NonCommercial-NoDerivatives licence.



Evolution of the Food Guide

In the Beginning (1, 2)

Ever since the 1940's a food guide has existed in Canada to direct Canadians toward healthy food choices and promote their nutritional health.

- In 1942, Canada's first food guide called 'Canada's Official Food Rules' was introduced. At that time, it focused on rationing and preventing nutrition deficiencies during World War II. Over time, it became a tool to teach Canadians about balancing their overall food choices to attain their required nutrients. The guide started out giving many direct rules but later on, recommendations became guidelines to follow.
- Along with name changes, the number of food groups evolved from 5 to 4 in the 1977 version because vegetables and fruit offer similar nutrients so they were combined to form one group, and then in 2019 they moved away from the 4 food groups and now categorize them in groupings on a plate as vegetables and fruit, protein foods and whole grains.
- The 1982 version was the start of educating the public about making food choices to decrease risk of chronic disease rather than merely prevent nutrient deficiencies. It included the concept of moderation.
- The 1992 version included stakeholder input, using feedback from experts, consumers, literature reviews, food consumption surveys, consumer research, and scientific reviews. Consultation was an integral part of the process. The guide changed from a circle to a rainbow in the 2007 version to show the higher recommended number of servings from the grain products and vegetable and fruit food groups than meat and alternatives and milk and alternatives.
- Experts' input to the guide's messages became increasingly important. In 2007, the input process into developing the Food Guide is very structured and involves many practitioners with various backgrounds, such as experts in nutrition, anaphylaxis, agriculture, food and consumer associations, environmental health, food science, and food industry representatives. In 2019.....[need to add updated info here]
- In 2016, as part of their Healthy Eating Strategy, Health Canada started to revise their nutrition recommendations and food guide, and the updated online suite of resources was officially released in January of 2019 (for more see: www.canada.ca/en/health-canada/services/canada-food-guides/revision-process.html).
- In 2019 Health Canada dropped the four food groups and serving sizes and recommended that Canadians eat plenty of vegetables and fruit, whole grain foods and protein foods. The Canada's Food Guide Snapshot demonstrated the portions of foods to eat.
- The newly updated 2019 Food Guide provides Canadians information and advice on making healthy food choices, as well as brings attention to the many factors that influence what and how we eat and drink. It is no longer a one-size-fits-all print document, but is now a mobile-responsive web application with new resources that provide Canadians, policy-makers and health professionals with

information and up-to-date advice on eating well. This time around the food guide was free of industry influence.

- The food guide is important to help impact policy, the food environment, food culture and what is taught to children and schools and others in the community.

The Controversy (2, 3)

- The 2007 version was controversial as the food industry was an integral part of the Food Guide Advisory Committee. Dairy, vegetable oil and consumer product manufacturers (including Pepsi-Co, Frito-Lay and Coca-Cola) were represented in the consultation process. Some feel their involvement may have swayed some of the recommendations on the guide.
- Controversy with the 2019 version of the Food Guide came from food producers and marketing boards indicating that their products were underrepresented (e.g. milk and meat not being as visible or heavily promoted).

References

1. Health Canada. Canada's Food Guides from 1942 to 1992. 2007 Jul 5 [cited 2016 Jul 21]. Available from: www.canada.ca/en/health-canada/services/food-nutrition/canada-food-guide/background-food-guide/canada-food-guides-1942-1992.html.
2. Health Canada. Eating Well with Canada's Food Guide (2007): Development of the Food Intake Pattern. 2007 May 18 [cited 2016 Aug 5]. Available from: www.canada.ca/en/health-canada/services/food-nutrition/reports-publications/eating-well-canada-food-guide-2007-development-food-intake-pattern.html.
3. Freedhoff, Y. Canada's Food Guide is broken – and no one wants to fix it. Globe and Mail. 2015 Apr 26 [cited 2016 Aug 5]. Available from: www.theglobeandmail.com/life/health-and-fitness/health-advisor/canadas-food-guide-is-broken-and-no-one-wants-to-fix-it/article2411164
4. Health Canada. Evidence Review for Dietary Guidance: Summary of Results and Implications for Canada's Food Guide. 2016 Jun 15 [cited 2017 Apr 26]. Available from: www.canada.ca/en/health-canada/services/publications/food-nutrition/evidence-review-dietary-guidance-summary-results-implications-canada-food-guide.html
5. Health Canada. Revision process for Canada's Food Guide. 2017 Jul 26. www.canada.ca/en/health-canada/services/canada-food-guides/revision-process.html

Planning a Healthy Menu

Planning meals and snacks for a few days at a time can help to save time and money. With a plan, you will buy fewer food items that you do not need and make fewer trips to the store. Invite students to make a week's worth of dinner menus for themselves or a family of four based on their personal lifestyle choices (e.g. how active they are; level of cooking skills; are there any cultural, biological (allergies or diabetes) or other (vegetarian) food restrictions or preferences; etc.) or they could plan a menu for a school food program.

Note: All students need to be physically active, eat well, and have positive mental health regardless of their weight, size and shape. It is important to be supportive of all youth by keeping the focus **on** health and wellness and **off** size and shape.

Youth do not need to count calories or develop strict meal plans in their everyday living. If calorie and % protein, carbohydrate and fat in foods are calculated, this should be for the purpose of understanding how this is done in a clinical setting, not for everyday living. Be cautious that these activities can cause anxiety in youth and potentially trigger disordered eating.

Below are suggested menu planning steps that you could review with your students.

Follow these steps to make a menu:

1. Prepare your workspace.

- Gather favourite recipes and search new meal ideas they would like to try. Talk about incorporating leftovers on a night or two but remind them that they will need to plan for extra servings to make sure there is enough for more meals.
- Get a copy of the Canada's Food Guide (CFG) Snapshot and recommendations online. Each meal should include about half your plate vegetables and/or fruit, a quarter protein foods and a quarter whole grains, choosing plant-based more often.

2. Fill in the menu.

- Choose the main family meal first. Sitting down and eating together as a family is important for youth. It provides an opportunity to share experiences from the day and helps to ensure a variety of foods are available and enjoyed. Planning main family meals first will help to make sure these meals occurs. . Keep food from the Snapshot in mind when planning meals and snacks. A good rule of thumb is to have about half your plate vegetables and fruit, a quarter whole grains, and a quarter protein foods at each meal. Have food from the food guide for snacks. When making a menu it is important to include favourite meals *and* try out new recipes and foods.

- Fill in breakfast and lunch. Often students are surrounded by food choices in their school and other places they have activities and live. Planning which meals will be eaten away from home, and keeping nutrition in mind, helps students make sure they choose a balanced meal and have extra food from home to supplement what is purchased. For example, if there is a canteen at school, students could plan to have lunch from the canteen knowing what is usually available, and then packing extra vegetables or fruit if this is not available at school.

3. Review the menu and think about the following things:

- Spice it up with variety. Encourage students to use a variety of ingredients, flavours, colours and textures. This will make meals more interesting and appealing. Combine old favourite foods with a few new dishes.
- What is going on in the week? Suggest students think about their families' schedules. A busy week filled with activities could mean planning fast and easy meals rather than food that will take longer to prepare.

4. Estimate the amount of food needed.

- Estimate the amount of food to buy and make. Students need to think about the number of people who will be eating and how much they may eat.

5. Make the grocery list

- Looking over the menu, students should think about what food they may already have on hand in order to decide what they will need to buy.
- Flip through grocery store flyers to take advantage of specials and use coupons to save money. For a homework project, you could have them compare the list to their pantry at home, then go to the store with a parent to price all the items they would have to buy to make their menu.
- Consider giving your students a budget to work with so that they need to consider the cost of the meals they have developed.

For more recipe and menu ideas check out Eat Right Ontario (www.unlockfood.ca), Dietitians of Canada (www.dietitians.ca) or download the Cookspiration mobile app from www.cookspiration.com.

Menu Planning Template

Remember to try to: eat with others, eat mindfully, enjoy your food, and cook more often.

Perfection is not the goal, it is okay to also include foods that don't fit Canada's Food Guide.

	Monday	Tuesday	Wednesday
Breakfast ✓ Vegetables and fruit ✓ Whole grains ✓ Protein foods			
Lunch ✓ Vegetables and fruit ✓ Whole grains ✓ Protein foods			
Afternoon snack ✓ food from Canada's Food Guide			
Supper ✓ Vegetables and fruit ✓ Whole grains ✓ Protein foods			
Evening Snack ✓ food from Canada's Food Guide			

References:

1. Health Canada. Consumer's Guide to the DRIs. 2010 [cited 2017 Apr 26] from: www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/dietary-reference-intakes/consumer-guide-dr-is-dietary-reference-intakes.html
2. Health Canada. Dietary Reference Intakes Tables. 2010 [Cited 2017 Aug 22]. Available from: www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/dietary-reference-intakes/tables.html
3. Government of Canada. Canadian Nutrient File. 2016 Jul 14 [cited 2017 Apr 26]. Available from: food-nutrition.canada.ca/cnf-fce/index-eng.jsp.

Healthy Eating for Active Youth

Proper nutrition is important for all people, but is crucial for the health of youth who are still growing, developing, and using a lot of energy in their activities. It is important for youth to learn which foods provide energy for the physical activities they do (1).



Nutrients and fluids to fuel our bodies

It is important to eat healthy foods on a regular basis. Eating specific foods when doing physical activity can help with growth and performance.

Carbohydrates, proteins, fats, vitamins, minerals and water all provide important nutrition to help fuel our bodies for physical activities and normal body functioning. Since active youth are still growing, and are being active, it is crucial to provide high quality food choices. This means choosing wholesome rather than processed foods to provide sufficient vitamins, minerals and macronutrients.

- **Carbohydrates:** Carbohydrates are the most important fuel source for active individuals. These nutrients break down to glucose, which is used as energy by the body. Glucose is stored in the muscles as glycogen. Muscle glycogen is the most readily available energy source for working muscle and can be released more quickly than other energy sources. Carbohydrates are also the main fuel source for the brain. Good sources of carbohydrates include whole grain bread, pasta, cereal, and crackers.
- **Proteins:** Proteins have a variety of roles in the body, including building, repairing and maintaining muscle. Protein breaks down into amino acids, which are the building blocks for other proteins. The body can make many amino acids, while others are considered essential, meaning we can only get them from food. Active youth need a little more protein than sedentary youth (about 1½–2 times that of sedentary individuals), but they can easily get that protein from food alone. Good sources of protein include eggs, nuts and nut butters, legumes (such as chickpeas, beans and lentils), fish, beef, chicken, and pork.
- **Fats, Vitamins, and Minerals:**
 - **Fats** provide energy for sustained physical activity as well as protection around vital organs.
 - **Vitamins and minerals** support all of the processes our bodies do to break down food for energy and building block materials (2).
 - **Iron** is important for carrying oxygen through the blood to all cells in the body. Iron requirements are higher during periods of rapid growth such as adolescence as well as during regular intense exercise, making it an important mineral for active youth (5).

- **Fluids and water:** Fluids help to regulate body temperature and replace sweat losses during physical activity. It is important for youth to stay hydrated for better mental and physical performance in the activities they do.
 - **Water** helps carry nutrients around in the body, get rid of wastes, regulate body temperature, and stay hydrated. Plain, cool water is usually all youth need for activities lasting one hour or less. Youth should consume plenty of plain, cool water before, during and after physical activities. Additional fluid is needed in warmer conditions.
 - **Sports Drinks:** The key ingredients in most sports drinks are water, sugar, and electrolytes (sodium and potassium). Most youth who participate in physical activity and sport do not need the extra sugar and electrolytes provided by these beverages. Although these beverages are marketed and sold to the general public as part of a healthy lifestyle, they are only useful in very specific circumstances such as if the activity is vigorous for longer than one hour, is intense, or if the activity is a prolonged competitive game that requires repeated intermittent activity (2, 3). In most cases, water is the best choice.
 - **Energy drinks:** Energy drinks are NOT the same as sports drinks. Energy drinks can actually decrease sports performance because they contain large amounts of sugar, caffeine and carbonation, which can cause an upset stomach during activity and dehydration. These drinks are not recommended for children, pregnant women and those sensitive to caffeine (5).

Supplements

- **Creatine:** Creatine supplements should not be used by anyone under age 18 (2).
- **Protein Supplements:** Protein supplements should not be used by youth; they can displace high quality food choices and may be high in sugar salt or low in other nutrients or fibre. There is also not enough research on their use with youth to know their safety or helpfulness.

What to Eat and Drink Before, During and after Physical Activity

- **Before Activity:** It is important to eat enough food before activity to fuel muscles and the brain for good mental and physical performance. High carbohydrate foods digest quickly and should be the main source of fuel within 2-3 hours before activity, with a medium amount of protein. High fat and/or fibre foods should be limited right before activity as they take longer to digest and can cause gas or upset stomachs during activity (1). Examples of high quality pre-activity choices include oatmeal, low fat yogurt and fruit, pasta with tomato sauce, or an egg and toast.
- **During Activity:** Plain cool water is usually all that is needed for activities lasting one hour or less. For vigorous activity lasting longer than one hour, or activity in hot temperatures, 100% juice, a store-bought or homemade sport drink or may be beneficial.

- **After Activity:** Youth should drink plenty of water after activity. Recovery foods are those that are eaten right after activity. A mixture of carbohydrate and protein within 30 minutes of the activity has been shown to be the best kind of recovery food to replenish energy stores and repair lean tissue (muscle) (1). Examples of high quality recover foods include chocolate milk, fruit and yogurt smoothies, cottage cheese and crackers, or homemade whole grain muffins.

NOTE: Youth do NOT need to count calories or follow strict meal plans to meet their physical activity needs. It is more important that they understand the general types of foods that can be included in their meals and snacks before during and after physical activity to help them feel good and perform their best. Focusing too strictly on portion sizes and macronutrient distribution can have a negative impact on youth's relationship with food and can even lead to disordered eating.

Making the healthy choice the easy choice

Since carbohydrates are the main fuel for activity, it is important for young athletes to eat a high carbohydrate diet along with enough protein to build and repair body tissues as well as support their growth (4). Young athletes need frequent healthy meals and snacks to ensure energy requirements can be sustained (4).

To help support active youth to make healthy food and beverage choices before, during and after activity, it is important to have healthy options available in recreation facilities, at tournaments, and at sporting events. Watch this short video to find out more:

www.youtube.com/watch?v=3ENmGpUKH0M.

References

1. Purcell, LK. Sport Nutrition for Young Athletes. Paediatr Child Health 2013;18(4):200-2. Available from: www.cps.ca/documents/position/sport-nutrition-for-young-athletes
2. Whitney et al. Understanding Nutrition 2nd Canadian Edition. 2016. United States: Lenore Taylor-Atkins; p 480-515.
3. Dietitians of Canada. Sports Hydration – Get the Facts. 2016 June 14. Available from: [www.dietitians.ca/Your-Health/Nutrition-A-Z/Sports-Nutrition-\(Adult\)/Sports-Hydration.aspx](http://www.dietitians.ca/Your-Health/Nutrition-A-Z/Sports-Nutrition-(Adult)/Sports-Hydration.aspx).
4. Coach.ca. Fueling the Young Athlete. 2017 [cited 2017 Aug 17]. Available from: www.coach.ca/fueling-the-young-athlete-p154684.
5. Food and Nutrition Board, Institute of Medicine. Dietary Reference Intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids. Washington, D.C.: The National. Also available from: www.nap.edu/books/0309085373/html.
6. Alberta Health Services. Sports Nutrition for Youth: A Handbook for Coaches. 2015 [cited 2017 Aug 17]. Available from: www.albertahealthservices.ca/assets/info/nutrition/if-nfs-sports-nutrition-for-youth.pdf

Nutrition Trends and Fad Diets

Many new diets and supplements come out each year advertised as being the best for gaining muscle, losing weight or enhancing sport performance. Diet programs, however, are not regulated in Canada (1), and nutrition information can be found everywhere and come from anyone. The hard part is knowing which source of information to believe.

A fad diet is a popular diet that usually promises weight loss. A fad diet often sounds “too good to be true,” and likely does not follow healthy eating guidelines that support good health and athletic performance. Red flags to watch out for include (1):

- ❗ Promises weight loss of more than 2 pounds (1 kg) per week.
- ❗ Does not provide support for long-term weight loss success.
- ❗ Restricts you to less than 800 calories a day.
- ❗ Is rigid and does not fit into your lifestyle or state of health.
- ❗ Cuts out major food categories (like gluten or carbohydrates) and stops you from enjoying your favourite foods.
- ❗ Forces you to buy the company’s foods or supplements rather than show you how to make better choices from a grocery store.
- ❗ Uses “counsellors” who are actually salespeople. Weight management counsellors should not make a commission from anything you buy.
- ❗ Gives you nutrition advice that is based on testimonials rather than scientific evidence.
- ❗ Promotes unproven ways to lose weight such as starch blockers, fat burners and detox cleanses.
- ❗ Does not encourage physical activity.

Fad diets may be harmful

Fad diets that are too low in calories may mean individuals won’t get enough energy to do the activities they love. By cutting out major groups of foods, people may not get the nutrients their bodies need to be healthy. If people lose weight on fad diets too quickly with no support to help keep it off, they could get stuck in a cycle of weight loss and weight gain. This yo-yo dieting is stressful for the body (1) and often does not result in a sustained weight, which is the goal. Dieting may cause individuals to become preoccupied with food and weight, which can lead to disordered eating.

Impacts of Dieting on Physical Activity (2)

When you do not get enough calories from carbohydrate, fat and protein, your performance may not be the best it could be.

If you don’t get enough calories in the short-term:

- You may not see results from your training
- You may lose muscle tissue which may result in the loss of strength and endurance

If you don't get enough calories long-term

- You may not get the vitamins and minerals you need
- Your immune system may be weakened
- Your hormone levels may be unbalanced
- You may have a higher risk of injury to muscles, bones or connective tissue
- Females may not menstruate regularly

Below are some common nutrition trends described:

1. High Fat, Low Carb Diets (moderate to high protein)

Examples: The Ketogenic Diet, Atkins, South beach, Paleolithic, etc.

The ketogenic diet is super high in fat (65-75% of your diet is fat), super low carbohydrate (<5% of your diet) and moderate in protein (15-20% of your diet). Health Canada recommends that for children 4-18 years of age, 10-30% of the calories be from protein, 45-65% from carbohydrate and 20-35% from fat (5). The ketogenic diet is high in animal sources of protein, high in fat of any kind, contains no grains or no pulses, and provides only low carb vegetables and a small amount of berries, but no other fruits. (3)

Getting most of your calories from fat forces your body to use different energy pathways. Instead of carbs for energy, the body burns fat, entering a state of dietary ketosis (when your body is forced to use ketones as an energy source instead of glucose).

Cons

- Lower endurance and muscle loss/harder to build it up
- Flu like symptoms due to low blood sugars (headache, brain fog, fatigue, nausea)
- Constipation
- High cholesterol
- Potential vitamin and mineral deficiencies
- May encourage disordered eating if focusing heavily on restriction
- Greater focus on what and how much to eat more than on the quality of food consumed
- Restrictive, hard to follow with a low success rate over time

Where has research shown benefits?

- Reduces seizures in children and adults with epilepsy (6).
- Possible benefits for other brain disorders such as Parkinson's, Alzheimer's, multiple sclerosis, sleep disorders, autism, and even brain cancer. However, there are no human studies to support recommending ketosis to treat these conditions (7).
- May have some benefits for blood sugar control for people with diabetes (8).

2. Detox Cleanses (9)

Examples: Juice or smoothie cleanse, liver detox, colon cleanse.

What they claim: Cleansing is often promoted to improve health by 'cleansing' the bowel and removing toxins from the body that come from the air we breathe, the food we eat and the beverages we drink. They also claim to promote healthy intestinal bacteria, boost energy and immunity, and start weight loss. However, there is no scientific evidence to show that cleansing actually does any of these things. Your body already has built in detoxifiers: your intestine, lungs, liver and kidneys effectively remove waste from your body every day.

Cleansing diets are not recommended for growing children and teens (9).

Cons

- If done often or followed for a long time, can be harmful and cause cramping, bloating, nausea, vomiting, dehydration, headaches, lack of energy and dizziness.
- Can change the healthy bacteria in the colon and lead to other more serious side effects such as:
 - changes in electrolyte levels
 - low blood sugar
 - low or high blood pressure
 - interactions with medications
 - vitamin and mineral deficiencies
- Not something you can do for long-term
- Can be expensive

Where has research shown benefits?

- There is no scientific evidence to support any beneficial claims.

3. Intermittent fasting

What it is: With Intermittent Fasting, you are restricting food intake, but only on certain days or for certain hours of the day, and on other days you would have the freedom to eat and meet energy requirements.

Examples: Fast daily for 16 hours, eating window is 8 hours (16/8), eat normally for 5 days a week (5:2), restrict calories to 600 for 2 days a week, do a 24 hour fast once or twice a week (eat-stop-eat), alternate day fasting

Cons

- Hard to follow in the long term

- Not listening to body's hunger and fullness cues
- Low energy, poor mood during fasting periods
- Digestive issues
- Could lead to bingeing
- No long term studies, so not sure of the long term effects
- High drop out rate of studies so may not be sustainable
- Animal studies show negative impact on reproductive health

Where has research shown benefits?

- can help lower cholesterol (10)
- can have a beneficial effect on cognitive performance, including memory (11)

When students investigate different diets, make sure they know how to find credible nutrition information backed up by scientific evidence. Encourage them to compare diets to the list of red flags as listed above, and also to Canada's Food Guide to see what might be missing.

Teenagers may be easily influenced by media and peer messages with diet promises for quick fixes and enhanced performance. Teachers can help to reinforce the importance of eating a variety of foods from Canada's Food Guide and encourage students to contact a dietitian should they have specific questions about diets. EatWell Saskatchewan is a free service connecting residents to a Registered Dietitian by email or phone, for more information see: eatwellsask.usask.ca/. People may also see a [private practice dietitian](#) for one on one counselling for more personalized and tailored services. Health insurance policies may cover these services.

For more information see:

- [Accessing Health Information On Line](#) see page 32
- [Healthy Eating for Active Youth](#) for information about sport supplements or what to eat during and after activity – page 44
- Canada's Food Guide at food-guide.canada.ca/en/

References:

1. Dietitians of Canada. Get the Facts on Fad Diets www.unlockfood.ca/en/Articles/Weight-Loss/Get-the-Facts-on-Fad-Diets.aspx
2. Dietitians of Canada. Sports Nutrition Facts. www.unlockfood.ca/en/Articles/Physical-Activity/Sports-Nutrition-Facts-on-Carbohydrate,-Fat-and-P.aspx
3. Abby's Kitchen – Ketogenic Diet www.abbeyskitchen.com/the-keto-diet-ketogenic/
4. Sports Dietitians Australia www.sportsdietitians.com.au/fad-diets/
5. Health Canada. 2005. Dietary Reference Intakes. www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/dietary-reference-intakes/tables/reference-values-macronutrients-dietary-reference-intakes-tables-2005.html
6. Martin, K., C. Jackson, R. Levy, and P. Cooper. 2016. Ketogenic diet and other dietary treatments for epilepsy. *Cochrane Database Syst Rev.* Feb 9;2:CD001903. doi: 10.1002/14651858.CD001903.pub3. Retrieved Aug 2 2019 from www.ncbi.nlm.nih.gov/pubmed/26859528
7. Włodarek D. (2019). Role of Ketogenic Diets in Neurodegenerative Diseases (Alzheimer's Disease and Parkinson's Disease). *Nutrients*, 11(1), 169. doi:10.3390/nu11010169. Retrieved Aug 2 2019 from: www.ncbi.nlm.nih.gov/pmc/articles/PMC6356942/
8. Turton, J. L., Raab, R., & Rooney, K. B. (2018). Low-carbohydrate diets for type 1 diabetes mellitus: A systematic review. *PLoS one*, 13(3), e0194987. doi:10.1371/journal.pone.0194987. Retrieved Aug 2 2019 from: www.ncbi.nlm.nih.gov/pmc/articles/PMC5875783/
9. Dietitians of Canada. Cleansing Diets Factsheet. Retrieved Aug 2 2019 from: www.dietitians.ca/getattachment/76db2fc4-fdc8-466a-b321-2e5582bc36b1/FACTSHEET-Cleansing-Diets.pdf.aspx
10. Santos, H., and R. Macedo. 2018. Impact of intermittent fasting on the lipid profile: Assessment associated with diet and weight loss. *Clin Nutr ESPEN.* Apr;24:14-21. doi: 10.1016/j.clnesp.2018.01.002. Retrieved Aug 2 2019 from www.ncbi.nlm.nih.gov/pubmed/29576352
11. Li, L., Wang, Z., & Zuo, Z. (2013). Chronic intermittent fasting improves cognitive functions and brain structures in mice. *PLoS one*, 8(6), e66069. doi:10.1371/journal.pone.0066069. Retrieved Aug 2 2019 from www.ncbi.nlm.nih.gov/pmc/articles/PMC3670843/

Opportunities and Barriers to Health Eating

*Food = food and drinks

At a first glance, what determines youths' eating behaviour appears to be purely a matter of personal choice, but research shows there are so many other factors that come into play (10). These factors can include: what is available to them at school and in their community, income and the cost of food, what foods and diets have been most heavily marketed to them, cultural food norms, pressures to be a certain body size, busy schedules and convenience, and so much more (10).

When healthy food options are more available, affordable, accessible, and culturally appropriate, youth will be more likely to choose them. When youth have few healthy food options, are the targets for unhealthy food marketing, and are regularly offered unhealthy options, they often end up choosing those which are high in sugar, salt, and unhealthy fat.

Personal Factors

- **Hunger and Fullness** - We are born with the ability to feel hunger and fullness; however, many things can interfere with this as we age, such as: irregular meal patterns, adults' expectation for youth to eat a certain amount of food, and rewarding youth with food (e.g. candy for getting a question right, etc.).
- **Food Preferences** – We are born with innate preferences for sweet and aversions for bitter taste (10). There are also social and cultural norms that help to shape our food preferences, including what we learn from family, friends, and our culture. The foods that taste the best to, are most readily available, comfort us, and are most heavily marketed, often become what we like best.
- **Emotions** - Over eating, under eating or eating different foods can happen in response to different emotions. The association between emotion and food is normal, but it can be problematic if it becomes the usual way to deal with emotions.
- **Nutritional Knowledge and Perceptions of Healthy Eating** – Perceptions about healthy eating are shaped by our social surroundings and can change over time. Youth are often able to show a general understanding of the connections between food choice and health, however, in these age groups, knowledge often does not influence food choice as much as other factors (5).
- **Self-esteem and Body Image** - Media images of unrealistic body sizes and shapes, along with comments from family, friends, and role models about weight and dieting can influence youths' body image and self-esteem. This in turn can increase the risk of unhealthy dieting behaviours. Talking about healthy eating and physical activity for health benefits without focusing on weight, size and shape can promote a positive body image in children and youth. See weight bias backgrounder on p. 59 for more.

Factors at Home

Influences on eating habits at home can include whether families have:

- **Enough income** to be able to afford to buy enough acceptable, culturally appropriate and nutritious foods. The most important barrier to healthy eating is inadequate income (11).
- **Access** to healthy foods in the community or transportation to get it somewhere else. Neighbourhoods where there is limited access to affordable nutritious food but easy access to unhealthy food make it difficult for families to purchase healthy food.
- **Food skills** such as grocery shopping, being able to plan and prepare healthy and tasty meals, gardening and preserving.
- **Enough time** to grocery shop, plan, and prepare a meal with busy work schedules, extracurricular activities and responsibilities.
- **Proper kitchen equipment**, such as a stove and refrigerator, to prepare and store healthy foods.
- **Regular family meals**. Youth who participate in family meals on a regular basis tend to eat better than those who do not.
- **Cultural eating practices**. Culture can influence what foods are selected, how they are prepared and served, and how and when foods are eaten. Traditional food practices are often associated with healthier eating, more affordability and a passing on of cultural knowledge.
- **Multiple stressors** such as difficulty paying rent, finding a place to live, finding employment, or caring for ill family members often take priority over healthy eating.
- **Specific beliefs** such as vegetarianism, religious beliefs, or beliefs around what healthy eating is can all impact the types of foods that are consumed in the household.

Factors outside the Home

Schools, community and surrounding area - When healthy foods are more accessible, more affordable and better advertised in and around the school, this makes it more likely youth will eat them (4). When students have greater access to unhealthy foods, such as fast-food restaurants and convenience stores nearby or highly processed foods served and sold right in the school, this makes it harder for them to make healthy choices.

It is also important for adults not to criticise or judge youth based on the types or amounts of food they consume, as this can actually lead to poorer eating habits, not better (5, 6, 7).

Involvement in different types of physical activities - Participation in sports and other physical activities can influence youths' eating habits. As they learn about the role of healthy eating and exercise, youth may choose healthier food options (if they are available). In addition, sports such as wrestling, football, gymnastics and dance, in which body size plays a role, also impact youths' eating habits. (For more on what to eat before, during and after exercise see p. 44).

Recreation facilities provide a space for physical activity, but unhealthy food choices are often readily available (8). Also, many unhealthy foods such as energy drinks, soft drinks and fast food are marketed by professional athletes or promoted by some coaches, and can influence youth eating habits.

Public Policy – policies at the local, regional and national level can have a significant impact on our collective food choices and this can act as determinants of healthy eating. Effective policies can help ensure our environments can produce enough food to eat, can guide Canadians towards healthier food choices without thinking much about it, and can help ensure people can afford the foods they need (10).

References

1. Health Canada. Improving Cooking and Food Preparation Skills: A Synthesis of the Evidence to Inform Program and Policy Development. 2010. Available from: from www.canada.ca/en/health-canada/services/food-nutrition/healthy-eating/children/improving-cooking-food-preparation-skills-synthesis-evidence-inform-program-policy-development-government-canada-2010.html
2. Taylor JP, Evers S, McKenna M. Determinants of healthy eating in children and youth. Can J Public Health. 2005 Jul-Aug; 96 Suppl 3:S20-6, S22-9.
3. Public Health Nutritionists of Saskatchewan. Teaching Nutrition in Saskatchewan Concepts and Resources: Grades 1 to 3. 2013. Available from: www.fhhr.ca/Documents/TNSGrades1-3-May2015.pdf
4. Dietitians of Canada. What is the evidence that the implementation of school nutrition policies/guidelines improves the nutritional intake of elementary school and high school aged-children? In: Practice-based Evidence in Nutrition [PEN]. 2012. [cited Nov 19, 2013]. Available from www.pennutrition.com. Access only by subscription.
5. Birch LL, Fisher JO. Appetite and eating behavior in children. Pediatr Clin North Am. 1995 Aug;42(4):931-953. Abstract available from: www.ncbi.nlm.nih.gov/pubmed/7610021
6. Lytle L, Eldridge A, Kotz K, Piper J, Williams S, Kalina B. Children's Interpretation of Nutrition Messages. 1997 May. Jour Nutr Ed 29(3):128-136. Abstract available from: [www.jneb.org/article/S0022-3182\(97\)70177-8/abstract](http://www.jneb.org/article/S0022-3182(97)70177-8/abstract)
7. Satter EM. Secrets of Feeding a Healthy Family. Madison, WI: Kelcy Press; 2005. Appendix H available from: ellysatterinstitute.org/cms-assets/documents/199657-862048.appendix-h-nutr-ed.pdf
8. Olstad, DL., Raine K. McCargar LJ. Adopting and implementing nutrition guidelines in recreational facilities: public and private sector roles. A multiple case study. BMC Public Health. 2012 May 25;12:376. Available from: bmcpublichealth.biomedcentral.com/articles/10.1186/1471-2458-12-376
9. Taylor JP, Evers S, McKenna M. Determinants of healthy eating in children and youth. Can J Public Health. 2005 Jul-Aug; 96 Suppl 3:S20-6, S22-9. Available from: journal.cpha.ca/index.php/cjph/article/viewFile/1501/1690
10. Raine, K. D. Determinants of Healthy Eating in Canada: an overview and synthesis. 2005. Canadian Journal of Public Health. Vol 96, suppl 3: 8-14. Retrieved from journal.cpha.ca/index.php/cjph/article/view/1499.
11. Power EM. The determinants of healthy eating among low-income Canadians. Can J Public Health 2005; 96 (sup 3): s37-s42.

Activity: Food Environment Assessment

Purpose: To help identify the influence the environment has on our food choices.

There are many reasons why we choose to eat the foods we do. Some are more obvious like hunger and taste, while others can be less obvious invitations to eat like smells of food nearby, advertising and marketing, or just because the food was there. This activity will help students identify some of the reasons we eat what we eat and the role the environment may have on our food choices.

See next page for worksheet....

Take Home Assignment – Fill out the following chart:

	What did you feel? Experience?	Did it have an influence on what you ate? Bought?	How did that influence what you ate? Bought?
How many food advertisements did you see during your favourite TV show or in a magazine?			
On your way home from school, count the number of places that you pass that sells food.			
How many steps does it take to get from the TV, computer, or desk at work to get something to eat?			
Notice how much you eat from a large bulk package versus a smaller package of food?			
Notice how much food you would put on a large plate versus a small plate or beverages in glasses?			
Do you often buy foods in meal deals, or because of a sale or special offer (e.g. 3 for \$10)?			
How do you feel when you see or smell food? (e.g. vending machine right by the school gym, desk with candies in a dish, passing by and smelling the KFC at lunch time).			

Adapted from: Craving Change. 2012. www.cravingchange.ca and Wansink, B. (n.d.) mindlesseating.org/index.php.

Processed Foods

What do whole grain breads, orange slices and potato chips have in common? They are all processed foods. Processed foods have received a bad reputation over the years. Often these foods are blamed for the increased number of people with chronic disease and weight issues. It is important to know that processed foods are more than potato chips and TV dinners. Although we need to be cautious of some processed or prepared foods and beverages that contribute to excess sodium, free sugars, or saturated fat, many can be part of a positive healthy eating pattern.



What is a processed food?

Almost all of the food and beverages we consume have been processed to some degree. Changing foods in any way from how they are found in nature is food processing. Peeling, chopping, cooking, and pasteurizing are all food processing methods, so it is almost impossible to find many foods in our diet that have not been processed in some way. Foods are processed for many reasons. Milk is pasteurized to destroy harmful bacteria, fresh vegetables are frozen to preserve them for another time, and grains are milled into flour to make various breads. Some foods are fortified to enhance or replace vitamins lost in processing such as Vitamin D which is added to low fat milk. Food processing itself is not an issue and can actually be the healthiest option, the concern is the amount of processing and what other ingredients are added during the processing. Typically processed foods are grouped in categories similar to those below (1).

1. **Minimally processed:** These foods have had some processing but it does not significantly change the nutritional makeup of the food. The processing makes these foods more accessible, convenient and often safer to eat. Examples of minimally processed foods would be chopping vegetables to make a salad, butchering an animal to make fresh meat, freezing vegetables to store for later, and pasteurizing milk to kill bacteria. These foods do not have the addition of additives such as sugar, flour or salt.
2. **Processed ingredients:** Some foods are processed to create food ingredients such as flour, sugar, salt and oil. These ingredients are not consumed as is but are added to foods. For example, wheat is processed into whole wheat flour to make bread. Oil is extracted to be used in foods such as baked goods and salad dressing.
3. **Ultra-processed** (also called highly processed): These foods are created when minimally processed foods are combined with processed ingredients. They do not have any resemblance to the food they are made from. Examples of these foods include chicken nuggets, hot dogs, fruit snacks, ice cream, and some breakfast cereals.

Ultra-processed, or highly processed foods, are the items of most concern. Highly processed foods tend to be high in fat, sugar, salt and calories while contain few vitamins, minerals or fibre. They are often designed to be “ready to eat”, reheated or be portable. These foods are highly marketed and are often easily accessible in convenience stores and schools. This availability enables them to be consumed at

anytime, anywhere and while doing other things such as driving a vehicle, working on a computer or watching television. These types of eating behaviours lead to mindless eating and can cause over consumption of these foods. Research has shown that our modern excess eating is a normal response to an over accessible and marketed food environment. It is inappropriate to consider that eating habits are simply a matter of personal choice.

Reference:

1. Monterio, C. A. Nutrition and Health: The issue is not food nor nutrients so much as processing. *Public Health Nutrition* 2009; 12(5): 729-731.

Weight Bias



Weight bias refers to negative attitudes towards people due to their weight. These negative attitudes result in stereotypes, prejudice and unfair treatment towards these people. Weight bias can be expressed in multiple forms, such as name-calling, teasing, physical aggression, cyber bullying, rumors, and social exclusion (1, 2, 4, 5, 7, 8). Not only can this be embarrassing for a child or youth, it can also have serious consequences on their physical, social and psychological health (4, 5, 8). Weight bias towards Youth most often occurs at school and at home (5, 8).

Why does weight bias happen?

Weight bias occurs because we live in a culture where there is a perception that being thin is desirable (but not *too* thin, because these people may be stigmatized as well) (1). Our culture also tends to believe that people are responsible for their life situation and “get what they deserve”. Despite research suggesting that body weight is determined by a complex interaction of genetic, biological and environmental factors, most people believe that weight gain or loss is under personal control (2,3).

We are exposed to misleading messages about weight from various means such as television, movies, books, magazines, social media and websites. A consequence of these messages is that it is thought to be socially acceptable to judge people’s characters, personalities and behaviours based on weight. When family members, friends, and education professionals reinforce these false messages, individuals are stigmatized (1).

How does weight bias affect students?

Students who experience teasing or discrimination because of their weight can have low self-esteem, poor body image, and are more likely to experience symptoms of depression and anxiety (1, 5, 8). These students are also more socially isolated, less likely to be chosen as friends, and more likely to engage in suicidal thoughts and behaviours (5, 8). Youth who experience weight biases are more likely to try unhealthy weight control measures, binge eat, and avoid physical activities (4, 5, 8). Research shows that Youth who have been victimized because of their weight report missing more days of school, and experiencing lower expectations by their teachers, which can result in poorer academic performance (4, 6, 7, 8).

Taking Action

All people deserve safety, respect, and acceptance in their community and classroom. Just as we should not tolerate racial or gender bias toward others, we should not tolerate weight bias (1). If you witness weight bias occurring in your school, intervene right away. More on taking action here: [Obesity Canada Message to Educators](#)

References

1. Rudd Center for Food Policy and Obesity. Teachers: Weight Bias in Youth. [Cited 2015 Dec 21]. Available from: www.uconnruddcenter.org/files/Pdfs/Educators-WeightBiasintheClassroom.pdf
2. Canadian Obesity Network. It's time to end the last form of socially acceptable prejudice. [Cited 2015 Dec 7]. Available from: www.obesitynetwork.ca/weight-bias
3. Rudd Center for Food Policy and Obesity. Weight Bias and Stigma Theories of Weight Bias. [Cited 2015 Dec 7]. Available from: www.uconnruddcenter.org/weight-bias-stigma-theories-of-weight-bias
4. Canadian Obesity Network. What is the impact of obesity stigma? [Cited 2015 Dec 7]. Available from: www.obesitynetwork.ca/impact-of-obesity-stigma
5. Rudd Center for Food Policy and Obesity. Weight Bias and Stigma Weight Stigmatization in Youth. [Cited 2015 Dec 7]. Available from: www.uconnruddcenter.org/weight-bias-stigma-weight-stigmatization-in-youth
6. Rudd Center for Food Policy and Obesity. Weight Bias and Stigma Education. [Cited 2015 Dec 7]. Available from: www.uconnruddcenter.org/weight-bias-stigma-education
7. Rudd Center for Food Policy and Obesity. Weight Bias: A Social Justice Issue. 2012 [cited 2015 Dec 7]. Available from: www.uconnruddcenter.org/files/Pdfs/Rudd_Policy_Brief_Weight_Bias.pdf
8. Puhl, R. Latner, J. Stigma, Obesity, and the Health of the Nation's Children. Psychol Bull. 2007; 133(4):557-80.

Body Composition and Health Risks in Youth



Weighing and measuring students in schools

- Measuring youth within the school setting can be more harmful than beneficial. Youth are often teased about their size and shape. Measuring weight or body composition at school can increase the amount of teasing youth may already be receiving. Regardless of their size or shape, youth may be pressured to try harmful diets. Body composition can influence health but research has shown that shaming people for their size does not improve their health (1).
- All students need to be physically active, eat well, and have positive mental health regardless of their size and shape. It is important to be supportive of all youth by keeping the focus **on** health and wellness and **off** size and shape.
- There are a number of measures that can be used to estimate body composition in relation to health risks.

BMI for Age

- BMI (Body Mass Index) for Age is the recommended way for health care providers to assess growth and estimate body composition in youth. Research has linked childhood BMI to health quality in adulthood (2). The calculation below is used to determine BMI.

$$\text{BMI} = \frac{\text{weight in kilograms}}{\text{height in metres}^2}$$

- BMI for youth **MUST** be interpreted differently than BMI for adults. Because youth are growing and developing, their body composition changes frequently. As a result, **BMI for youth MUST be interpreted by using the appropriate BMI for Age charts and NOT adult BMI charts.**
- When health care providers assess growth, several measurements over a period of time are used instead of one measurement at one point in time.

Skin fold thickness measurements

- Skin fold thickness measurements are not recommended for use in schools and fitness facilities. There is a **high potential for error** due to the difficulty in obtaining accurate measurements.
- Most importantly, skin fold calipers measure subcutaneous fat (fat that is found under the skin). Subcutaneous fat, although still part of overall weight, is not the most concerning fat for health.

- Visceral fat (fat stored in the abdomen), found close to internal organs, is the type of fat that is associated with health risks and often cannot be measured using skin fold measurements (3).

Regardless of the technique used, body composition should only be measured and used by a trained healthcare provider as part of a total health assessment to accurately evaluate disease risk.

References

1. Puhl, R. Heuer, C. Obesity Stigma: Important Considerations for Public Health. Am J Public Health. 2010 June; 100(6): 1019–1028. Available from: www.ncbi.nlm.nih.gov/pmc/articles/PMC2866597/.
2. Dietitians of Canada. PEN Current Issues: Growth Monitoring of Infants and Children Using the 2006 World Health Organization Child Growth Standards and 2007 WHO Growth References. 2013 [cited 2015 Nov 3]. Available from: www.dietitians.ca/Dietitians-Views/Prenatal-and-Infant/WHO-Growth-Charts/WHO-Growth-Charts---Resources-for-Health-Professio.aspx
3. Harvard Medical School. Abdominal fat and what to do about it. 2015 [cited 2015 Nov 3]. Available from: www.health.harvard.edu/staying-healthy/abdominal-fat-and-what-to-do-about-it .