



4 Cal/g



4 Cal/g



9 Cal/g

remember that plant fats are more healthy than animal fats

saturated	unsaturated
solid	liquid
animals	plants (and fish)
"fat"	"oil"
X	✓

Vitamins		
Vitamin	Sources	Function
A (retinol)	Yellow, orange, and dark green vegetables; dairy products	Important for growth of skin cells; important for night vision
D (calciferol)	Fish oils, eggs; made by skin when exposed to sunlight; added to dairy products	Promotes bone growth; increases calcium and phosphorus absorption
E (tocopherol)	Green leafy vegetables; seeds; vegetable oils	Antioxidant; prevents cellular damage
K	Green leafy vegetables; made by bacteria that live in human intestine	Needed for normal blood clotting
B ₁ (thiamine)	Whole grains, pork, legumes, milk	Normal metabolism of carbohydrates
B ₂ (riboflavin)	Dairy products, meats, vegetables, whole-grain cereal	Normal growth; part of electron transport chain; energy metabolism
Niacin	Liver, milk, whole grains, nuts, meats, legumes	Important in energy metabolism
B ₆ (pyridoxine)	Whole grains, meats, vegetables	Important for amino acid metabolism
Pantothenic acid	Meats, dairy products, whole grains	Needed for energy metabolism
Folic acid	Legumes, nuts, green leafy vegetables, oranges, broccoli, peas, fortified bread and cereal	Coenzyme involved in nucleic acid metabolism; prevents neural-tube defects in developing fetuses
B ₁₂ (cyanocobalamin)	Meats, eggs, dairy products, enriched cereals	Coenzyme in nucleic acid metabolism; maturation of red blood cells
C (ascorbic acid)	Citrus fruits, tomatoes, red or green peppers, broccoli, cabbage, strawberries	Maintenance of cartilage and bone; antioxidant; improves iron absorption; important for healthy gums, tissue repair, and wound healing
Biotin	Legumes, vegetables, meat	Coenzyme in synthesis of fat; glycogen formation; amino acid metabolism
Choline	Egg yolk, liver, grains, legumes	Required for phospholipids and neurotransmitters

fat-soluble

water-soluble

Important Minerals		
Mineral	Sources	Function
Calcium	Dairy products, salmon, sardines, kale, tofu, collard greens, legumes	Bone and tooth formation; blood clotting; nerve and muscle function
Phosphorus	Dairy products, meats, poultry, grains	Bone and tooth formation; acid-base balance
Potassium	Meats, dairy products, many fruits and vegetables, grains	Acid-base balance; body water balance; nerve function; muscle function
Chlorine	Table salt, processed foods	Acid-base balance; formation of gastric juice
Sodium	Table salt, processed foods	Acid-base balance; body water balance; nerve function; muscle function
Magnesium	Whole grains, green leafy vegetables	Activation of enzymes in protein synthesis
Iron	Meats, eggs, legumes, whole grains, green leafy vegetables, dried fruit	Component of hemoglobin and of electron carriers used in energy metabolism
Fluorine	Fluoridated drinking water, tea, seafood	Maintenance of tooth structure; maintenance of bone structure
Iodine	Seafood, dairy products, iodized salt	Component of thyroid hormones
Zinc	Meats, seafood, grains	Component of certain digestive enzymes

Primary Factors Affecting Human Eating

	Unhealthy Foods	Healthy Foods
Accessibility	●	●
Convenience	●	●
Advertising	●	●
Taste	●	●
Cost	●	●

Recommended Number of Food Guide Servings per Day

	Children			Teens			Adults		
	2-3	4-8	9-13	14-18	19-50	51+	Years	Years	Years
	Girls and Boys	Female	Male	Female	Male	Female	Male	Female	Male
Vegetables and Fruit	4	5	6	7	8	7-8	8-10	7	7
Grain Products	3	4	6	6	7	6-7	8	6	7
Milk and Alternatives	2	2	3-4	3-4	3-4	2	2	3	3
Meat and Alternatives	1	1	1-2	2	3	2	3	2	3

Why bother eating a healthy diet?

Healthy eating (and mild exercise) reduces your risk:

- obesity
- type 2 diabetes
- heart disease
- certain types of cancer
- osteoporosis

It also contributes to:

- Better overall health
- Lower risk of disease
- A healthy body weight
- Feeling and looking better
- More energy
- Stronger muscles and bones

Age 14-18	Vegetables and Fruit	Grain Products	Milk and Alternatives	Meat and Alternatives
Male	4.87	7.98	2.64	3.05
Female	4.45	5.74	1.82	1.81

Vegetables and Fruit

- 125 mL (½ cup) fresh, frozen or canned vegetable or fruit or 100% juice
- 250 mL (1 cup) leafy raw vegetables or salad
- 1 piece of fruit



Grain Products

- 1 slice (35 g) bread or ½ bagel (45 g)
- ½ pita (35 g) or ½ tortilla (35 g)
- 125 mL (½ cup) cooked rice, pasta, or couscous
- 30 g cold cereal or 175 mL (¾ cup) hot cereal

Milk and Alternatives

- 250 mL (1 cup) milk or fortified soy beverage
- 175 g (¾ cup) yogurt
- 50 g (1 ½ oz.) cheese

Meat and Alternatives

- 75 g (2 ½ oz.)/125 mL (½ cup) cooked fish, shellfish, poultry or lean meat
- 175 mL (¾ cup) cooked beans
- 2 eggs
- 30 mL (2 Tbsp) peanut butter

Here is an example:

Vegetable and beef stir-fry with rice, a glass of milk and an apple for dessert.

- 250 mL (1 cup) mixed broccoli, carrot and sweet red pepper = 2 Vegetables and Fruit Food Guide Servings
- 75 g (2 ½ oz.) lean beef = 1 Meat and Alternatives Food Guide Serving
- 250 mL (1 cup) brown rice = 2 Grain Products Food Guide Servings
- 5 mL (1 tsp) canola oil = part of your Oils and Fats intake for the day
- 250 mL (1 cup) 1% milk = 1 Milk and Alternatives Food Guide Serving
- 1 apple = 1 Vegetables and Fruit Food Guide Serving

7/8
6/7
3-4
2/3

Crackers	
Nutrition Facts	1
Per 4 crackers (28 g)	3
Calories 90	
Total Fat 3g	6%
Saturated Fat 0.5g	1%
Trans Fat 1g	2%
Cholesterol 0mg	0%
Sodium 132mg	6%
Total Crap 1g	2%
Fiber 2g	4%
Sugars 2g	4%
Protein 2g	4%
Vitamin A 0%	0%
Vitamin C 0%	0%
Calcium 0%	0%
Iron 0%	0%

1. The **Nutrition Facts** table includes Calories and 13 nutrients: Fat, Saturated fat, Trans fat, Cholesterol, Sodium, Carbohydrate, Fiber, Sugars, Protein, Vitamin A, Vitamin C, Calcium and Iron.

2. All the information in the Nutrition Facts table is based on a **specific amount of food**. Be sure to compare this amount to the amount you eat. The **specific amount** may be indicated by:

- A phrase such as: a slice, one egg, two cookies, followed by the metric measure.
- **Familiar household units** such as mL, cups, tablespoons, or a fraction or unit of food (e.g., 1/4 pizza), followed by the metric measure (g, mL) (e.g., 175 g yogourt).

Stricken Burger	Chicken Burger
Nutrition Facts	Nutrition Facts
Per 1 burger (110g)	Per 1 burger (110g)
Calories 360	Calories 360
Total Fat 42g	Total Fat 42g
Saturated Fat 12g	Saturated Fat 12g
Trans Fat 2g	Trans Fat 2g
Cholesterol 110mg	Cholesterol 110mg
Sodium 100mg	Sodium 100mg
Total Crap 1g	Total Crap 1g
Fiber 2g	Fiber 2g
Sugars 2g	Sugars 2g
Protein 22g	Protein 22g
Vitamin A 0%	Vitamin A 0%
Vitamin C 0%	Vitamin C 0%
Calcium 2%	Calcium 2%
Iron 30%	Iron 30%

3. The **% Daily Value** is:
 • based on recommendations for a healthy diet; and
 • used to determine whether there is a lot or a little of a nutrient in a specific amount of food
 • useful for comparing foods quickly

4. **Calories and core nutrients**

Calories and the same core nutrients are always listed in the same order. A consistent look makes the Nutrition Facts table easy to find and use.

5. **Nutrition claims**

The Government has rules in place that must be met before a nutrition claim can be made on a label or advertisement. The rules for nutrition claims apply to all foods, prepackaged and not prepackaged, no matter where they are sold.

A manufacturer can choose whether or not to include nutrition claims on the label or in the advertisement of a food.

Many products will have nutrition claims as these claims highlight a feature of interest to consumers. Sample claims include:

Source of fiber
 - means the food contains at least 2 grams of dietary fibre in the amount of food specified in the Nutrition Facts table.

Low Fat
 - "Low" is always associated with a very small amount. "Low fat" means that the food contains no more than 3 grams of fat in the amount of food specified in the Nutrition Facts table.
 note: "100% Fat-free" means contains less than 0.5 g per 100 g or contains no added fat.

Cholesterol-free
 - means that the product has a negligible amount (less than 2 mg of cholesterol in the amount of food specified in the Nutrition Facts table) and it is also low in saturated fat and trans fat.

Sodium-free
 - "Free" is an amount of a nutrient so small that health experts consider it nutritionally insignificant. A "sodium-free" claim means the amount of food specified in the Nutrition Facts table contains less than 5 mg of sodium.

Reduced in Calories
 - has at least 25% less energy (Calories) than the food it is being compared to.

Light
 - When referring to a nutritional characteristic of a product, "light" is allowed only on foods that are either "reduced in fat" or "reduced in energy" (Calories). "Light" can also be used to describe sensory characteristics of a food like light tasting, light colored.

6. **List of ingredients**

All of the ingredients for a food are listed in descending order by weight. The ingredients present in the greatest amount in a product are listed first. Therefore, in this example, *whole wheat* is the ingredient present in the greatest amount, since it is listed first.

The list is also a source of information for people who want to avoid certain ingredients or verify the presence of an ingredient in a food.

Nutrition Facts

Serving Size 1 cup (30g)

Amount Per Serving	% Daily Value*
Calories 110	
Total Fat 2g	3%
Saturated Fat 0g	0%
Cholesterol 0mg	0%
Sodium 280mg	12%
Total Carbohydrate 22g	7%
Dietary Fiber 3g	12%
Sugars 1g	
Protein 3g	
Vitamin A 10%	Vitamin C 20%
Calcium 4%	Iron 45%

* Percent Daily Values are based on a 2,000 Calorie diet. Your daily values may be higher or lower depending on your caloric needs.

Ingredients: Whole grain oats, sugar, salt, milled corn, oat fiber, dried whey, honey

1. If this label is taken from a box of cereal, is the serving size reasonable?

2. If you ate 2 cups of this product, how many grams of protein would you eat? How many grams of fat?

3. If you ate 2 servings of this product, how much of your needed Vitamin A would you get?

4. The packaging for this product contained the claim that it was a good source of iron. Is this claim true? Would the manufacturer be allowed to say it was a good source of calcium?

5. If a friend were diabetic would you recommend this product?

6. If your friend is anemic, would you recommend this product?

Label Quiz

Rank in 194 Countries	% obese	% overweight
1. Nauru		
9. US		
19. Mexico		
21. Australia		
28. UK		
35. Canada		
43. Germany		
70. Luxembourg		
91. Norway		
176. India		
194. Eritrea		

In Canada,

- of 2-5 year olds are overweight.
- of 6-10 year olds are overweight.
 - In N.B., of adults and of children and youth are overweight or obese
 - the adult obesity rate is significantly higher than the national average
 - of children and youth eat at least five times per day and less servings of fruits and vegetables
 - engaged in daily leisure-time physical activity
- are morbidly obese (i.e., 1 in 50 people is more than 100 pounds overweight).
- diabetes is increasing. Of children born today, will be diabetic.
- of adults have at least one risk factor for heart disease.
- of adults are inactive but believe exercise prevents heart disease.
- deaths of Canadians aged 20-64 is caused by excess weight.

BMI

Healthy weight	18.5-24.9
Overweight	25-29.9
Obese	> 30
Morbidly obese	> 40

What's your BMI?

NIH BMI Calculator

Males (Calories per day)

Age	Sedentary ¹ Level	Low Active ² Level	Active ³ Level
2-3 y	1100	1350	1500
4-5 y	1250	1450	1650
6-7 y	1400	1600	1800
8-9 y	1500	1750	2000
10-11 y	1700	2000	2300
12-13 y	1900	2250	2600
14-16 y	2300	2700	3100
17-18 y	2450	2900	3300
19-30 y	2500	2700	3000
31-50 y	2350	2600	2900
51-70 y	2150	2350	2650
71 y +	2000	2200	2500

Females (Calories per day)

Age	Sedentary ¹ Level	Low Active ² Level	Active ³ Level
2-3 y	1100	1250	1400
4-5 y	1200	1350	1500
6-7 y	1300	1500	1700
8-9 y	1400	1600	1850
10-11 y	1500	1800	2050
12-13 y	1700	2000	2250
14-16 y	1750	2100	2350
17-18 y	1750	2100	2400
19-30 y	1900	2100	2350
31-50 y	1800	2000	2250
51-70 y	1650	1850	2100
71 y +	1550	1750	2000

1 Sedentary: Typical daily living activities (e.g., household tasks, walking to the bus).

2 Low Active: Typical daily living activities PLUS 30 - 60 minutes of daily moderate activity (ex. walking at 5-7 km/h).

3 Active: Typical daily living activities PLUS At least 60 minutes of daily moderate activity.

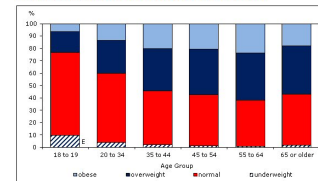
For Canadians,

Age 12-19	Daily Calorie Consumption
Male	
Female	

Where do these calories come from?

- Canadians of all ages get more than of their calories from "other foods," which are food and beverages that are not part of the four major groups.
- Snacks accounted for more calories than breakfast, and about the same number of calories as lunch.
- of Canadians eat something from a fast-food restaurant daily. Among adolescents aged 14 to 18, the proportion was
- of patrons of fast-food establishments chose a pizza, sandwich, hamburger or hot dog, and had a regular (as opposed to diet) soft drink
- do not eat breakfast
- of daily calories were consumed at breakfast. Snacks accounted for of calories for children and for adults. The worst snackers were boys aged 14 to 18 who got of calories from snacks.
- More than of the calories from snacks come from the "other food" category.
- There are about obesity related deaths in North America each year
- In 2009, there were M obese people in the world. In 2015 there will be M
- In 2005 there were M obese children under the age of 5.
- of Canadians aged 12-17 are overweight or obese.
- Overweight people earn less in comparable jobs.
- Obese elementary school students miss more days of school.
- Obese adolescent girls are less likely to attend university.

Percentage who were underweight, normal weight, overweight and obese (self-reported), by age group, household population 18 or older, Canada, 2011



Source: Canadian Community Health Survey, 2011

Children need an average of 1300 Cal /day or 430 Cal/meal.

Restaurant	% of kids menu exceeding limit
Subway	33
Wendy's	93
Taco Bell	100
Burger King	92
McDonald's	93
KFC	100

Estimated Energy Requirement (kcal/day) = Total Energy Expenditure + Energy Deposition

These equations provide an estimate of energy requirement. Relative body weight (i.e., loss, stable, gain) is the preferred indicator of energy adequacy.

Boys aged 9-18 years

$$EER = 88.5 - (61.9 \times \text{age [y]}) + PA \times \{(26.7 \times \text{weight [kg]}) + (903 \times \text{height [m]})\} + 20$$

Girls aged 9-18 years

$$EER = 135.3 - (30.8 \times \text{age [y]}) + PA \times \{(10.0 \times \text{weight [kg]}) + (934 \times \text{height [m]})\} + 25$$

- Convert your weight to kg: lbs / 2.2 = kg
- Convert your height to m:
 - (Feet x 12) + Inches = height in inches (A)
 - A x 2.54 / 100 = height in m
- (26.7 x weight) + (903 x height) = B
- Find your PA
- PA x B = C
- 61.9 x age = D
- 88.5 - D + C + 20 = your caloric needs

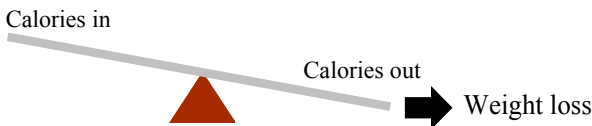
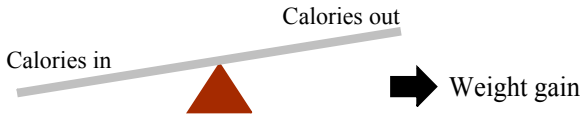
Physical Activity Coefficients (PA values) for use in EER equations

	Sedentary (PAL 1.0-1.39) Typical daily living activities (e.g., household tasks, walking to the bus)	Low Active (PAL 1.4-1.59) Typical daily living activities PLUS 30 - 60 minutes of daily moderate activity (ex. walking at 5-7 km/h)	Active (PAL 1.6-1.89) Typical daily living activities PLUS At least 60 minutes of daily moderate activity	Very Active (PAL 1.9-2.5) Typical daily living activities PLUS At least 60 minutes of daily moderate activity PLUS An additional 60 minutes of vigorous activity or 120 minutes of moderate activity
Boys 3 - 18 y	1.00	1.13	1.26	1.42
Girls 3 - 18 y	1.00	1.16	1.31	1.56
Men 19 y +	1.00	1.11	1.25	1.48
Women 19 y +	1.00	1.12	1.27	1.45

Item	Calories (your estimate)	Calories (actual)	Fat (g)
Big Mac, med. fries, med. Coke		●	●
6" Roast chicken w/ cheese on white bread (meal deal with chips)		●	●

Healthy Halo Effect

People underestimate the calorie content of foods but healthy meals are underestimated even further. People feel because a food is healthy they can eat more of it.



	Your estimate	Calories	Fat (g)	Rank
Quarter pounder w/ cheese		●	●	●
Medium fries		●	●	●
Vanilla cone		●	●	●
Medium Coke		●	●	●
Big Mac		●	●	●
McDonald's regular hamburger		●	●	●
McChicken		●	●	●
McFlurry, large		●	●	●
Caesar Entree salad w/ warm chicken		●	●	●
Garden entree salad		●	●	●
Garden entree salad w/ warm grilled chicken		●	●	●
Garden entree salad w/ warm crispy chicken		●	●	●
Fruit 'n' yogurt parfait		●	●	●
6" Subway meatball marinara		●	●	●

Put these in order from most healthy to least healthy.

Snack	g fat	Calories	% Calories from fat
Oatmeal to Go (Cinnamon Roll)			
Chocolate milk	5	180	25
Tostitos (Spicy Quesadilla)	23	400	51
Doritos (Nacho Cheese) (Baked)			
Smartfood (White cheddar)	19	280	
Coffee crisp	10	195	46

$$\% \text{ Calories from fat} = \frac{\text{Calories from fat}}{\text{Total Calories}} \times 100\%$$

e.g., Imagine a snack which contains 300 Calories and 9 grams of fat.

Questions

1. If you are counting fat grams, is the serving size important? Explain.
2. If you are using the "30% of calories from fat" guideline, is serving size important? Explain.
3. For overall calorie intake, why might serving size be important?

Energy Density

Energy Density = $\frac{\text{calories per serving}}{\text{grams per serving}}$

Energy density	What to do	Examples
Less than 1.0	Eat freely	Most vegetables and fruits, broth-based soups, applesauce, tofu, most beans, salsa, non-fat yogurt, cottage cheese
1.0 to 2.0	Eat in moderation	White fish, tuna, sardines, shrimp, pasta, rice, low-fat yogurt, chicken breast, sweet potatoes, corn, frozen fruit bars
2.0 to 3.0	Eat small portions	Bread, bagels, tortillas, frozen waffles, most breakfast cereals, meat, ice cream, dried fruit
More than 3.0	Eat sparingly	Most cheese, cake, cookies, chocolate, butter, margarine, oils, salad dressing, fried chips, nuts, bacon

Fat cells absorb fat → release leptin

↑ [leptin] → brain says

↓ [leptin] → brain says

chronic ↑ [leptin] → brain ignores it so
When would this happen?

↓ [leptin] → brain overreacts and says
When would this happen?

In other words, when you are obese your brain
When you try to lose weight, your brain

When planning meals, people's choices are influenced by a variety of factors.

- What are some of the factors that affect people's food choices?
- How does cost affect people's eating habits?
- What role do information and education play?
- What might cause people to choose fast food?
- Before this unit, did you think you had healthy eating habits? What do you think now?
- How do you think your eating habits will change because of what you have learned?

Proteins/fats/carbohydrates		
	Kwashiorkor	edema, irritability, anorexia, ulcerating dermatoses, and an enlarged liver with fatty infiltrates
	Marasmus	caused by a severe deficiency of nearly all nutrients, especially protein and calories; extensive tissue and muscle wasting
	Mental retardation	
Dietary vitamins and minerals		
Calcium	Osteoporosis	bone density is reduced and there is an increased risk of fracture
	Rickets	softening of bones in children due to deficiency or impaired metabolism of vitamin D, phosphorus, or calcium, potentially leading to fractures and deformity
	Tetany	muscle spasms and paralysis
Iodine deficiency	Goiter	swelling of the thyroid
Iron deficiency	Iron deficiency anemia	fatigue and weakness are the primary symptoms but they range widely
Zinc	Growth retardation	
Thiamine (Vitamin B1)	Beriberi	weight loss, emotional disturbances, impaired sensory perception, limb weakness and pain, periods of irregular heart rate
Niacin (vitamin B3)	Pellagra	diarrhea, dermatitis, dementia and death
Vitamin C	Scurvy	malaise and lethargy, skin changes with roughness, easy bruising and petechiae, gum disease, loosening of teeth, poor wound healing, and emotional changes. In the late stages, jaundice, generalized edema, oliguria, neuropathy, fever, and convulsions and eventual death are frequently seen
Vitamin D	Osteoporosis	
	Rickets	

21. What is the difference between a calorie and a Calorie?
22. Most plant proteins are incomplete. What must vegetarians do to ensure they get complete protein?
23. a) A man has a high level of cholesterol in his blood. What dietary recommendations would you give him?
b) The man asks if he should avoid all fat at all costs. What would you say?
24. Why is fat a good choice for energy storage?
25. What would happen if you did not eat enough
 - a) carbohydrates?
 - b) fats?
 - c) proteins?
26. Fad diets that claim rapid weight loss often suggest eating a limited variety of foods. Explain why these diets are usually an unhealthy way to lose weight.