

Getting Ready...

- What nutrition does your body need each day?
- What is a healthy diet? What is a healthy lifestyle?
- Can you damage your body by eating too much or too little?
- How can you improve your health?



Science Log



Over the period of one day, list all the foods you eat. Record the amount consumed beside each food. You will use this information later in the chapter.

Everyone in the photograph looks eager and ready to go. How have the participants prepared themselves to reach the finish line?

Part of the answer involves the food choices they have made. Our bodies need a source of energy to keep going — whether or not we are running in marathons. Every day throughout your lifetime, your body uses the foods and drinks you consume to help carry out life processes.

To achieve its maximum performance, your body needs more than just any food or drink. You need to fuel your body with a

balanced diet that will help it run at its most efficient.

In this chapter, you will study the nutrients that your body needs — carbohydrates, fats, proteins, vitamins, minerals, and water. You will find out how to improve the way your body functions by making good diet choices. You will also look more closely at the digestive system.

As you understand more about the way your body processes and uses food, you will see how important lifestyle and a balanced diet are for everyone, no matter what activities they enjoy.



What You Will Learn

In this chapter you will learn:

- how diet affects the body
- how the body processes and uses food
- how to read nutrient labels
- how to analyze diets

Why It Is Important

- How well your body functions depends on your food and lifestyle choices. You need to make informed decisions to protect your long-term health and well-being. Take charge of your own health!

Skills You Will Use

In this chapter you will:

- identify essential nutrients
- investigate how the digestive system processes food
- read and understand food labels
- analyze your own diet
- develop diets to meet special needs

Starting Point ACTIVITY

Cuisine for Teens

Use what you know about wholesome foods to design and make an exciting poster that will encourage other students to make healthy food choices.

Safety Precautions



What You Need

- poster board
- magazines with pictures of various foods
- coloured markers
- glue
- scissors

What to Do

1. Form a team of three. Brainstorm the content of your poster.
2. Use the materials provided to create a collage.
3. Share your posters with other groups.

What Did You Discover?

1. Summarize the food choices your class featured in their posters.
2. (a) Take a poll in your class to find out how many students actually make the food choices featured in the posters.
(b) Identify reasons why students make healthy or unhealthy food choices.

10.1 Assessing Nutrients



Figure 10.1 Healthy diets are a booming business! But how can you determine the best diet for you?

In Chapter 9, you learned that the circulatory and digestive systems work very closely together. In this chapter, you will look more closely at these systems. How do diet and lifestyle affect the relationship between circulation and digestion?

To answer this question, you need to look at the foods you eat and how they influence your body functions.

Nutrition is a branch of science that studies foods and how the body uses them. Nutritionists study the food needs of humans and other organisms. They develop lists of daily **nutrient** requirements for many different organisms. Nutrients are substances found in foods. It is the nutrients that provide nourishment to your body. In order to maintain health, all animals must consume a mixture of foods and drinks that supply enough nourishment and energy to their bodies. The nourishment and energy help the body to maintain its cells, tissues, and organs, and to support growth and development.

Humans of all ages need a variety of foods. Over the period of a week, we should all eat and drink enough useful nutrients to meet all our nutritional needs.

Malnutrition occurs when essential nutrients are missing from a diet. It can occur when people eat too little. It can also occur if people eat enough volume but make poor food choices and are therefore missing important nutrients.

Malnourished people often suffer from high levels of sickness and disability. They also have shorter life spans. Those who lack an adequate supply of food may die from starvation. Children who lack proper nutrients may not grow properly and may suffer from brain damage.



What is malnutrition?



Eggshells contain a lot of calcium. Place a hard-boiled egg in a cup of vinegar and leave it overnight. See what happens when vinegar removes the calcium. Do the same thing with a chicken bone!



About 90 percent of calcium is stored in your bones. If you could remove all the calcium from a bone, you could tie the bone in a knot!



Figure 10.2 This young child suffers from malnutrition caused by a lack of protein in her diet. The condition has turned her hair red.



Figure 10.3 This person may suffer from malnutrition. He may consume large volumes of food, but he may make poor food choices and therefore not get the right nutrients.

What Nutrients Do We Need?

You have learned about what can happen to your body if the food you eat does not supply what you need. Your body needs specific nutrients to perform all the life functions. What are the nutrients you need?

Your body requires the following six nutrients.

- **carbohydrates** — in the form of sugars and starches are the primary source of energy for your body
- **proteins** — build body tissue, regulate chemical activity, and supply energy when carbohydrates and fats are not available
- **fats** — are stored in the body for use as an energy source when carbohydrates are in short supply
- **vitamins** — are organized according to whether they can be absorbed in fat or water. Vitamins A, D, E, and K are in foods that contain fats. Vitamins B and C are soluble in water.
- **minerals** — help carry out life functions. Minerals include calcium, phosphorus, magnesium, iron, and iodine.
- **water** — is essential for life because it is used in every life function. The water you take in through food and drink needs to balance the water that is eliminated from your body.

READING Check ✓

What type of food is the primary source of energy in your body?

Table 10.1 Nutrients Our Bodies Need

READING
Check ✓

What nutrients does your body need to function properly?

DidYouKnow?

In the 1530s, Aboriginal women cured Jacques Cartier's sailing crew of scurvy. Scurvy results from a prolonged deficiency of vitamin C. The women prepared a tea from the bark and needles of the white cedar tree. Better than orange juice!

Nutrient and Food Source	Function
<p>Carbohydrates</p> 	<ul style="list-style-type: none"> • sugars and starches supply energy • fibre helps move food through digestive tract <p>Figure 10.4 Rice, whole grains, breads and cereals, potatoes, and pasta provide carbohydrates.</p>
<p>Proteins</p> 	<ul style="list-style-type: none"> • build and repair tissue • regulate chemical activity • provide energy only when carbohydrates and fats are not available <p>Figure 10.5 Meat, fish, poultry, eggs, milk products, dried peas and beans, nuts, and cereals provide proteins.</p>
<p>Fats</p> 	<ul style="list-style-type: none"> • provide energy • insulate • absorb fat-soluble vitamins • structural component of nerve and brain tissue • enable cells to function <p>Figure 10.6 Butter, margarine, nuts, oils, and red meats provide fats.</p>
<p>Vitamins</p> 	<ul style="list-style-type: none"> • help carry out life functions such as growth and reproduction <p>Figure 10.7 Eating a variety of foods provides adequate amounts of vitamins A, B, C, D, E, and K.</p>
<p>Minerals</p> 	<ul style="list-style-type: none"> • structural component of body tissues • help carry out life functions <p>Figure 10.8 Eating a variety of foods provides enough calcium, phosphorus, magnesium, iron, and iodine for health.</p>
<p>Water</p> 	<ul style="list-style-type: none"> • helps dilute and dispose of body wastes and toxins • moves nutrients • controls body temperature <p>Figure 10.9 Drink at least two litres of water a day!</p>

Testing for Nutrients

You can't tell what nutrients a food contains just by looking at it. So how do you find out? In this investigation, you will find out which testing agent to use to check for the presence of glucose, starch, protein, or fat.

Problem

How do scientists identify the specific nutrients in various foods?

Safety Precautions



- Handle all chemicals with care.
- Use caution when handling Biuret solution. It can cause irritation to the skin and eyes, and may discolour clothing.
- Use caution when handling iodine. It can cause irritation to the skin and eyes, and may discolour skin and clothing. The vapours can be toxic if inhaled in large amounts. Clean up any spills immediately.
- Use caution when handling Benedict's solution. It can cause irritation to the skin and eyes, and may discolour clothing.

- Wash your hands after handling these materials.

Note: This activity involves four tests. Each test requires some different materials and some different procedures. Be sure to read the instructions carefully.

Apparatus

- 4 large test tubes
- test tube rack
- 7 medicine droppers (one for each nutrient and each solution)
- 400 mL beaker containing about 150 mL water
- tongs

- hot plate
- thermometer

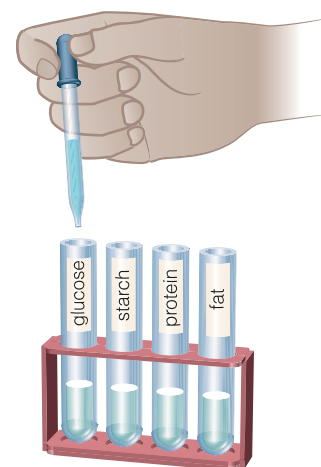
Materials

- glucose solution
- starch solution
- egg white (protein)
- oil
- Biuret solution
- iodine solution
- Benedict's solution
- 4 pieces of brown paper cut into 10 x 10 cm squares

Procedure

- 1 Make an observation chart like the one shown here. Use the chart to record the colour changes during each test. A colour change indicates that you have identified a testing agent that can be used to check for the presence of a specific nutrient.

- 2 Obtain four test tubes. Label each with the name of *one* of the following nutrients: glucose, starch, protein, or fat. Use the same test tube for the same nutrient in each test.
- 3 Place 10 drops of glucose solution in the test tube labelled glucose.



Testing Agent	Glucose	Starch	Protein	Fat
Biuret solution				
iodine solution				
Benedict's solution				
brown paper				

- Place 10 drops of starch solution in the test tube labelled starch.
- 5 Place a small amount of egg white in the test tube labelled protein.
- Place 10 drops of oil in the test tube labelled fat.

Test 1: Biuret Solution

- 7 Add 4 drops of Biuret solution to each test tube.
- Observe the colour after about 30 seconds.
- Record your observations on the chart. Mark an “X” if there is no colour change. If there is a change, record the colour in the appropriate box.
- 1 Clean the test tubes and repeat Steps 3 to 6.

Test 2: Iodine

- 11 Add 4 drops of iodine solution to each test tube.
- 12 Observe the colour after about 30 seconds.
- 13 Record your observations. Mark an “X” if there is no colour change. If there is a change, record the colour in the appropriate box.
- 1 Clean the test tubes and repeat Steps 3 to 6.

Test 3: Benedict’s Solution

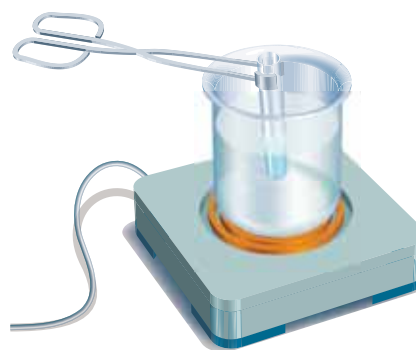
- 15 Add 4 drops of Benedict’s solution to each test tube.
- 1 Heat a beaker of water to 80°C on a hot plate.
- 17 Use tongs to place the test tubes in the hot water bath for 2 minutes. Maintain the water temperature at 80°C.

- 1 At the end of 2 minutes, remove the test tubes with tongs and place them in a test tube rack. Be careful — they are hot!

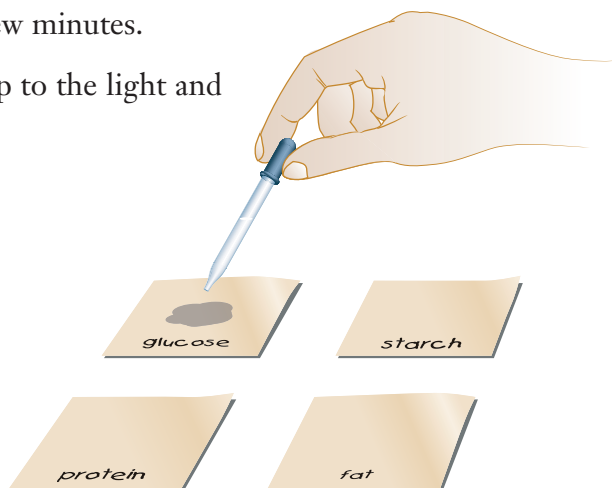
- 1 Observe the colour of the solutions.
- 2 Record your observations. Mark an “X” if there is no colour change. If there is a change, record the colour in the appropriate box.
- 21 Clean the test tubes. Store them as directed by your teacher.

Test 4: Brown Paper

- 22 Obtain four pieces of brown paper. Label each with the name of *one* of the following nutrients: glucose, starch, protein, fat.
- 23 Add a few drops of glucose, starch, protein, or oil to the piece of paper with the matching label.



- 2 Let the samples dry for a few minutes.
- 25 Hold each piece of paper up to the light and look for transparent stains.
- 2 Record your observations.



Analyze

1. Which test can identify fat? glucose? protein? starch?
2. You are testing for nutrients in a sample of an unknown food. You do the above four tests and observe a colour change with more than one testing agent. Explain why this might occur.

Conclude and Apply

3. Which of the two nutrients you tested are carbohydrates?
4. Describe how you could use these nutrient tests for other purposes.

Try This!

Put a magnet in a bag of iron-fortified cereal. Shake it up. What happens?

Check Your Understanding

1. List the six essential nutrients needed for a well-balanced diet.
2. What happens to excess fat in the body?
3. Name one source of each of the following nutrients: protein, carbohydrate, fat.
4. People who do not get enough to eat and those who eat enough but make poor food choices suffer from the same condition.
 - (a) Name the condition.
 - (b) Describe the results of such a condition.

Key Terms

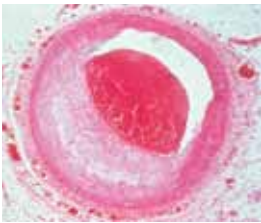
nutrition
 nutrient
 malnutrition
 carbohydrates
 proteins
 fats
 vitamins
 minerals

10.2 Analyzing Diets

What is a “**diet**”? Most people use the word to mean that they are restricting the amount or type of food they eat. In fact, diet refers to the amount and type of food you eat every day.

DidYouKnow?

Figure 10.10 Fatty deposits called cholesterol narrow the walls of an artery. This affects the ability of the circulatory system to function. You can control your cholesterol level by limiting the amount of fat in your diet. The Canadian Heart and Stroke Foundation recommends that you limit your fat intake to less than 30 percent of your total calories.



The easiest way to obtain the nutrients your body needs is to eat a **mixed diet** — a diet that contains a wide variety of foods. **Canada’s Food Guide** classifies food into four groups: grain products, fruits and vegetables, milk products, and meat and alternative products. Since each food group supplies its own set of nutrients, it is essential to choose foods from each group.

The amount of food you need depends on your age, body size, activity level, and gender. For example, if you participate in physical activities at school, you need to eat more than someone who does not participate.

Pregnant and breast-feeding women have additional nutritional needs.

Internet CONNECT

www.mcgrawhill.ca/links/science.connect1

Canada’s Food Guide is a publication that provides suggestions to help you make wise food choices. It also suggests how much of each food group you should eat every day. For more information on Canada’s Food Guide, go to the above web site, then to **Internet Connects, Unit C, Chapter 9**, and then to **Canada’s Food Guide**.

Canada’s Food Guide

Health and Welfare Canada developed Canada’s Food Guide to help Canadians make healthy choices about the types and amounts of food they eat. The food guide is based on five guidelines.

1. Eat a variety of foods.
2. Eat a lot of whole grain cereals, breads, fruits, and vegetables.
3. Choose low fat dairy products, lean meats, and foods prepared with little or no fat.
4. Participate in regular physical activity.
5. Limit the intake of salt, sugar, alcohol, and caffeine.

READING Check

List the four basic types of foods that are part of a good mixed diet.

Food Labelling

It is easy to know what nutrients you are eating when you eat fresh, unprocessed foods (such as raw fruits and vegetables) and whole grains (such as rice and kamut). How do you tell what nutrients are in processed foods such as cereal and prepared pudding?

Sometimes it is hard to tell. In fact, the only sure way is to read the label. When you do, you will find at least three different types of information.

Figure 10.11 Food packages provide a lot of information. Nutritional information is usually in fine print.

The image shows a food label for 'Mac & Cheese' with three distinct sections indicated by brackets on the right:

- Advertising:** The top section features a logo with 'MⁿC' and the product name 'Mac & Cheese' in large, bold letters.
- Preparation Directions:** The middle section contains the text: 'Stir pasta into 1.5 L boiling water. Boil 8-10 minutes. Drain. Add 50 mL milk and cheese sauce. Stir.'
- Nutrition Information:** The bottom section is titled 'Nutrition Information' and includes:
 - Ingredients:** Macaroni: Enriched wheat flour; Sauce Mix: Modified milk ingredients, Cheese, Salt, Rennet, Citric acid, colour.
 - 175 mL prepared with 2% milk**
 - Energy _____ 275 Cal
 - Protein _____ 9 g
 - Fat _____ 9.5 g
 - Carbohydrate _____ 38 g
 - Percentage of Recommended Daily Intake**
 - Thiamin _____ 63 %

Find Out **ACTIVITY**

Comparing Food Labels

Read and compare food labels. Decide which product has the most or best nutrients.



What You Need

2 or 3 nutrition labels from the same type of food product

What to Do

1. With a partner, study the nutrition information provided on a food label. Look for the following information.
 - Ingredients are listed, in descending order, by mass.
 - Nutrients are grouped for convenience.
 - Energy the food provides per serving.
 - Daily Value indicates how much of the recommended daily intake of a nutrient a serving provides.

SKILL CHECK

-  Initiating and Planning
- Performing and Recording
- Analyzing and Interpreting
-  Communication and Teamwork



2. For each food label, list the product's ingredients, nutrients, serving size, and daily value.
3. Compare the nutritional value and decide which product is the most nutritious.

What Did You Find Out?

1. Which product provides the best overall nutritional value? Explain.
2. Was it easy to interpret the information on the food labels? Explain why or why not.

Vegetarian Diets

Vegetarians choose not to eat animal products. Strict vegetarians or “vegans” do not eat any animal products. Other types of vegetarians may eat dairy products or eggs.

Because vegetarians do not eat meat, they must take extra care to eat a variety of plant foods that provide protein. A well-balanced diet of this type has many health benefits because it is high in fibre and low in harmful forms of fat.

The drawback is that such diets can be low in iron and B vitamins. The vegan diet may lack calcium. Many vegetarians take vitamin supplements to fill these nutritional needs.

Fad Diets

The term “**fad diet**” refers to a current diet idea or craze about how or what people should eat. Such diets often involve weight loss.

Popular fad diets include the “cabbage soup diet,” the “grapefruit diet,” and the Atkins high protein, low carbohydrate diet. Athletes and others who want to gain weight are attracted to the Atkins diet because they believe that high amounts of protein help develop more body muscle. This is not true!

Athletes who want to increase their muscle bulk need to consume more energy from carbohydrates, *not* from more protein. At the same time, they need to work out to strengthen their muscles and encourage muscle growth. Consuming too much protein causes dehydration because it takes extra water to eliminate the excess protein from the body.

READING Check

What food group is missing from the vegetarian diet? What nutrients are low?

Try This!

Choose one fad diet. Use Canada's Food Guide to determine how nutritious the diet is. Identify any potential deficiencies. What is there too much of?

READING Check

Explain one disadvantage of the Atkins diet.

Key Terms

diet
mixed diet
Canada's Food Guide
vegetarian
fad diet

Check Your Understanding

1. What factors affect the amount of food a student should eat?
2. List five guidelines of Canada's Food Guide.
3. Explain the difference between a mixed diet based on Canada's Food Guide and a vegetarian diet.
4. What categories of information do nutrition labels provide?
5. Plan a breakfast and a lunch that includes a serving from each of the food groups in Canada's Food Guide.
6. With a partner, look for articles about food fads. Write a brief report about one. In your report, mention:
 - health benefits
 - research to support health claims
 - dangers to health

10.3 Digestive System: Mining the Nutrients

It would not matter how many nutrients you ate if your body did not absorb them. The job of your digestive system is to break up the food you eat and obtain the necessary nutrients. This work involves three processes.

1. **Mechanical digestion** — teeth and stomach break food into small pieces
2. **Chemical digestion** — chemicals known as **enzymes** break food down into smaller particles
3. **Absorption** — molecule-sized products of chemical digestion move into the bloodstream

READING
Check ✓

Name the three processes involved in digestion.

Mouth

The teeth have the most important role in mechanical digestion. They reduce the size of food and mix it with liquids in the mouth called **saliva**. Enzymes found in the saliva chemically break down starch into smaller fragments.

Stomach

As Dr. Beaumont found in his research on Alexis St. Martin, the stomach breaks down food and mixes it with gastric juices to form a pasty fluid. Acids in the gastric juices activate enzymes that digest food and turn it into liquid form. Special enzymes begin the process of chemical digestion by breaking down proteins.

Once the food is partially digested, the stomach releases it into the small intestine.

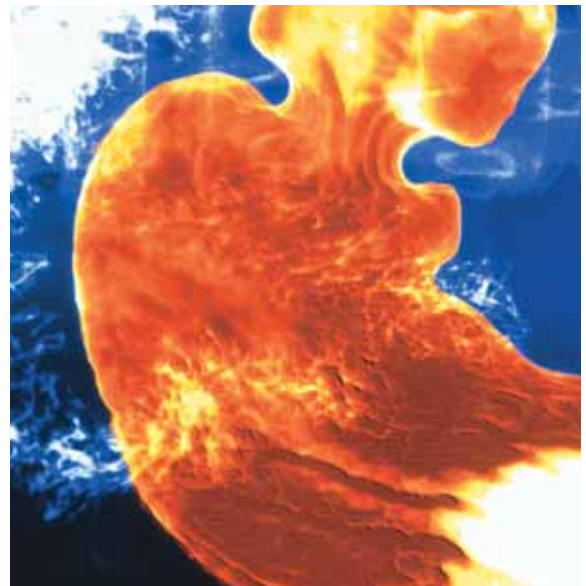


Figure 10.12 The stomach completes mechanical digestion and continues chemical digestion.



A Canadian trapper who accidentally shot himself in the stomach helped

researchers find out how digestion works. Alexis St. Martin was treated by Dr. William Beaumont. Although he recovered, he was left with a small hole in his abdomen that provided direct access into his stomach. Dr. Beaumont placed some bread in the hole leading to St. Martin's stomach. Some liquid came out. Beaumont added some of the liquid to a test tube containing meat. Within an hour, the meat had swollen. A few hours later, the meat had turned to a liquid.

Try This!

Crackers contain lots of starch. Enzymes break down starch into glucose. Glucose tastes sweet but starch does not. Put a cracker in your mouth and chew. Do *not* swallow — keep chewing. After a few minutes the cracker should taste sweet!

Digestion is Mechanical and Chemical

Simulate what happens during digestion.

Safety Precautions



- Handle chemicals with care. Hydrochloric acid is corrosive. Rinse any spills immediately with plenty of water and inform your teacher.
- Wash your hands thoroughly after you complete the activity.

What You Need

thoroughly cooked hamburger meat (about 50 g)

2 zippered plastic bags

2 ice-cream containers (2 L)

15 mL spoon

250 mL water

pepsin (1 g)

medicine dropper

hydrochloric acid

pH paper

tape



What to Do

1. Spoon a piece of hamburger meat into a plastic bag.
2. Add 125 mL of water and 1 g of pepsin, which is an enzyme.
3. Use a medicine dropper to add hydrochloric acid, one drop at a time, to make the solution acidic. After each drop, use pH paper to check the solution. Keep adding drops and checking until the solution has a pH between 2 and 4.
4. In another bag, place *only* a piece of hamburger meat and 125 mL water.
5. Secure the bags. Place each in a large container. Tape the lids.
6. Shake the containers between your hands for 10 to 15 minutes. Then open both and look at the meat samples.

Small Intestine

Most of the chemical digestion and nearly all of the absorption of nutrients occurs in the small intestine. As food materials arrive from the stomach, enzymes secreted by glands such as the liver and pancreas neutralize the gastric juices.

Carbohydrates — Enzymes further break down carbohydrates into sugars. These sugars are in a form that can be absorbed into the bloodstream.

Protein — Enzymes split the proteins into simpler components ready for absorption.

Fat — Bile, a fluid produced by the liver, breaks fat into smaller particles. Enzymes produced in the pancreas can then digest these smaller particles. Once this is complete, fats are ready to be absorbed.

Large Intestine

Absorption continues in the large intestine. It is here that water, minerals, and vitamins are absorbed into the bloodstream.

The large intestine also stores waste materials in the form of feces. Feces are made up mostly of dead bacteria and undigested food. They are temporarily stored in the colon and discharged through the anus.

READING Check

Imagine that a ham-burger in a bun has been swallowed by a toddler. Describe its journey through the digestive system.

Try This!

To see how bile works, you will need two test tubes with stoppers, cooking oil, dish soap, two medicine droppers, a 2 mL measuring spoon, and some water. Half fill the test tubes with water. Add 5 to 10 drops of oil to each. Add 2 mL of dish soap to one. Stopper both tubes and shake. What happens in each test tube? What does the dish soap represent?

Off the Wall

Here's a simple test to determine if you are drinking enough water for your activity level. Observe the quantity and colour of your urine! If your intake is adequate, your body produces lots of pale urine. If your intake is *not* adequate, your body produces a small amount of dark urine.

Disc CONNECT

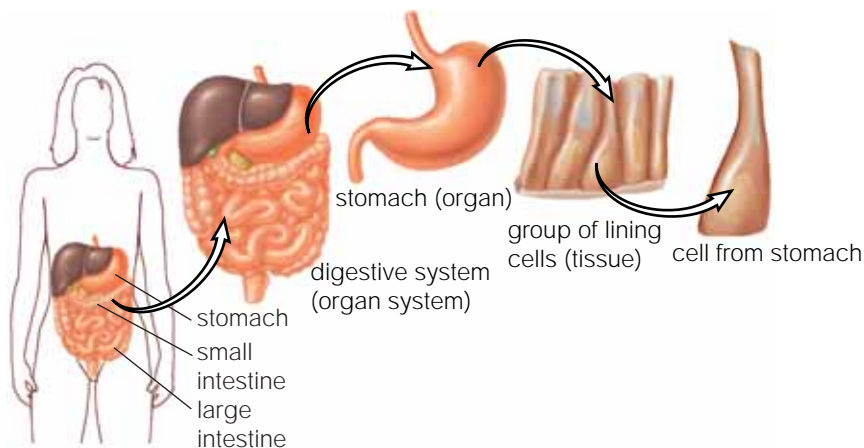
To learn more about the organs of the human digestive system, load the student CD-ROM onto your computer. Launch the **Digestion** applet and follow the instructions.

Check Your Understanding

- (a) Name the parts of the digestive system responsible for mechanical digestion of food.

(b) Describe what happens.
- (a) Name the digestive processes that occur in the organs you see here.

(b) Describe what happens in each organ.



Key Terms

mechanical digestion
chemical digestion
enzyme
absorption
saliva

- In a disorder called celiac disease, villi are destroyed when they come into contact with a protein called gluten. Develop a short oral presentation that explains the purpose of villi, and predict what happens to the rate of absorption in celiac disease.

10.4 The Role of Diet

What role does diet play in your life? Use the activity below to find out.

THINK & LINK

INVESTIGATION 10-B

SKILLCHECK

Initiating and Planning

Performing and Recording

Analyzing and Interpreting

Communication and Teamwork

Analyze Your Diet

Think About It

Use what you have learned about a well-balanced diet to assess your own diet and to get a general idea of the amount of energy you consume in a day. Energy is measured in units called calories.

What to Do

- 1 Get the food record that you completed for the Science Log at the beginning of this chapter.
- 2 Use the worksheet to record the foods you ate.
- 3 Using Canada's Food Guide, classify each item you ate as a grain product, vegetable or fruit, meat or meat alternative, or milk product.
- 4 Record the number of servings you ate.
- 5 Use a Food and Calories Chart to calculate the number of calories the food provides.
- 6 Record the number of calories in the appropriate column.
- 7 Total the number of servings and number of calories you consumed from each food group. Total the amounts.

Computer CONNECT

Create a spreadsheet to help you keep track of the information for this investigation.

Analyze

1. Analyze the value of your food intake.
 - (a) What food groups did you choose most often? less often?
 - (b) How close were you to the recommended number of servings for each food group?
2. Compare the total number of calories you consumed to the recommended values in the table. Are you eating an appropriate diet?

Female	Calories	Male	Calories
Age 13-15	2600 to 2700	Age 13-15	3000 to 3200
Age 16-19	2400 to 2500	Age 16-19	3500 to 3700

Note: The chart provides average calorie needs. The number of required calories depends on a variety of things, including activity levels, weight, and body structure. Athletes and people in active jobs, such as bicycle couriers, need many more.

3. Is the source of calories important? Explain why or why not.
4. According to Canadian statistics, the average adult female (19-35) requires 2100 calories. The average adult male (19-35) requires 3000. Why do teenagers require more?

Note: Again, the number of required calories depends on a variety of things, including activity levels, weight, body structure, and whether a woman is pregnant or nursing.

Evaluate Your Choices

Your body depends on you to fuel it with a good balance of nutrients at regular intervals.

Choosing too many fats causes several problems.

- Your body has to work harder to digest fats.
- Excess fats in your digestive system may cause you to feel uncomfortable or to throw up.
- High fat diets can cause fatigue and lack of energy.
- Cholesterol from fatty foods blocks arteries.
- Over time, fats cause weight gain.

Skipping meals also causes problems. When you have not eaten for a long period of time, your blood sugar levels are low. In order to conserve energy, your body may slow down. As a result, you may feel drowsy and be unable to concentrate.

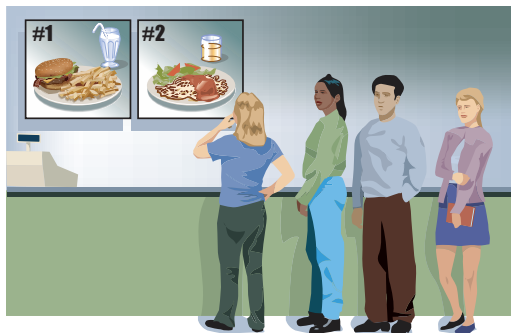


Figure 10.13 Burgers, fries, and a milkshake provide carbohydrates, proteins, vitamins and minerals, and a large amount of fat. Spaghetti, salad, and a glass of milk provide carbohydrates, protein, more vitamins, minerals, and less fat. What should she choose?

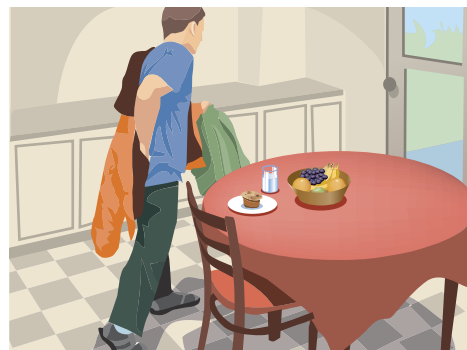


Figure 10.14 Breakfast is the most important meal of the day. It breaks the fast from the last food he ate the night before. By now he needs nutrient reinforcements! What should he do?

Internet CONNECT

www.mcgrawhill.ca/links/science.connect1

Many people keep track of the foods they eat, and then calculate the number of calories. To access some food and calories charts, go to the above web site. Go to **Internet Connects**, **Unit C**, **Chapter 10**, and then to **Calories Charts**.

Check Your Understanding

1. What happens to your body when you skip breakfast?
2. How does a balanced diet contribute to a healthy lifestyle?
3. (a) Research the dietary needs of *one* of the following individuals.
 - an athlete preparing for a tournament
 - a pregnant mother
 - a vegetarian
 - a lactose-intolerant person (someone who is unable to digest lactose, a sugar found in milk)
 - a person with celiac disease(b) Based on your findings, plan a well-balanced diet for the individual for one day. Explain your choices.

READING Check

List three ways that a high fat diet affects your body.

10 Review

Key Terms

nutrition

nutrient

malnutrition

carbohydrates

proteins

fats

vitamins

minerals

diet

mixed diet

Canada's Food Guide

vegetarian

fad diet

mechanical digestion

chemical digestion

enzyme

absorption

saliva

Reviewing Key Terms

If you need to review, the section numbers show you where these terms were introduced.

- Write the following sentences in your notebook or Science Log. Use the key terms to complete the statements. Do not write in the textbook.
 - The small intestine digests _____, _____, and _____ . (10.3)
 - If you lack one or more essential nutrients in your diet, you may suffer from _____ . (10.1)
 - A diet that does *not* include meat is called a _____ diet. (10.2)
 - Canada's Food Guide is considered to be a _____ diet. (10.2)
 - Three processes involved in the digestive system are _____, _____, and _____ . (10.3)
 - To maintain a healthy body, you must meet your daily requirements for _____ . (10.2)
 - Fruits and vegetables usually contain _____ and _____ . (10.1)
 - A chemical substance that aids the process of digestion is called an _____ . (10.3)
 - The branch of science that studies the nutrient needs of humans and other organisms is called _____ . (10.1)
 - The amount and type of food that a person eats is called _____ . (10.2)

- A diet that promises weight loss if you eat only one kind of food is called a _____ . (10.2)
- The liquid secreted by glands in the mouth is called _____ . (10.3)

Understanding Key Ideas

Section numbers are provided if you need to review.

- What is good nutrition?
 - What is malnutrition? (10.1)
- How could following a fad diet be dangerous to your health? (10.2)
- What digestive process does this drawing demonstrate? (10.3)



- List the processes that occur in each of the following organs. (10.3)
 - mouth
 - small intestine
 - stomach
 - large intestine
- What kinds of information do food labels contain? (10.4)

7. How does a diet high in fat affect your body? (10.4)

Developing Skills

8. List the food groups in Canada's Food Guide. (10.2)
9. Sylvie found the following information on a box of cereal. (10.2)

Cereal Only		Cereal Plus 125 mL 2% Milk	
Energy	120 Cal	Energy	185 Cal
Protein	3.5 g	Protein	7.8 g
Fat	1.9 g	Fat	4.4 g
Carbohydrate	22 g	Carbohydrate	29 g
Potassium	98 mg	Potassium	297 g

- (a) What kind of information is it?
 (b) How can this information help her?

10. There are many food myths. One example is that fat should be eliminated from our diets. Find a food myth. Research the facts. Present your findings in a short oral presentation. (10.2)
11. Identify the advantages and disadvantages of a vegetarian diet. (10.2)

Problem Solving/Applying

12. Eloise has noticed that her skin is dry and her hair seems dull. She wonders if her diet is affecting her body. Review her food log for a typical day. (10.1, 10.2)

Breakfast	Lunch	Dinner	Snacks
cup coffee with sugar and cream	small pizza	tuna on a bagel	Slurpee™
doughnut	cola	serving fries with gravy serving chocolate pudding cup coffee with sugar and cream	small bag of chips

- (a) Use Canada's Food Guide to analyze her diet. Be sure to classify the following items.
- food groups
 - number of servings
- (b) What diet changes might you suggest to Eloise if she wants to improve her skin and hair?

Critical Thinking

13. The photo shows Kim's dinner. (10.1, 10.2, 10.4)
- (a) Which foods provide carbohydrates?
 (b) Which foods supply proteins?
 (c) Does this meal supply all the nutrients a teenager needs? Explain.
 (d) How could you improve this meal?



Pause & Reflect

1. Go back and read the Getting Ready section on page 196 again. Check your answers. Has your thinking changed? How would you answer these questions now that you have investigated the topics in this chapter?
2. Canada ships tonnes of grain to majority world countries during times of famine. Even with this food aid, large numbers of people continue to suffer from malnutrition and die of starvation. Would sending more grain help? Use the information you learned in this chapter to discuss whether eating adequate supplies of grain can prevent malnutrition.