Lifetime Physical Fitness & Wellness

A Personalized Program

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Weight Management

“Physical activity is the cornerstone of any sound weight management program. If you are unwilling to increase daily physical activity, do not attempt to lose weight because most likely you won’t be able to keep it off.”

Objectives

▶ **Describe** the health consequences of obesity.
▶ **Exposé** some popular fad diets and myths and fallacies regarding weight control.
▶ **Describe** eating disorders and their associated medical problems and behavior patterns, and outline the need for professional help in treating these conditions.
▶ **Explain** the physiology of weight loss, including setpoint theory and the effects of diet on basal metabolic rate.
▶ **Explain** the role of a lifetime exercise program as the key to a successful weight loss and weight maintenance program.
▶ **Be able** to implement a physiologically sound weight reduction and weight maintenance program.
▶ **Describe** behavior modification techniques that help support adherence to a lifetime weight maintenance program.

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Visit www.cengagebrain.com to access course materials and companion resources for this text including quiz questions designed to check your understanding of the chapter contents. See the preface on page xv for more information.

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What is more important for weight loss: a negative caloric balance (diet) or increasing physical activity?
Most of the research shows that weight loss is more effective when you cut back on calories (dieting), as opposed to only increasing physical activity or exercise. Weight loss is more effective, nonetheless, when 150 or more minutes of physical activity per week are added to dieting. Body composition changes are also much more effective when dieting and exercise are combined while attempting to lose body weight. Most of the weight loss when dieting with exercise comes in the form of body fat and not lean body tissue, a desirable outcome. Weight loss maintenance, however, in most cases is possible only with 60 to 90 minutes of sustained daily physical activity or exercise.

Does the time of day when calories are consumed matter in a weight loss program? The time of day when a person eats food appears to play a part in weight reduction. When attempting to lose weight, intake should consist of a minimum of 25 percent of the total daily calories for breakfast, 50 percent for lunch, and 25 percent or less at dinner. Also, try not to eat within three hours of going to bed. This is the time of day when your metabolism is slowest. Your caloric intake is less likely to be used for energy and more likely to be stored as fat.

Are some diet plans more effective than others? The term diet implies a negative caloric balance. A negative caloric balance means that you are consuming fewer calories than those required to maintain your current weight. When energy output surpasses energy intake, weight loss will occur. Popular diets differ widely in the food choices that you are allowed to have. The more limited the choices, the lower the chances to overeat, and thus you will have a lower caloric intake. And the fewer the calories that you consume, the greater the weight loss. For health reasons, to obtain the variety of nutrients the body needs, even during weight loss periods, you should not consume fewer than 1,500 calories per day (except very small individuals). These calories should be distributed over a wide range of foods, emphasizing grains, fruits, vegetables, and small amounts of low-fat animal products or fish.

Why is it so difficult to change dietary habits? In most developed countries, there is an overabundance of food and practically an unlimited number of food choices. With unlimited supply and choices, most people do not have the willpower, stemming from their core values, to avoid overconsumption.

Our bodies were not created to go hungry or to overeat. We are uncomfortable overeating and we feel even worse when we have to go hungry. Our health values, however, are not strong enough to prevent overconsumption. The end result: weight gain. Next, we restrict calories (go on a diet), we feel hungry, and we have a difficult time adhering to the diet. Stated quite simply, going hungry is an uncomfortable and unpleasant experience.

To avoid this vicious cycle, our dietary habits (and most likely physical activity habits) must change. A question you need to ask yourself is: Do you value health and quality of life more than food overindulgence? If you do not, then the achievement and maintenance of recommended body weight and good health is a moot point. If you desire to avoid disease and increase quality of life, you have to value health more than food overconsumption. If we have spent the past 20 years tasting and “devouring” every food item in sight, it is now time to make healthy choices and consume only moderate amounts of food at a time (portion control). You do not have to taste and eat everything that is placed before your eyes. If you can make such a change in your eating habits, you may not have to worry about another diet for the rest of your life.

Real Life Story

David’s Experience

I played high school football and I knew I was in real good shape and had a lot of muscle. After high school, my football days were over. My freshman year in college took some adjustment, even more so being away from home and all my buddies. I wasn’t exercising and gained 12 pounds that year. At 192 pounds, I still thought I was in pretty good shape. My sophomore year I stopped at the school’s annual health and fitness fair during the fall semester. There I had my body fat checked. It turned out to be 26.5 percent. I always thought I was pretty fit and I wasn’t happy to be rated “overweight.” That one body fat test motivated me to enroll in the fitness and wellness course. In class, I learned how to set up a good aerobic and strength-training exercise program, eat better, and the value of increasing daily physical activity. At the end of the semester I had only lost eight pounds, but I was pleasantly surprised to find out that I had also gained seven pounds of lean body mass (in essence I lost 15 pounds of body fat) and my body fat decreased to 19.6 percent.
Personal Lifetime Weight Management Program

I. Do you understand the concept of recommended body weight and do you consider yourself to be at this weight?

________ Yes  ________ No

II. What type of exercise program do you consider most effective for weight management: aerobic exercise or strength training?

III. Have you gained weight since you started college? If so, what do you attribute this weight gain to?

IV. What can you learn from David’s experience and what strategies can you use to help you properly manage your body weight?

V. Do you understand the concept of long-term gratification derived through a lifetime exercise program and the required process to do so?

Obesity is a health hazard of epidemic proportions in most developed countries around the world. According to the World Health Organization, an estimated 35 percent of the adult population in industrialized nations is obese. Obesity has been defined as a body mass index (BMI) of 30 or higher. The obesity level is the point at which excess body fat can lead to serious health problems.

The number of people who are obese and overweight in the United States has increased dramatically, a direct result of physical inactivity and poor dietary habits. The average weight of American adults between the ages of 20 and 74 has increased by 25 pounds or more since 1965. More than one-half of all adults in the United States do not achieve the minimum recommended amount of physical activity (see Figure 1.8, page 11). In 2004, American women consumed 335 more calories daily than they had 20 years earlier, and men an additional 170 calories per day.

About 68 percent of U.S. adults age 20 and older are overweight (have a BMI greater than 25), and 34 percent are obese (see Figure 5.1). More than 120 million people are overweight and 30 million are obese. Between 1960 and 2002, the overall (men and women combined) prevalence of adult obesity increased from about 13 percent to 30 percent. Most of this increase occurred in the 1990s.

As illustrated in Figure 5.2, the obesity epidemic continues to escalate. Before 1990, not a single state reported an obesity rate above 15 percent of the state’s total population (includes both adults and children). By the year 2009, only Colorado and the District of Columbia had an obesity rate below 20 percent, and 33 states had an obesity rate equal to or greater than 25 percent, including nine states with a rate above 30 percent.

In the past decade alone, the average weight of American adults increased by about 15 pounds. The prevalence of obesity is even higher in certain ethnic groups, especially African Americans and Hispanic Americans. Further, as the nation continues to evolve into a more mechanized and automated society (relying on escalators, elevators, remote controls, computers, e-mail, cell phones, and automatic-sensor doors), the amount of required daily physical activity continues to decrease. We are being lulled into a high-risk sedentary lifestyle.

More than a third of the population is on a diet at any given moment. People spend about $40 billion yearly attempting to lose weight, with more than $10 billion going to memberships in weight reduction centers and another $30 billion to diet food sales. Furthermore, the total cost attributable to treating obesity-related diseases is estimated at $117 billion per year.

Excessive body weight combined with physical inactivity is the second leading cause of preventable death in the United States, causing more than 112,000 deaths each year. Furthermore, obesity is more prevalent than

<table>
<thead>
<tr>
<th>Figure 5.1</th>
<th>Percentage of the adult population (20 years and older) that is overweight (BMI ≥25) and obese (BMI ≥30) in the United States.</th>
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<tr>
<td><img src="chart.png" alt="" /></td>
<td>![Bar chart showing obesity statistics]</td>
</tr>
</tbody>
</table>

SOURCE: Centers for Disease Control and Prevention, 2010.
smoking (19 percent), poverty (14 percent), and problem drinking (6 percent). Obesity and unhealthy lifestyle habits are the most critical public health problems we face in the 21st century.

Excessive body weight and obesity are associated with poor health status and are risk factors for many physical ailments, including cardiovascular disease, type 2 diabetes, and some types of cancer. Evidence indicates that health risks associated with increased body weight start at a BMI over 25 and are enhanced greatly at a BMI over 30.

The American Heart Association has identified obesity as one of the six major risk factors for coronary heart disease. Estimates also indicate that 14 percent of all cancer deaths in men and 20 percent in women are related to current overweight and obesity patterns in the United States. Excessive body weight also is implicated in psychological maladjustment and a higher accidental death rate. Extremely obese people have a lower mental health-related quality of life.

Health Consequences of Excessive Body Weight

Being overweight or obese increases the risk for

- high blood pressure
- elevated blood lipids (high blood cholesterol and triglycerides)
- type 2 (non–insulin-dependent) diabetes
- insulin resistance, glucose intolerance
- coronary heart disease
- angina pectoris
- congestive heart failure
- stroke
- gallbladder disease
- gout
- osteoarthritis
- obstructive sleep apnea and respiratory problems
- some types of cancer (endometrial, breast, prostate, and colon)
- complications of pregnancy (gestational diabetes, gestational hypertension, preeclampsia, and complications during C-sections)
- poor female reproductive health (menstrual irregularities, infertility, irregular ovulation)
- bladder control problems (stress incontinence)
- psychological disorders (depression, eating disorders, distorted body image, discrimination, and low self-esteem)
- shortened life expectancy
- decreased quality of life

SOURCE: Centers for Disease Control and Prevention, downloaded March 30, 2011.
Overweight versus Obesity

Overweight and obesity are not the same thing. Many overweight people (who weigh about 10 to 20 pounds over the recommended weight) are not obese. Although a few pounds of excess weight may not be harmful to most people, this is not always the case. People with excessive body fat who have type 2 diabetes and other cardiovascular risk factors (elevated blood lipids, high blood pressure, physical inactivity, and poor eating habits) benefit from losing weight. People who have a few extra pounds of weight but are otherwise healthy and physically active, exercise regularly, and eat a healthy diet may not be at higher risk for early death. Such is not the case, however, with obese individuals.

Research indicates that individuals who are 30 or more pounds overweight during middle age (30 to 49 years of age) lose about seven years of life, whereas being 10 to 30 pounds overweight decreases the life span by about three years. These decreases are similar to those seen with tobacco use. Severe obesity (BMI greater than 45) at a young age, nonetheless, may cut up to 20 years off one’s life.

Although the loss of years of life is significant, the decreased life expectancy doesn’t even begin to address the loss in quality of life and increase in illness and disability throughout the years. Even a modest reduction of two to three percent can reduce the risk for chronic diseases, including heart disease, high blood pressure, high cholesterol, and diabetes.

A primary objective to achieve overall physical fitness and enhanced quality of life is to attain recommended body composition. Individuals at recommended body weight are able to participate in a wide variety of moderate to vigorous activities without functional limitations. These people have the freedom to enjoy most of life’s recreational activities to their fullest potential. Excessive body weight does not afford an individual the fitness level to enjoy many lifetime activities such as basketball, soccer, racquetball, surfing, mountain cycling, or mountain climbing. Maintaining high fitness and recommended body weight gives a person a degree of independence throughout life that most people in developed nations no longer enjoy.

Scientific evidence also recognizes problems with being underweight. Although the social pressure to be thin has declined slightly in recent years, the pressure to attain model-like thinness is still with us and contributes to the gradual increase in the number of people who develop eating disorders (anorexia nervosa and bulimia, discussed under “Eating Disorders” on pages 151–153).

Extreme weight loss can lead to medical conditions such as heart damage, gastrointestinal problems, shrinkage of internal organs, abnormalities of the immune system, disorders of the reproductive system, loss of muscle tissue, damage to the nervous system, and even death. About 14 percent of people in the United States are underweight.

Critical Thinking

Do you consider yourself overweight? If so, how long have you had a weight problem, what attempts have you made to lose weight, and what has worked best for you?

Tolerable Weight

Many people want to lose weight so they will look better. That’s a worthy goal. The problem, however, is that they have a distorted image of what they would really look like if they were to reduce to what they think is their ideal weight. Hereditary factors play a big role, and only a small fraction of the population has the genes for what is called a “perfect body.”

The media have the greatest influence on people’s perception of what constitutes “ideal” body weight. Most people consult fashion, fitness, and beauty magazines to determine what they should look like. The “ideal” body shapes, physiques, and proportions illustrated in these magazines are rare and are achieved mainly through airbrushing and medical reconstruction. Many individuals, primarily young women, go to extremes in attempts to achieve these unrealistic figures. Failure to attain a “perfect body” may lead to eating disorders in some individuals.

When people set their own target weight, they should be realistic. Attaining the “Excellent” percent of body fat shown in Table 4.10 (page 134) is extremely difficult for some. It is even more difficult to maintain over time, unless the person makes a commitment to a vigorous lifetime exercise program and permanent dietary changes. Few people are willing to do that. The “Moderate” percent body fat category may be more realistic for many people.
The question you should ask yourself is: Am I happy with my weight? Part of enjoying a higher quality of life is being happy with yourself. If you are not, you need to either do something about it or learn to live with it.

If your percent of body fat is higher than those in the Moderate category of Table 4.10 in Chapter 4, you should try to reduce it and stay in this category for health reasons. This is the category that seems to pose no detriment to health.

If you are in the Moderate category but would like to reduce your percent of body fat further, you need to ask yourself a second question: How badly do I want it? Do I want it badly enough to implement lifetime exercise and dietary changes? If you are not willing to change, you should stop worrying about your weight and deem the Moderate category “tolerable” for you.

The Weight Loss Dilemma

Yo-yo dieting carries as great a health risk as being overweight and remaining overweight in the first place. Epidemiological data show that frequent fluctuations in weight (up or down) markedly increase the risk for dying from cardiovascular disease. Based on the findings that constant losses and regains can be hazardous to health, quick-fix diets should be replaced by a slow but permanent weight loss program (as described under “Losing Weight the Sound and Sensible Way,” page 165). Individuals reap the benefits of recommended body weight when they get to that weight and stay there throughout life.

Unfortunately, only about 10 percent of all people who begin a traditional weight loss program without exercise are able to lose the desired weight. Worse, only 5 in 100 are able to keep the weight off. The body is highly resistant to permanent weight changes through caloric restrictions alone.

Traditional diets have failed because few of them incorporate permanent behavioral changes in food selection and an overall increase in physical activity and exercise as fundamental to successful weight loss and weight maintenance. When the diet stops, weight gain begins. The $40 billion diet industry tries to capitalize on the false idea that a person can lose weight quickly without considering the consequences of fast weight loss or the importance of lifetime behavioral changes to ensure proper weight loss and maintenance.

In addition, various studies indicate that most people, especially obese people, underestimate their energy intake. Those who try to lose weight but apparently fail to do so are often described as “diet resistant.” One study found that while on a “diet,” a group of obese individuals with a self-reported history of diet resistance underestimated their average daily caloric intake by almost 50 percent (1,028 self-reported versus 2,081 actual calories) (see Figure 5.3). These individuals also overestimated their amount of daily physical activity by about 25 percent (1,022 self-reported versus 771 actual calories). These differences represent an additional 1,304 calories of energy per day unaccounted for by the subjects in the study. The findings indicate that failing to lose weight often is related to misreports of actual food intake and level of physical activity.

Diet Crazes

Capitalizing on hopes that the latest diet to hit the market will really work this time, fad diets continue to appeal to people of all shapes and sizes. These diets may work for a while, but their success is usually short-lived. Regarding the effectiveness of these diets, Dr. Kelly Brownell, one of the foremost researchers in the field of weight management, has stated: “When I get the latest diet fad, I imagine a trick birthday cake candle that keeps lighting up and we have to keep blowing it out.”

Fad diets deceive people and claim that dieters will lose weight by following all instructions. Many diets are very low in calories. Under these conditions, a lot of the weight lost is in the form of water and protein, and not fat.

On average, a 150-pound person stores about 1.3 pounds of glycogen (carbohydrate or glucose storage) in the body. This amount of glycogen is higher in aerobically trained individuals, as intense training (elite athletes) can store the body’s capacity to store glycogen. About 80 percent of the glycogen is stored in muscles and the remaining 20 percent in the liver. Water, however, is required to store glycogen. A 2.6-to-1 water to glycogen ratio is necessary to store glycogen.

![Figure 5.3](image-url)
Thus, our 150-pound person stores about 3.4 pounds of water (1.3 × 2.6), along with the 1.3 pounds of glycogen, accounting for a total of 4.7 pounds of the person’s normal body weight.

When fasting or on a crash diet (typically defined as less than 800 calories per day), glycogen storage can be completely depleted in just a few days. This loss of weight is not in the form of body fat and is typically used to promote and guarantee rapid weight loss with many fad diets on the market today. When the person resumes a normal eating plan, the body will again store its glycogen, along with the water required to do so, and subsequent weight gain.

Furthermore, on a crash diet, close to half the weight loss is in lean (protein) tissue. When the body uses protein instead of a combination of fats and carbohydrates as a source of energy, weight is lost as much as 10 times faster. This is because a gram of protein produces half the amount of energy that fat does. In the case of muscle protein, one-fifth of protein is mixed with four-fifths water. Therefore, each pound of muscle yields only one-tenth the amount of energy of a pound of fat. As a result, most of the weight lost is in the form of water, which on the scale, of course, looks good.

Long-term crash dieting also increases the risk of heart attacks because low calorie intake eventually leads to heart muscle (protein) loss. Limiting potassium, magnesium, and cooper intake as a result of very low calorie diets may induce fatal cardiac arrhythmias. Furthermore, sodium depletion may cause a dangerous drop in blood pressure. Very low calorie diets should always be followed under a physician’s supervision. Unfortunately, most crash dieters simply consult a friend rather than seek a physician’s advice.

Diet books are frequently found on best-seller lists. The market is flooded with these books. Examples include the Volumetrics Eating Plan, the Ornish Diet, the Atkins Diet, the Zone Diet, the South Beach Diet, the Best Life Diet, the Abs Diet, and You on a Diet. Some of these popular diets are becoming more nutritionally balanced and encourage consumption of fruits and vegetables, whole grains, some lean meat and fish, and low-fat milk and dairy products. Such plans reduce the risk for chronic diseases, including cardiovascular diseases and cancer.

While it is clear that some diets are healthier than others, strictly from a weight loss point of view, it doesn’t matter what diet plan you follow, if caloric intake is lower than your caloric output, weight will come off. Dropout rates for many popular diets, however, are high because of the difficulty in long-term adherence to limited dietary plans.

**Low-Carb Diets**

Among the most popular diets on the market in recent years were the low-carbohydrate/high-protein (LCHP) diet plans. Although they vary slightly, low-carb diets, in general, limit the intake of carbohydrate-rich foods—bread, potatoes, rice, pasta, cereals, crackers, juices, sodas, sweets (candy, cake, cookies), and even fruits and vegetables. Dieters are allowed to eat all the protein-rich foods they desire, including steak, ham, chicken, fish, bacon, eggs, nuts, cheese, tofu, high-fat salad dressings, butter, and small amounts of a few fruits and vegetables. Typically, these diets also are high in fat content. Examples of these diets are the Atkins Diet, the Zone, Protein Power, the Scarsdale Diet, the Carb Addict’s Diet, the South Beach Diet, and Sugar Busters.

During digestion, carbohydrates are converted into glucose, a basic fuel used by every cell in the body. As blood glucose rises, the pancreas releases insulin. Insulin is a hormone that facilitates the entry of glucose into the cells, thereby lowering the glucose level in the bloodstream. A rapid rise in glucose also causes a rapid spike in insulin, which is followed by a rapid removal and drop in blood glucose that leaves you hungry again. A slower rise in blood glucose is desirable because the level is kept constant longer, delaying the onset of hunger. If the cells don’t need the glucose for normal cell functions or if to fuel physical activity, and if cellular glucose stores are already full, glucose is converted to, and stored as, body fat.

Not all carbohydrates cause a similar rise in blood glucose. The rise in glucose is based on the speed of digestion, which depends on a number of factors, including the size of the food particles. Small-particle carbohydrates break down rapidly and cause a quick, sharp rise in blood glucose. Thus, to gauge a food’s effect on blood glucose, carbohydrates are classified by their **glycemic index**.

A high glycemic index signifies a food that causes a quick rise in blood glucose. At the top of the 100-point scale is glucose itself. This index is not directly related to simple and complex carbohydrates, and the glycemic values are not always what one might expect. Rather, the index is based on the actual laboratory- measured speed of absorption. Processed foods generally have a high glycemic index, whereas high-fiber foods tend to have a lower index (see Table 5.1). Other factors that affect the index are the amount of carbohydrate, fat, and protein in the food; how refined the ingredients are; and whether the food was cooked.

The body functions best when blood sugar remains at a constant level. Although this is best accomplished by

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**Key Terms**

- **Glycogen**: Manner in which carbohydrates (glucose molecules) are stored in the human body, predominantly in the liver and muscles.

- **Glycemic index**: A measure that is used to rate the plasma glucose response of carbohydrate-containing foods with the response produced by the same amount of carbohydrate from a standard source, usually glucose or white bread.
Popular Diets

The Volumetrics Eating Plan
Diet plan that focuses on maximizing the volume of food and limiting calories by emphasizing high-water-content/low-fat foods (lower energy density), low-fat cooking techniques, and extensive use of vegetables. The average daily caloric intake is reduced by 500–1,000 calories, with a macronutrient composition of approximately 55% carbohydrates, less than 20–30% fat, and more than 20% protein.

The Best Life Diet
The initial phase of the diet plan encourages exercise and a recommended eating schedule. The second phase requires a reduction in caloric intake through consumption of healthful foods to satisfy hunger. The plan deals extensively with “emotional eating.” Caloric intake averages about 1,700 with maintenance of daily moderate physical activity. The diet composition is about 50% carbohydrates, 30% fat, and 20% protein.

Ornish Diet
Very low fat, vegetarian-type diet. Dieters are not allowed to drink alcohol or eat meat, fish, oils, sugar, or white flour. Data indicate that strict adherence to the Ornish Diet can prevent and reverse heart disease. An average daily caloric intake is about 1,500, composed of approximately 75% carbohydrates, 15% protein, and less than 10% fat.

The Zone Diet
The diet proposes that proper macronutrient (carbohydrate/fat/protein) distribution is critical to keep blood sugar and hormones in balance to prevent weight gain and disease. All meals need to provide 40% carbohydrate calories, 30% fat calories, and 30% protein calories. Daily caloric allowance is about 1,100 for women and 1,400 for men.

Atkins Diet
A low-carbohydrate/high-protein diet. Practically all carbohydrates are eliminated in the first two weeks of the diet. Thereafter, very small amounts of carbohydrates are allowed, primarily in the form of limited fruits, vegetables, and wine. No caloric guidelines are given, but a typical daily diet plan is about 1,500 calories, extremely high in fat (about 60% of calories), followed by protein (about 30% of calories), and limited carbohydrates (about 10% of calories). Dieters may not be as hungry on the Atkins Diet, but they tend to find it too restrictive for long-term adherence.

The South Beach Diet
Also a low-carbohydrate/high-protein diet, but not as restrictive as the Atkins Diet. Emphasizes low-glycemic foods thought to decrease cravings for sugar and refined carbohydrates. Sugar, fruits, and grains are initially eliminated. In phase 2, some high-fiber grains, fruit, and dark chocolate are permitted. No caloric guidelines are given, but a typical dietary plan provides about 1,400 calories per day composed of 40% fat, 40% carbohydrate, and 20% protein.

Consuming foods with a low glycemic index (nuts, apples, oranges, low-fat yogurt), a person does not have to eliminate all high-glycemic index foods (sugar, potatoes, bread, white rice, soda drinks) from the diet. Foods with a high glycemic index along with some protein are useful to replenish depleted glycogen stores following prolonged or exhaustive aerobic exercise. Combining high-glycemic index items or with some fat and protein brings down the average index.

Regular consumption of high-glycemic foods by themselves may increase the risk for cardiovascular disease, especially in people at risk for diabetes. A person does not need to plan the diet around the index itself, as many popular diet programs indicate. The glycemic index deals with single foods eaten alone. Most people eat high-glycemic index foods in combination with other foods as part of a meal. In combination, these foods have a lower effect on blood sugar. Even people at risk for diabetes or who have the disease can eat high-glycemic foods in moderation.

Low-glycemic foods may also aid in weight loss and weight maintenance. As blood sugar levels drop between snacks and meals, hunger increases. Keeping blood sugar levels constant by including low-glycemic foods in the diet helps stave off hunger, appetite, and overeating (see Figure 5.4).

Proponents of LCHP diets claim that if a person eats fewer carbohydrates and more protein, the pancreas will produce less insulin, and as insulin drops, the body will turn to its own fat deposits for energy. There is no scientific proof, however, that high levels of insulin lead to weight gain. None of the authors of these diets published any studies validating their claims. Yet, these authors base their diets on the faulty premise that high insulin leads to obesity. We know the opposite to be true: Excessive body fat causes insulin levels to rise, thereby increasing the risk for developing diabetes.

The reasoning for rapid weight loss in LCHP dieting is that a low carbohydrate intake forces the liver to produce glucose. The source for most of this glucose is body proteins—your lean body mass, including muscle. As indicated earlier, protein is mostly water; thus, weight is lost rapidly. When a person terminates the diet, the body rebuilds some of the protein tissue and quickly regains some weight.

Research studies indicated that individuals on an LCHP (Atkins) diet lost slightly more weight in the first
Are Low-Carb/High Protein Diets More Effective?

A few studies suggest that, at least over the short-term, low-carb/high-protein (LCHP) diets are more effective in producing weight loss than carbohydrate-based diets. These results are preliminary and controversial. In LCHP diets:

- A large amount of weight loss is water and muscle protein, not body fat. Some of this weight is quickly regained when regular dietary habits are resumed.
- Few people are able to stay with LCHP diets for more than a few weeks at a time. The majority stop dieting before the targeted program completion.
- LCHP dieters are rarely found in a national weight loss registry of people who have lost 30 pounds and kept them off for a minimum of 6 years.
- Food choices are severely restricted in LCHP diets. With less variety, individuals tend to eat less (800 to 1,200 calories/day) and thus lose more weight.
- LCHP diets may promote heart disease, cancer, and increase the risk for osteoporosis.
- LCHP diets are fundamentally high in fat (about 60 percent fat calories).
- LCHP diets are not recommended for people with diabetes, high blood pressure, heart disease, or kidney disease.
- LCHP diets do not promote long-term healthy eating patterns.

Years of research will be required to determine the extent to which adhering over the long term to LCHP diets increases the risk for heart disease, cancer, and kidney or bone damage. Low-carb diets are contrary to the nutrition advice of most national leading health organizations (which recommend a diet lower in saturated fat and trans fats and high in complex carbohydrates). Without fruits, vegetables, and whole grains, high-protein diets are unhealthy and may be harmful.

The effectiveness of the diet, however, seemed to dwindle over time. In one of the studies, at 12 months into the diet, participants in the LCHP diet had regained more weight than those on the low-fat diet plan.

Table 5.1 Glycemic Index of Selected Foods

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<th>Item</th>
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<th>Item</th>
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<td>38</td>
<td>Milk, chocolate</td>
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<td>60</td>
<td>Potato, baked</td>
<td>56–100</td>
</tr>
<tr>
<td>Corn Flakes</td>
<td>92</td>
<td>Potato, French fries</td>
<td>75</td>
</tr>
<tr>
<td>Doughnut</td>
<td>76</td>
<td>Potato, sweet</td>
<td>51</td>
</tr>
<tr>
<td>Frosted Flakes</td>
<td>55</td>
<td>Rice, white</td>
<td>56</td>
</tr>
<tr>
<td>Fruit cocktail</td>
<td>55</td>
<td>Sugar, table</td>
<td>65</td>
</tr>
<tr>
<td>Gatorade</td>
<td>78</td>
<td>Watermelon</td>
<td>72</td>
</tr>
<tr>
<td>Glucose</td>
<td>100</td>
<td>Yogurt, low-fat</td>
<td>32</td>
</tr>
<tr>
<td>Honey</td>
<td>58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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Blood glucose
Insulin

Figure 5.4 Effects of high- and low-glycemic carbohydrate intake on blood glucose levels.
diets lack many vitamins, minerals, antioxidants, phytonutrients, and fiber—all dietary factors that protect against an array of ailments and diseases.

The major risk associated with long-term adherence to LCHP diets could be the increased risk for heart disease, because high-protein foods are also high in fat content (see Chapter 10). Short-term (a few weeks or months) adherence to LCHP diets does not appear to increase heart disease risk. The long-term (years) effects of these types of diet, nonetheless, have not been evaluated by scientific research (very few people would be willing to adhere to such a diet for several years). A possible long-term adverse effect of adherence to an LCHP diet is a potential increase in cancer risk. Phytonutrients found in fruits, vegetables, and whole grains protect against certain types of cancer. A low-carbohydrate intake also produces a loss of vitamin B, calcium, and potassium. Potential bone loss can accentuate the risk for osteoporosis.

Side effects commonly associated with LCHP diets include weakness, nausea, bad breath, constipation, irritability, lightheadedness, and fatigue. If you choose to go on an LCHP diet for longer than a few weeks, let your physician know so that he or she may monitor your blood lipids, bone density, and kidney function.

The benefit of adding extra protein to a weight loss program may be related to the hunger-suppressing effect of protein. Data suggest that protein curbs hunger more effectively than carbohydrates or fat. Dieters feel less hungry when caloric intake from protein is increased to about 30 percent of total calories and fat intake is cut to about 20 percent (while carbohydrate intake is kept constant at 50 percent of total calories). Thus, if you struggle with frequent hunger pangs, try to include 10 to 15 grams of lean protein with each meal. This amount of protein is the equivalent of one and a half ounces of lean meat (beef, fowl, or fish), two tablespoons of natural peanut butter, or eight ounces of plain low-fat yogurt.

The reason why many of these diets succeed is because they restrict a large number of foods. Thus, people tend to eat less food overall. With the extraordinary variety of foods available to us, it is unrealistic to think that people will adhere to these diets for very long. People eventually get tired of eating the same thing day in and day out and start eating less, leading to weight loss. If they happen to achieve the lower weight but do not make permanent dietary changes, they regain the weight quickly once they go back to their previous eating habits.

A few diets recommend exercise along with caloric restrictions—the best method for weight reduction, of course. People who adhere to these programs will succeed, so the diet has achieved its purpose. Unfortunately, if the people do not change their food selection and activity level permanently, they gain back the weight once they discontinue dieting and exercise.

If people only accepted that no magic foods will provide all of the necessary nutrients and that a person has

How to Recognize Fad Diets

Fad diets have characteristics in common. These diets typically

- are nutritionally unbalanced.
- rely primarily on a single food (for example, grapefruit).
- are based on testimonials.
- were developed according to “confidential research.”
- are based on a “scientific breakthrough.”
- promote rapid and “painless” weight loss.
- promise miraculous results.
- restrict food selection.
- are based on pseudo claims that excessive weight is related to a specific condition such as insulin resistance, combinations or timing of nutrient intake, food allergies, hormone imbalances, certain foods (fruits, for example).
- require the use of selected products.
- use liquid formulas instead of foods.
- misrepresent salespeople as individuals qualified to provide nutrition counseling.
- fail to provide information on risks associated with weight loss and of the diet use.
- do not involve physical activity.
- do not encourage healthy behavioral changes.
- are not supported by the scientific community or national health organizations.
- fail to provide information for weight maintenance upon completion of the diet phase.
to eat a variety of foods to be well nourished, dieters would be more successful and the diet industry would go broke. Also, let’s not forget that we eat for pleasure and for health. Two of the most essential components of a wellness lifestyle are healthy eating and regular physical activity, and they provide the best weight management program available today.

**Eating Disorders**

Eating disorders are medical illnesses that involve crucial disturbances in eating behaviors thought to stem from some combination of environmental pressures. These disorders are characterized by an intense fear of becoming fat, which does not disappear even when the person is losing weight in extreme amounts. The three most common types of eating disorders are anorexia nervosa, bulimia nervosa, and binge-eating disorder. A fourth disorder, emotional eating, can also be listed under disordered eating.

Most people who have eating disorders are afflicted by significant family and social problems. They may lack fulfillment in many areas of their lives. The eating disorder then becomes the coping mechanism to avoid dealing with these problems. Taking control over their own body weight helps them believe that they are restoring some sense of control over their lives.

Anorexia nervosa and bulimia nervosa are common in industrialized nations where society encourages low calorie diets and thinness. The female role in society has changed rapidly, which makes women more susceptible to eating disorders. Although frequently seen in young women, eating disorders are most prevalent among individuals between the ages of 25 and 50. Surveys, nonetheless, indicate that as many as 40 percent of college-age women are struggling with an eating disorder.

Eating disorders are not limited to women. Every 1 in 10 cases occurs in men. But because men’s role and body image are viewed differently in our society, these cases often go unreported.

Although genetics may play a role in the development of eating disorders, most cases are environmentally related. Individuals who have clinical depression and obsessive-compulsive behavior are more susceptible. About half of all people with eating disorders have some sort of chemical dependency (alcohol and drugs), and most of them come from families with alcohol- and drug-related problems. Of reported cases of eating disorders, a large number are individuals who are, or have been, victims of sexual molestation.

Eating disorders develop in stages. Typically, individuals who are already dealing with significant issues in life start a diet. At first they feel in control and are happy about the weight loss, even if they are not overweight. Encouraged by the prospect of weight loss and the control they can exert over their own weight, the dieting becomes extreme and often is combined with exhaustive exercise and the overuse of laxatives and diuretics.

The syndrome typically emerges following emotional issues or a stressful life event and the uncertainty about one’s ability to cope efficiently. Life experiences that can trigger the syndrome might be gaining weight, starting the menstrual period, beginning college, losing a boyfriend, having poor self-esteem, being socially rejected,

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**Key Terms**

Anorexia nervosa An eating disorder characterized by self-imposed starvation to lose and maintain very low body weight.

Bulimia nervosa An eating disorder characterized by a pattern of binge eating and purging in an attempt to lose weight and maintain low body weight.

Binge-eating disorder An eating disorder characterized by uncontrollable episodes of eating excessive amounts of food within a relatively short time.

Emotional eating The consumption of large quantities of food to suppress negative emotions.
starting a professional career, or becoming a wife or a mother.

The eating disorder then takes on a life of its own and becomes the primary focus of attention for the individual afflicted with it. Her self-worth revolves around what the scale reads every day, her relationship with food, and her perception of how she looks each day.

**Anorexia Nervosa**

An estimated one percent of the population in the United States has the eating disorder anorexia nervosa. Anorexic individuals seem to fear weight gain more than death from starvation. Furthermore, they have a distorted image of their bodies and think of themselves as being fat even when they are emaciated.

Anorexic patients commonly develop obsessive and compulsive behaviors and emphatically deny their condition. They are preoccupied with food, meal planning, and grocery shopping, and they have unusual eating habits. As they lose weight and their health begins to deteriorate, they feel weak and tired. They might realize they have a problem, but they will not stop the starvation and refuse to consider the behavior abnormal.

Once they have lost a lot of weight and malnutrition sets in, the physical changes become more visible. Typical changes are amenorrhea (absence of menstruation), digestive problems, extreme sensitivity to cold, hair problems, fluid and electrolyte abnormalities (which may lead to an irregular heartbeat and sudden stopping of the heart), injuries to nerves and tendons, abnormalities of immune function, anemia, growth of fine body hair, mental confusion, inability to concentrate, lethargy, depression, dry skin, lower skin and body temperature, and osteoporosis.

Diagnostic criteria for anorexia nervosa are:\(^1^4\):

- Refusal to maintain body weight over a minimal normal weight for age and height (weight loss leading to maintenance of body weight less than 85 percent of that expected, or failure to make expected weight gain during periods of growth, leading to body weight less than 85 percent of that expected)
- Intense fear of gaining weight or becoming fat, even though underweight
- Disturbance in the way in which one’s body weight, size, or shape is perceived, undue influences of body weight or shape on self-evaluation, or denial of the seriousness of the current low body weight
- In postmenarcheal females, amenorrhea (absence of at least three consecutive menstrual cycles) (A woman is considered to have amenorrhea if her periods occur only following estrogen therapy.)

Many of the changes induced by anorexia nervosa can be reversed. Individuals with this condition can get better with professional therapy, or they sometimes turn to bulimia nervosa, or they die from the disorder. Anorexia nervosa has the highest mortality rate of all psychosomatic illnesses today—20 percent of anorexic individuals die as a result of their condition. The disorder is 100 percent curable, but treatment almost always requires professional help. The sooner it is started, the better are the chances for reversibility and cure. Therapy consists of a combination of medical and psychological techniques to restore proper nutrition, prevent medical complications, and modify the environment or events that triggered the syndrome.

Seldom can anorexia sufferers overcome the problem by themselves. They strongly deny their condition. They are able to hide it and deceive friends and relatives. Based on their behavior, many of them meet all of the characteristics of anorexia nervosa, but it goes undetected because both thinness and dieting are socially acceptable. Only a well-trained clinician is able to diagnose anorexia nervosa.

**Bulimia Nervosa**

Bulimia nervosa is more prevalent than anorexia nervosa. As many as one in five women on college campuses may be bulimic, according to some estimates. Bulimia nervosa also is more prevalent than anorexia nervosa in males, although bulimia is still much more prevalent in females.

People with bulimia usually are healthy looking, well educated, and near recommended body weight. They seem to enjoy food and often socialize around it. In actuality, they are emotionally insecure, rely on others, and lack self-confidence and self-esteem. Recommended weight and food are important to them.

The binge–purge cycle usually occurs in stages. As a result of stressful life events or the simple compulsion to eat, bulimic individuals engage periodically in binge eating that may last an hour or longer. With some apprehension, bulimics anticipate and plan the cycle. Next they feel an urgency to begin, followed by large and uncontrollable food consumption, during which time they may eat several thousand calories (up to 10,000 calories in extreme cases). After a short period of relief and satisfaction, feelings of deep guilt and shame and intense fear of gaining weight emerge. Purging seems to be an easy answer, as the bingeing cycle can continue without fear of gaining weight.

The diagnostic criteria for bulimia nervosa follow:\(^1^5\):

- Recurrent episodes of binge eating. An episode of binge eating is characterized by both of the following: (a) eating in a discrete period of time (e.g., within any two-hour period) an amount of food that is definitely more than most people would eat during a similar period and under similar circumstances; (b) a sense of lack of control over eating during the episode (a feeling that one cannot stop eating or control what or how much one is eating)
• Recurring inappropriate compensatory behaviors to prevent weight gain, such as self-induced vomiting; misuse of laxatives, diuretics, other medications, or enemas; fasting; or excessive exercise
• Occurrence of the binge eating and inappropriate compensatory behaviors both occur, on average, at least twice a week for three months
• Undue influence of body shape and weight on self-evaluation

The most typical form of purging is self-induced vomiting. Bulimics also frequently ingest strong laxatives and emetics. Near-fasting diets and strenuous bouts of exercise are common. Medical problems associated with bulimia nervosa include cardiac arrhythmias, amenorrhea, kidney and bladder damage, ulcers, colitis, tearing of the esophagus or stomach, tooth erosion, gum damage, and general muscular weakness.

Unlike anorexics, bulimia sufferers realize that their behavior is abnormal and feel shame about it. Fearing social rejection, they pursue the binge–purge cycle in secrecy and at unusual hours of the day.

Bulimia nervosa can be treated successfully when the person realizes that this destructive behavior is not the solution to life’s problems. A change in attitude can prevent permanent damage or death.

Binge-Eating Disorder

Binge-eating disorder is probably the most common of the three main eating disorders. About two percent of American adults are afflicted with binge-eating disorder in any six-month period. Although most people overeat from time to time, eating more than one should now and then does not mean the individual has a binge-eating disorder. The disorder is slightly more common in women than in men; three women for every two men have the disorder.

Binge-eating disorder is characterized by uncontrol-lable episodes of eating excessive amounts of food within a relatively short time. The causes of binge-eating disorder are unknown, although depression, anger, sadness, boredom, and worry can trigger an episode. Unlike bulimic sufferers, binge eaters do not purge; thus, most people with this disorder are either overweight or obese.

Typical symptoms of binge-eating disorder include:
• Eating what most people think is an unusually large amount of food
• Eating until uncomfortably full
• Eating out of control
• Eating much faster than usual during binge episodes
• Eating alone because of embarrassment of how much food one is consuming
• Feeling disgusted, depressed, or guilty after overeating

Emotional Eating

In addition to physiological purposes, eating also fulfills psychological, social, and cultural purposes. We eat to sustain our daily energy requirements, but we also eat at family celebrations, national holidays, social gatherings, sporting events (as spectators), and even when we become very emotional (some people stop eating when emotional). Emotional eating involves the consumption of large quantities of food, mostly “comfort” and junk food, to suppress negative emotions. Such emotions include stress, anxiety, uncertainty, guilt, anger, pain, depression, loneliness, sadness, or boredom. In such circumstances, people eat for comfort when they are at their weakest point emotionally. Comfort foods often include calorie-dense, sweet, salty, and fatty foods. Excessive emotional eating hinders proper weight management.

Some palatable foods, such as chocolate, cause the body to release small amounts of mood-elevating opi-ates, helping to offset negative emotions. A preference for certain foods is also present when one experiences specific feelings (loneliness, anxiety, fear). Eating helps to divert the stressor away for a while, but the distraction is only temporary. The emotions return and may be compounded by a feeling of guilt from overeating.

If you are an emotional overeater, you can always seek help from a therapist at the school’s counseling center. The following list of suggestions may also help:

1. Learn to differentiate between emotional and physical hunger.
2. Avoid storing and snacking on unhealthy foods.
4. Use countering techniques (going for a walk instead of reaching for the ice cream, listening to music instead of eating the candy bar).
5. Keep a “trigger log” and get to know what triggers your emotional food consumption.
6. Work it out with exercise instead of food.

Treatment

Treatment for eating disorders is available on most school campuses through the school’s counseling center or health center. Local hospitals also offer treatment for these conditions. Many communities have support groups, frequently led by professional personnel and often free of charge. All information and the individual’s identity are kept confidential, so the person need not fear embarrassment or repercussions when seeking professional help.

Physiology of Weight Loss

Traditional concepts related to weight control have centered on three assumptions:
1. Balancing food intake against output allows a person to achieve recommended weight.
2. All fat people simply eat too much.
3. The human body doesn’t care how much (or little) fat it stores.

Although these statements contain some truth, they are open to much debate and research. We now know that the causes of obesity are complex, involving a combination of genetics, behavior, and lifestyle factors.

**Energy-Balancing Equation**

The principle embodied in the energy-balancing equation is simple: As long as caloric input equals caloric output, the person will not gain or lose weight. If caloric intake exceeds output, the person gains weight; when output exceeds input, the person loses weight. If daily energy requirements could be determined accurately, caloric intake could be balanced against output. This is not always the case, though, because genetic and lifestyle-related individual differences determine the number of calories required to maintain or lose body weight.

Table 5.3 (page 167) offers general guidelines to determine the estimated energy requirement (EER) in calories per day. This is an estimated figure and (as discussed under “Losing Weight the Sound and Sensible Way,” page 165) serves only as a starting point from which individual adjustments have to be made.

The total daily energy requirement has three basic components (see Figure 5.5):

1. Resting metabolic rate
2. Thermic effect of food
3. Physical activity

The resting metabolic rate (RMR)—the energy requirement to maintain the body’s vital processes in the resting state—accounts for approximately 60 to 70 percent of the total daily energy requirement. The thermic effect of food—the energy required to digest, absorb, and store food—accounts for about 5 to 10 percent of the total daily requirement. Physical activity accounts for 15 to 30 percent of the total daily requirement.

One pound of fat is the equivalent of 3,500 calories. If a person’s EER is 2,500 calories and that person were to decrease intake by 500 calories per day, it should result in a loss of one pound of fat in seven days (500 × 7 = 3,500). But research has shown—and many people have experienced—that even when dieters carefully balance caloric input against caloric output, weight loss does not always result as predicted. Furthermore, two people with similar measured caloric intake and output seldom lose weight at the same rate.

The most common explanation for individual differences in weight loss and weight gain has been variation in human metabolism from one person to another. We are all familiar with people who can eat “all day long” and not gain an ounce of weight, while others cannot even “dream about food” without gaining weight. Because experts did not believe that human metabolism alone could account for such extreme differences, they developed other theories that might better explain these individual variations.

**Setpoint Theory**

Results of research studies point toward a weight-regulating mechanism (WRM) in the human body that has a setpoint for controlling both appetite and the amount of fat stored. Setpoint is hypothesized to work like a thermostat for body fat, maintaining fairly constant body weight, because it “knows” at all times the exact amount of adipose tissue stored in the fat cells. Some people have high settings; others have low settings.

If body weight decreases (as in dieting), the setpoint senses this change and triggers the WRM to increase the person’s appetite or make the body conserve energy to maintain the “set” weight. The opposite also may be true. Some people have a hard time gaining weight. In this case, the WRM decreases appetite or causes the body to waste energy to maintain the lower weight.

Every person has his or her own certain body fat percentage (as established by the setpoint) that the body attempts to maintain. The genetic instinct to survive tells the body that fat storage is vital, and therefore it sets an acceptable fat level. This level may remain somewhat constant or may climb gradually because of poor lifestyle habits.

For instance, under strict calorie reduction, the body may make extreme metabolic adjustments in an effort to maintain its setpoint for fat. The basal metabolic rate (BMR), the lowest level of caloric intake necessary to sustain life, may drop dramatically when operating under a consistent negative caloric balance, and that person’s weight loss may plateau for days or even weeks. A
low metabolic rate compounds a person’s problems in maintaining recommended body weight.

These findings were substantiated by research conducted at Rockefeller University in New York. The authors showed that the body resists maintaining altered weight. Obese and lifetime nonobese individuals were used in the investigation. Following a 10-percent weight loss, the body, in an attempt to regain the lost weight, compensated by burning up to 15 percent fewer calories than expected for the new reduced weight (after accounting for the 10 percent loss). The effects were similar in the obese and nonobese participants. These results imply that after a 10-percent weight loss, a person would have to eat even less or exercise even more to compensate for the estimated 15-percent slowdown (a difference of about 200 to 300 calories).

In this same study, when the participants were allowed to increase their weight to 10 percent above their “normal” body weight (before weight loss) weight, the body burned 10 to 15 percent more calories than expected—attempting to waste energy and maintain the preset weight. This is another indication that the body is highly resistant to weight changes unless additional lifestyle changes are incorporated to ensure successful weight management. (These methods are discussed under “Losing Weight the Sound and Sensible Way,” page 165.)

Critical Thinking

Do you see a difference in the amount of food that you are now able to eat compared with the amount that you ate in your mid- to late-teen years? • If so, to what do you attribute this difference? • What actions are you taking to account for the difference?

Dietary restriction alone will not lower the setpoint, even though the person may lose weight and fat. When the dieter goes back to the normal or even below-normal caloric intake (at which the weight may have been stable for a long time), he or she quickly regains the lost fat as the body strives to regain a comfortable fat store.

An Example

Let’s use a practical illustration. A person would like to lose some body fat and assumes that his or her current stable body weight has been reached at an average daily caloric intake of 1,800 calories (no weight gain or loss occurs at this daily intake). In an attempt to lose weight rapidly, this person now goes on a very low caloric diet (defined as 800 calories per day or less), or, even worse, a near-fasting diet. This immediately activates the body’s survival mechanism and readjusts the metabolism to a lower caloric balance. After a few weeks of dieting at the 800-calories-per-day level, the body now can maintain its normal functions at 1,300 calories per day. This new figure (1,300) represents a drop of 500 calories per day in the metabolic rate.

Achieving and maintaining a high physical fitness percent body fat standard requires a lifetime commitment to regular physical activity and proper nutrition.

Having lost the desired weight, the person terminates the diet but realizes that the original intake of 1,800 calories per day will have to be lower to maintain the new lower weight. To adjust to the new lower body weight, the person restricts intake to about 1,600 calories per day.

Key Terms

Energy-balancing equation A principle holding that as long as caloric input equals caloric output, the person will not gain or lose weight. If caloric intake exceeds output, the person gains weight; if output exceeds input, the person loses weight.

Estimated energy requirement (EER) The average dietary energy (caloric) intake that is predicted to maintain energy balance in a healthy adult of defined age, gender, weight, height, and level of physical activity, consistent with good health.

Resting metabolic rate (RMR) The energy requirement to maintain the body’s vital processes in the resting state.

Weight-regulating mechanism (WRM) A feature of the hypothalamus of the brain that controls how much the body should weigh.

Setpoint Weight control theory that the body has an established weight and strongly attempts to maintain that weight.

Basal metabolic rate (BMR) The lowest level of oxygen consumption (and energy requirement) necessary to sustain life.

Very low caloric diet A diet that allows an energy intake (consumption) of only 800 calories or less per day.
The individual is surprised to find that even at this lower daily intake (200 fewer calories), the weight comes back at a rate of one pound every one to two weeks. After the diet is over, this new lowered metabolic rate may take several months to kick back up to its normal level.

Based on this explanation, individuals clearly should not go on very low calorie diets. This will slow the RMR and also will deprive the body of basic daily nutrients required for normal function. Very low calorie diets should be used only in conjunction with dietary supplements and under proper medical supervision. Furthermore, people who use very low calorie diets are not as effective in keeping the weight off once the diet is terminated.

Recommendation
A daily caloric intake of approximately 1,500 calories provides the necessary nutrients if they are distributed properly over the basic food groups (meeting the daily recommended amounts from each group). Of course, the individual will have to learn which foods meet the requirements and yet are low in fat and sugar.

Under no circumstances should a person go on a diet that calls for a level of 1,200 calories or less for petite women or 1,500 calories or less for most men and women. Weight (fat) is gained over months and years, not overnight. Likewise, weight loss should be gradual, not abrupt. At 1,200 calories per day you may require a multivitamin supplement. Your health care professional should be consulted regarding such supplement.

A second way in which the setpoint may work is by keeping track of the nutrients and calories consumed daily. It is thought that the body, like a cash register, records the daily food intake, and that the brain will not feel satisfied until the calories and nutrients have been “registered.”

This setpoint for calories and nutrients seems to operate even when people participate in moderately intense exercise. Some evidence suggests that people do not become hungrier with moderate physical activity. Therefore, people can choose to lose weight either by going hungry or by combining a sensible calorie-restricted diet with an increase in daily physical activity.

Lowering the Setpoint
The most common question regarding the setpoint is how to lower it so that the body will feel comfortable at a reduced fat percentage. The following factors seem to affect the setpoint directly by lowering the fat thermostat:

- Exercise
- A diet high in complex carbohydrates
- Nicotine
- Amphetamines

The last two are more destructive than the extra fat weight, so they are not reasonable alternatives (as far as the extra strain on the heart is concerned, smoking one pack of cigarettes per day is said to be the equivalent of carrying 50 to 75 pounds of excess body fat). A diet high in fats and refined carbohydrates, near-fasting diets, and perhaps even artificial sweeteners seem to raise the setpoint. Therefore, the only practical and sensible way to lower the setpoint and lose fat weight is a combination of exercise and a diet high in complex carbohydrates and only moderate amounts of fat.

Because of the effects of proper food management on the body’s setpoint, most of the successful dieter’s effort should be spent in reforming eating habits, increasing the intake of complex carbohydrates and high-fiber foods, and decreasing the consumption of processed foods that are high in refined carbohydrates (sugars) and fats. This change in eating habits will bring about a decrease in total daily caloric intake. Because one gram of

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**Behavior Modification Planning**

**Eating Right When on the Run**

Current lifestyles often require people to be on the run. We don’t seem to have time to eat right, but fortunately it doesn’t have to be that way. If you are on the run, it is even more critical to make healthy choices to keep up with a challenging schedule. Look at the following food choices for eating on the run:

- Water
- Whole-grain cereal and skim milk
- Whole-grain bread and bagels
- Whole-grain bread with peanut butter
- Non-fat or low-fat yogurt
- Fresh fruits
- Frozen fresh fruit (grapes, cherries, banana slices)
- Dried fruits
- Raw vegetables (carrots, red peppers, cucumbers, radishes, cauliflower, asparagus)
- Crackers
- Pretzels
- Bread sticks
- Low-fat cheese sticks
- Granola bars
- Snack-size cereal boxes
- Nuts
- Trail mix
- Plain popcorn
- Vegetable soups

**Try It** In your Online Journal or class notebook, plan your fast-meal menus for the upcoming week. It may require extra shopping and some food preparation (for instance, cutting vegetables to place in snack-size plastic bags). At the end of the week, evaluate how many days you had a “healthy eating on the run day.” What did you learn from the experience?
carbohydrates provides only four calories, as opposed to nine calories per gram of fat, you could eat twice the volume of food (by weight) when substituting carbohydrates for fat. Some fat, however, is recommended in the diet—preferably polyunsaturated and monounsaturated fats. These so-called good fats do more than help protect the heart; they help delay hunger pangs.

A “diet” should not be viewed as a temporary tool to aid in weight loss but, instead, as a permanent change in eating behaviors to ensure weight management and better health. The role of increased physical activity also must be considered, because successful weight loss, maintenance, and recommended body composition are seldom attained without a moderate reduction in caloric intake combined with a regular exercise program.

**Diet and Metabolism**

Fat can be lost by selecting the proper foods, exercising, or restricting calories. However, when dieters try to lose weight by dietary restrictions alone, they also lose lean body mass (muscle protein, along with vital organ protein). The amount of lean body mass lost depends entirely on caloric limitation. When people go on a near-fasting diet, up to half of the weight loss is lean body mass and the other half is actual fat loss (see Figure 5.6). When diet is combined with exercise, close to 100 percent of the weight loss is in the form of fat, and lean tissue actually may increase. Loss of lean body mass is never good, because it weakens the organs and muscles and slows metabolism. Large losses in lean tissue can cause disturbances in heart function and damage to other organs. Equally important is not to overindulge (binge) following a very low calorie diet, as this may cause changes in metabolic rate and electrolyte balance, which could trigger fatal cardiac arrhythmias.

Contrary to some beliefs, aging is not the main reason for the lower metabolic rate. It is not so much that metabolism slows down as that people slow down. As people age, they tend to rely more on the amenities of life (remote controls, cell phones, intercoms, single-level homes, riding lawnmowers) that lull a person into sedentary living.

Basal metabolism also is related to lean body weight. More lean tissue yields a higher metabolic rate. As a consequence of sedentary living and less physical activity, the lean component decreases and fat tissue increases. The human body requires a certain amount of oxygen per pound of lean body mass. Given that fat is considered metabolically inert from the point of view of caloric use, the lean tissue uses most of the oxygen, even at rest. As muscle and organ mass (lean body mass) decrease, so do the energy requirements at rest.

Diet with caloric intakes below 1,500 calories cannot guarantee the retention of lean body mass. Even at this intake level, some loss is inevitable unless the diet is combined with exercise. Despite the claims of many diets that they do not alter the lean component, the simple truth is that regardless of what nutrients may be added to the diet, severe caloric restrictions always prompt the loss of lean tissue. Sadly, many people go on very low calorie diets constantly. Every time they do, their metabolic rate slows as more lean tissue is lost.

People in their 40s and older who weigh the same as they did when they were 20 tend to think they are at recommended body weight. During this span of 20 years or more, though, they may have dieted many times without participating in an exercise program. After they terminate each diet, they regain the weight, and much of that gain is additional body fat. Maybe at age 20 they weighed 150 pounds, of which only 15 percent was fat. Now at age 40, even though they still weigh 150 pounds, they might be 30 percent fat (see Figure 5.7). At “recommended” body weight, they wonder why they are eating very little and still having trouble staying at that weight.

**Hormonal Regulation of Appetite**

Ghrelin and leptin are two hormones currently being extensively researched because they appear to play a role in appetite. Ghrelin, produced primarily in the stomach, stimulates appetite: that is, the more ghrelin the body produces, the more you want to eat. Leptin, produced by fat cells, on the other hand, lets the brain know when you are full; the more leptin you produce, the less you want to eat. Similar to insulin resistance (leading to type 2 diabetes), research is beginning to show that a lack of physical activity also leads to leptin resistance, setting up a vicious cycle that leads to excessive eating. Scientists are now looking into the role these hormones play in weight gain and weight loss, as...
well as at the effects of sleep deprivation and exercise dose on these hormones and subsequent appetite regulation.

**Sleep and Weight Management**

As presented under the Healthy Lifestyle Habits box in Chapter 1 (see page 27), adequate sleep is one of the 12 key components that enhance health and extend life. New evidence shows that sleep is also important to adequate weight management. Sleep deprivation appears to be conducive to weight gain and may interfere with the body’s capability to lose weight.

Current obesity and sleep deprivation data point toward a possible correlation between excessive body weight and sleep deprivation. About 68 percent of the U.S. population is overweight or obese, and according to the National Sleep Foundation, 63 percent of Americans report that they do not get eight hours of sleep per night. The question must be raised: Is there a connection? Let’s examine some of the data.

One of the most recent studies examining this issue showed that individuals who get less than six hours of sleep per night have a higher average BMI (28.3) compared with those who average eight hours per night (24.5).\(^\text{18}\) Another study on more than 68,000 women between the ages of 30 and 55 found that those who got five or less hours of sleep per night were 30 percent more likely to gain 30 or more pounds compared with women who got eight hours per night.\(^\text{19}\)

Researchers believe that lack of sleep disrupts normal body hormonal balances. Sleep deprivation has now been shown to elevate ghrelin levels and decrease leptin levels, potentially leading to weight gain or keeping you from losing weight.\(^\text{20}\) Data comparing these hormone levels in five-hour versus eight-hour sleepers found that the short sleepers had a 14.9 percent increase in ghrelin levels and a 15.5-percent decrease in leptin levels. The short sleepers also had a 3.6 percent higher BMI than the regular sleepers.\(^\text{21}\)

Based on all these studies, the data appear to indicate that sleep deprivation has a negative impact on weight loss or maintenance. Thus, an important component to a well-designed weight management program should include a good night's rest (eight hours of sleep).

**Monitoring Body Weight**

A most critical component to lifetime weight management is to regularly monitor your body weight. Get into the habit of weighing yourself, preferably at the same time of day and under the same conditions; for instance, in the morning just as you get out of bed. Depending on your body size, activity patterns, rehydration level, and dietary intake on any given day, your weight will fluctuate by a pound or more from one day to the next. You do not want to be obsessed with body weight that can potentially lead to an eating disorder, but monitoring your recommended body weight (and that is the key: “healthy” recommended body weight) on a regular basis allows you to make immediate adjustments in food intake and physical activity if your weight increases and stays there for several days. Do not adapt and accept the higher weight as your new stable weight. Understand that it is a lot easier to make sensible short-term dietary and activity changes to lose one or two pounds of weight, rather than having to make drastic long term changes to lose 10, 20, 50, or more pounds that you allowed yourself to gain over the course of several months or years. Whenever feasible, you also want to do periodic assessments of body composition using experienced technicians and valid techniques.
**Exercise and Weight Management**

To tilt the energy-balancing equation in your favor, you need to burn more calories through physical activity. Research indicates that exercise accentuates weight loss while on a negative caloric balance (diet) as long as you do not replenish the calories expended during exercise. The debate, however, centers on what amount of exercise is best for individuals who are trying to lose weight and those who are trying to maintain weight. The data is clear, nonetheless, that exercise is the best predictor of long-term maintenance of weight loss.22

Regular exercise seems to exert control over how much a person weighs. On average, the typical adult American gains one to two pounds of weight per year. A one-pound weight gain represents a simple energy surplus of under 10 calories per day (10 × 365 days = 3,650 calories and one pound of fat represents 3,500 calories). This simple surplus of under 10 calories per day is the equivalent of less than one teaspoon of sugar. Weight gain is clearly related to a decrease in physical activity and an increase in caloric intake. Physical inactivity, however, might very well be the primary cause leading to excessive weight and obesity. The human body was meant to be physically active and a minimal level of activity appears to be necessary to accurately balance caloric intake to caloric expenditure. In sedentary individuals, the body seems to lose control over this fine energy balance.

Most people understand that exercise enhances the rate of weight loss, enhances body composition, and is vital in maintaining the lost weight. Not only will exercise maintain lean tissue, but advocates of the setpoint theory say that exercise resets the fat thermostat to a new, lower level.

Most people who struggle with weight management need 60 to 90 minutes of daily physical activity to effectively manage body weight. While accumulating 30 minutes of moderate-intensity activity per day provides substantial health benefits (the minimum daily recommended amount of activity), from a weight management point of view, however, the Institute of Medicine of the National Academy of Sciences recommends that people accumulate 60 minutes of moderate-intensity physical activity most days of the week.23 The evidence shows that people who maintain recommended weight typically accumulate an hour or more of daily physical activity.

According to the American College of Sports Medicine position stand on strategies for weight loss and prevention of weight regain for adults (see Figure 5.8), greater weight loss is achieved by increasing the amount of weekly physical activity. Of even greater significance, physical activity is required for weight maintenance following weight loss. People who exercise regain less weight than those who do not. And those who exercise the most regain the least amount of weight. Individuals who remain physically active for 60 or more minutes per day are able to keep the weight off.

Further, data from the National Weight Control Registry (http://www.nwcr.ws) on more than 6,000 individuals who have lost at least 30 pounds and have kept them off for a minimum of five years indicates that they typically expend about 300 calories through daily moderate-intensity exercise.24 Three hundred calories represents about three miles jogging in 30 minutes or walking briskly the same distance in 60 minutes. Individuals who completely stop physical activity regain almost 100 percent of the weight within 18 months of discontinuing the weight loss program. Most of the successful “weight maintainers” also show greater dietary restraint and follow a low-fat diet, consuming less than 30 percent of the total daily calories from fat.

Most experts and leading organizations now recognize that if weight management is not a consideration, 30 minutes of daily activity five days per week provides substantial health benefits. To prevent weight gain, nonetheless, 60 minutes of daily activity is recommended; to maintain substantial weight loss, 90 minutes may be required.

The most important reason why physical activity and exercise are so vital for weight loss maintenance is because sedentary living expends no additional energy (calories) over the resting metabolic rate. With limited physical activity throughout the day, sedentary people cannot afford to eat very many calories, perhaps only 1,000 to 1,200 calories per day. And such a low level of energy intake is not sufficient to keep the person from constantly feeling hungry. The only choice they now have is to go hungry every day, an impossible task to

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**Figure 5.8** Approximate decrease in body weight based on total weekly minutes of physical activity without caloric restrictions.

<table>
<thead>
<tr>
<th>Weeks</th>
<th>Less than 150 min/week</th>
<th>Between 150 and 225 min/week</th>
<th>Between 225 and 420 min/week</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>15</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>12</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>


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Behavior Modification Planning

Physical Activity Guidelines for Weight Management

The following physical activity guidelines are recommended to effectively manage body weight:

- 30 minutes of physical activity on most days of the week if you do not have difficulty maintaining body weight (more minutes and/or higher intensity if you choose to reach a high level of physical fitness).
- Between 30 and 60 minutes of light-to-moderate exercise on most days of the week if you are trying to lose weight. Incorporate as many light ambulatory activities as possible during the course of each day.
- 60 minutes of daily activity if you want to prevent weight gain.
- Between 60 and 90 minutes each day if you want to keep weight off following extensive weight loss (30 pounds of weight loss or more). Be sure to include some high-intensity/low impact activities at least twice a week in your program.

Try It In your Behavior Change Planner Progress Tracker, Online Journal, or class notebook, record how many minutes of daily physical activity you accumulate on a regular basis and record your thoughts on how effectively your activity has helped you manage your body weight. Is there one thing you could do today to increase your physical activity?

Bebehavior Modification Planning

Weight Maintenance Benefits of a Lifetime Exercise Program

The authors of this book have been jogging together a minimum of 15 miles per week (3 miles/5 times per week) for the past 35 years. Without considering the additional energy expenditure from their regular strength-training program and their many other sport and recreational activities, the energy cost of this regular jogging program over 35 years has been approximately 2,730,000 calories (15 miles × 100 calories/mile × 52 weeks × 35 years) or the equivalent of 780 pounds of fat (2,730,000 ÷ 3,500).

In essence, without this 30-minute jogging workout 5 times per week, the authors would weigh 922 and 896 pounds respectively. Such is the long-term gratification (reward) of a lifetime exercise program—not to mention the myriad of health benefits, joy, and quality of life derived through this program.

Try It Ask yourself whether a regular aerobic exercise program is part of your long-term gratification and health enhancement program. If the answer is no, are you ready to change your behavior? Use the Behavior Change Planner to help you answer the question.

Although the increase in BMR through increased muscle mass is being debated in the literature and merits further research, data indicate that each additional pound of muscle tissue raises the BMR in the range of 6 to 35 calories per day. The latter figure is based on calculations that an increase of 3 to 3.5 pounds of lean tissue through strength training increased BMR by about 105 to 120 calories per day.

Most likely, the benefit of strength training goes beyond the new muscle tissue itself. Maybe a pound of muscle tissue requires only six calories per day to sustain itself, but as all muscles undergo strength training, they undergo increased protein synthesis to build and repair themselves, resulting in increased energy expenditure of 1 to 1.5 calories per pound in all trained muscle tissue. Such an increase would explain the 105- to 120-calorie BMR increase in this research study.

To examine the effects of a small increase in BMR on long-term body weight, let’s use a very conservative estimate of an additional 50 calories per day as a result of a regular strength-training program. An increase of 50 calories represents an additional 18,250 calories per
year (50 \times 365), or the equivalent of 5.2 pounds of fat (18,250 \div 3,500). This increase in BMR would more than offset the typical adult weight gain of one to two pounds per year.

This figure of 18,250 calories per year does not include the actual energy cost of the strength-training workout. If we use an energy expenditure of only 150 calories per strength-training session, done twice per week, over a year’s time it would represent 15,600 calories (150 \times 2 \times 52), or the equivalent of another 4.5 pounds of fat (15,600 \div 3,500).

In addition, although the amounts seem small, the previous calculations do not account for the increase in metabolic rate following the strength-training workout (the time it takes the body to return to its preworkout resting rate—about two hours). Depending on the training volume (see Chapter 7, page 237), this recovery energy expenditure ranges from 20 to 100 calories following each strength-training workout. All these “apparently small” changes make a big difference in the long run.

Although size (inches) and percent body fat both decrease when sedentary individuals begin an exercise program, body weight often remains the same or may even increase during the first couple of weeks of the program. Exercise helps to increase muscle tissue, connective tissue, blood volume (as much as 500 mL, or the equivalent of one pound, following the first week of aerobic exercise), enzymes and other structures within the cell, and glycogen (which binds water). All of these changes lead to a higher functional capacity of the human body. With exercise, most of the weight loss becomes apparent after a few weeks of training, when the lean component has stabilized.

We know that a negative caloric balance of 3,500 calories does not always result in a loss of exactly one pound of fat, but the role of exercise in achieving a negative balance by burning additional calories is significant in weight reduction and maintenance programs. Sadly, some individuals claim that the number of calories burned during exercise is hardly worth the effort. They think that cutting their daily intake by 300 calories is easier than participating in some sort of exercise that would burn the same amount of calories. The problem is that the willpower to cut those 300 calories lasts only a few weeks, and then the person goes back to the old eating patterns.

If a person gets into the habit of exercising regularly, say three times a week, jogging three miles per exercise session (about 300 calories burned), this represents 900 calories in one week, about 3,600 calories in one month, or 46,800 calories per year. This minimal amount of exercise represents as many as 13.5 extra pounds of fat in one year, 27 in two, and so on.

We tend to forget that our weight creeps up gradually over the years, not just overnight. Hardly worth the effort? And we have not even taken into consideration the increase in lean tissue, possible resetting of the setpoint, benefits to the cardiovascular system, and, most important, the improved quality of life. Fundamental reasons for excessive weight and obesity, few could argue, are sedentary living and lack of a regular exercise program.

In terms of preventing disease, many of the health benefits that people seek by losing weight are reaped through exercise alone, even without weight loss. Exercise offers protection against premature morbidity and mortality for everyone, including people who are overweight or already have risk factors for disease.

### The Role of Exercise Intensity and Duration in Weight Management

A hotly debated and controversial current topic is the exercise volume required for adequate weight management. Depending on the degree of the initial weight...
problem and the person’s fitness level, there appears to be a difference in the volume of exercise that is most conducive toward adequate weight loss, weight loss maintenance, and weight management.

We have known for years that compared with vigorous intensity, a greater proportion of calories burned during light-intensity exercise are derived from fat. The lower the intensity of exercise, the higher the percentage of fat utilization as an energy source. During light-intensity exercise, up to 50 percent of the calories burned may be derived from fat (the other 50 percent from glucose [carbohydrates]). With vigorous exercise, only 30 to 40 percent of the caloric expenditure comes from fat. Overall, however, you can burn twice as many calories during vigorous-intensity exercise and, subsequently, more fat as well.

Let’s look at a practical illustration (also see Table 5.2). If you exercised for 30 to 40 minutes at light intensity and burned 200 calories, about 100 of those calories (50 percent) would come from fat. If you exercised at a vigorous intensity during those same 30 to 40 minutes, you could burn 400 calories, with 120 to 160 of the calories (30 to 40 percent) coming from fat. Thus, even though it is true that the percentage of fat used is greater during light-intensity exercise, the overall amount of fat used is still less during light-intensity exercise. Plus, if you were to exercise at a light intensity, you would have to do so twice as long to burn the same amount of calories. Another benefit is that the metabolic rate remains at a slightly higher level longer after vigorous-intensity exercise, so you continue to burn a few extra calories following exercise.

The previous discussion does not mean that light-intensity exercise is ineffective. Light-intensity exercise provides substantial health benefits, including a decrease in premature morbidity among overweight individuals. Additionally, beginners are more willing to participate and stay with light-intensity programs. The risk of injury when starting out is quite low with this type of program. Light-intensity exercise does promote weight loss.

In terms of overall weight loss, there is controversy regarding the optimal exercise dose. Initial research indicated that vigorous-intensity exercise triggered more fat loss than light- to moderate-intensity exercise. Research conducted in the 1990s at Laval University in Quebec, Canada, using both men and women participants, showed that subjects who performed a high-intensity intermittent-training (HIIT) program lost more body fat than participants in a low- to moderate-intensity continuous aerobic endurance group. Even more surprisingly, this finding occurred despite the fact that the vigorous-intensity group burned fewer total calories per exercise session. The researchers concluded that the “results reinforce the notion that for a given level of energy expenditure, vigorous exercise favors negative energy and lipid balance to a greater extent than exercise of low- to moderate-intensity. Moreover, the metabolic adaptations taking place in the skeletal muscle in response to the HIIT program appear to favor the process of lipid oxidation.” If time constrains do not allow much time for exercise, to increase energy expenditure, a vigorous 20- to 30-minute exercise programs is recommended.

Recently, it has been suggested that when attempting to lose weight, particularly for women, lengthy exercise sessions may not be helpful because they actually trigger greater food consumption following exercise; whereas shorter exercise sessions do not lead to a greater caloric intake. Thus, some people think that the potential weight reduction effect of lengthy exercise sessions may be attenuated because people end up eating more food when they exercise.

A recent 2009 study had postmenopausal women exercise at 50 percent of their maximal aerobic capacity for about 20 minutes, 40 minutes, or 60 minutes three to four times per week. On average, the groups lost 3, 4.6, and, 3.3 pounds of weight, respectively. The data indicated that the 20- and 40-minute groups lost weight closely to what had been predicted, whereas the 60 minute group lost significantly less than predicted. The researchers concluded that 60 minutes of exercise led this group of women to compensate with greater food intake, possibly triggered by an increase in ghrelin levels. All three groups, nonetheless, exhibited a significant decrease in waist circumference, independent of total weight lost. Researchers theorize that the biological mechanism to maintain fat stores in women is stronger than in men.

On the other hand, a 2010 study of more than 34,000 women who were followed for 13 years, starting at an average age of 54, found that on average the

<table>
<thead>
<tr>
<th>Exercise Intensity</th>
<th>Total Energy Expenditure (Calories)</th>
<th>Percent Calories from Fat</th>
<th>Total Fat Calories</th>
<th>Percent Calories from CHO*</th>
<th>Total CHO Calories</th>
<th>Calories Burned per Minute</th>
<th>Calories per Pound per Minute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light Intensity</td>
<td>200</td>
<td>50%</td>
<td>100</td>
<td>50%</td>
<td>100</td>
<td>6.67</td>
<td>0.045</td>
</tr>
<tr>
<td>Moderate Intensity</td>
<td>280</td>
<td>40%</td>
<td>112</td>
<td>60%</td>
<td>168</td>
<td>9.45</td>
<td>0.063</td>
</tr>
<tr>
<td>Vigorous Intensity</td>
<td>400</td>
<td>30%</td>
<td>120</td>
<td>70%</td>
<td>280</td>
<td>13.50</td>
<td>0.090</td>
</tr>
</tbody>
</table>

*CHO = Carbohydrates
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Table 5.2
Comparison of Approximate Energy Expenditure Between 30–40 Minutes of Exercise at Three Different Intensity Levels
women gained six pounds of weight; but a small group of them who reported 60 minutes of almost daily exercise at a moderate intensity closely maintained their body weight. The exercise routine of the latter group was not something new to them, but rather exercise that they had been doing for years. While the best exercise dose for optimal weight loss may not be a precise science, the research is quite clear that regular exercise is the best predictor of long-term weight maintenance. The data also indicate that even as little as 80 weekly minutes of aerobic or strength training exercise prevents regain of the harmful visceral fat (also see page 130 in Chapter 4).

The take-home message from these studies is that when trying to lose weight, initial lengthy exercise sessions (longer than 60 minutes) may not be the best approach to weight loss, unless you carefully monitor daily caloric intake and avoid caloric compensation. The data show that people who carefully monitor caloric intake, instead of “guesstimating” energy intake, are by far more successful with weight loss.

Caloric compensation in response to extensive exercise in overweight individuals may be related to a low initial fitness level and the already low caloric intake. Overall, inactive people tend to eat fewer calories, and a lengthy exercise session may very well trigger a greater appetite due to the large negative caloric balance. Research confirms that energy deficit, and not exercise, is the most significant regulator of the hormonal responses seen in previously inactive individuals who begin an exercise program. In active/fit individuals, lengthy exercise sessions are not at all counterproductive. If such was the case, health clubs and jogging trails would be full of overweight and obese people.

New research is beginning to look into the role of increasing light-intensity ambulation (walking) and standing activities (doing some of the work on your feet instead of sitting the entire time) on weight loss. In essence, the individual will increase light-intensity physical activity throughout the day. Light-intensity activities do not seem to trigger the increase in ghrelin levels seen in previously inactive individuals who undertake long moderate- or vigorous-intensity exercise sessions. The difference in energy expenditure by increasing light-intensity activities throughout the day can represent several hundred calories. As you achieve a higher fitness level, you can combine light-intensity activities performed throughout the day with moderate- and/or vigorous-intensity exercise. A graphic illustration of such lifestyle patterns and the effects on the metabolic rate and overall energy expenditure is provided in Figure 5.9.

If you wish to engage in vigorous-intensity exercise to either maintain lost weight or for adequate weight management, a word of caution is in order: Be sure that it is medically safe for you to participate in such activities and that you build up gradually to that level. If you are cleared to participate in vigorous-intensity exercise, do not attempt to do too much too quickly, because you may incur injuries and become discouraged. You must allow your body a proper conditioning period of 8 to 12 weeks or even longer.

Also keep in mind that vigorous intensity does not mean high impact. High-impact activities are the most common cause of exercise-related injuries. Additional information on proper exercise prescription is presented in Chapter 6. And remember, when on a weight loss program, always carefully monitor your daily caloric intake to avoid food overconsumption.

**Healthy Weight Gain**

“Skinny” people, too, should realize that the only healthy way to gain weight is through exercise (mainly strength-training exercises) and a slight increase in caloric intake. Attempting to gain weight by overeating alone will raise the fat component and not the lean component—which is not the path to better health. Exercise is the best solution to weight (fat) reduction and weight (lean) gain alike.

A strength-training program such as explained in Chapter 7 is the best approach to add body weight. The training program should include at least two exercises of one to three sets for each major body part. Each set should consist of about 8 to 12 repetitions maximum.

Even though the metabolic cost of synthesizing a pound of muscle tissue is still unclear, consuming an estimated 500 additional calories per day is recommended to gain lean tissue. Your diet should include a daily total intake of about 1.5 grams of protein per kilogram of body weight. If your daily protein intake already exceeds 1.5 grams per day, the extra 500 calories should be primarily in the form of complex carbohydrates. The higher caloric intake must be accompanied by a strength-training program; otherwise, the increase in body weight will be in the form of fat, not muscle tissue (Activity 5.4 can be used to monitor your caloric intake for healthy weight gain). Additional information on nutrition to optimize muscle growth and strength development is provided in Chapter 7 in the section “Dietary Guidelines for Strength Development,” page 244.

**Weight Loss Myths**

Cellulite and spot reducing are mythical concepts. Cellulite is caused by the herniation of subcutaneous fat within fibrous connective tissue, giving it a padded-like appearance.

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### Key Terms

**Spot reducing** Fallacious theory proposing that exercising a specific body part will result in significant fat reduction in that area.

**Cellulite** Term frequently used in reference to fat deposits that “bulge out”; caused by the herniation of subcutaneous fat within fibrous connective tissue, giving it a padded-like appearance.
Doing several sets of daily sit-ups will not get rid of fat in the midsection of the body. When fat comes off, it does so throughout the entire body, not just the exercised area. The greatest proportion of fat may come off the biggest fat deposits, but the caloric output of a few sets of sit-ups has practically no effect on reducing total body fat. A person has to exercise much longer to see results.

Other touted means toward quick weight loss, such as rubberized sweat suits, steam baths, and mechanical vibrators, are misleading. When a person wears a sweat suit or steps into a sauna, the weight lost is not fat but merely a significant amount of water. Sure, it looks nice when you step on the scale immediately afterward, but this represents a false loss of weight. As soon as you replace body fluids, you gain back the weight quickly.

Wearing rubberized sweat suits hastens the rate of body fluid that is lost—fluid that is vital during prolonged exercise—and raises core temperature at the same time. This combination puts a person in danger of dehydration, which impairs cellular function and, in extreme cases, can even cause death.

Similarly, mechanical vibrators are worthless in a weight-control program. Vibrating belts and turning rollers may feel good, but they require no effort whatsoever. Fat cannot be shaken off. It is lost primarily by burning it in muscle tissue.
Losing Weight the Sound and Sensible Way

Dieting never has been fun and never will be. People who are overweight and are serious about losing weight, however, have to include regular physical activity and exercise in their lives, along with proper food management and a sensible reduction in caloric intake.

Because excessive body fat is a risk factor for cardiovascular disease, some precautions are in order. Depending on the extent of the weight problem, a medical examination may be a good idea before undertaking the exercise program. Consult a physician in this regard.

Significantly overweight individuals need to choose activities in which they will not have to support their own body weight but that still will be effective in burning calories. Injuries to joints and muscles are common in excessively overweight individuals who participate in weight-bearing exercises such as walking, jogging, and aerobics.

Swimming may not be a good weight loss exercise modality for some people. More body fat makes a person more buoyant, and many people are not at the skill level required to swim fast enough to get a good training effect, thus limiting the number of calories burned as well as the benefits to the cardiorespiratory system. During the initial stages of exercise, better alternatives include riding a bicycle (either road or stationary), walking in a shallow pool, doing water aerobics, or running in place in deep water (treading water). The latter forms of water exercise aid with weight loss without fear of injuries.

How long should each exercise session last? The amount of exercise needed to lose weight and maintain the weight loss is different from the amount of exercise needed to improve fitness. For health fitness, accumulating 30 minutes of physical activity a minimum of five days per week is recommended. To develop and maintain cardiorespiratory fitness, 20 to 60 minutes of vigorous-intensity exercise, three to five times per week, is suggested (see Chapter 6). For successful weight loss, however, 30 to 60 minutes of light to moderate exercise on most days of the week are recommended. Additional light-intensity ambulation and standing throughout the day are also strongly encouraged. To maintain substantial weight loss, 60 to 90 minutes of physical activity on a nearly daily basis is recommended.

A person should not try to do too much too fast. Unconditioned beginners should start with about 15 minutes of aerobic exercise three times a week, and during the next 3 to 4 weeks gradually increase the duration by approximately 5 minutes per week and the frequency by one day per week.

In addition to exercise and food management, a sensible reduction in caloric intake and careful monitoring of this intake are recommended. Research indicates that a negative caloric balance is required to lose weight because:

1. People tend to underestimate their caloric intake and are eating more than they should be eating.
2. Developing new behaviors takes time, and most people have trouble changing and adjusting to new eating habits.
3. Many individuals are in such poor physical condition that they take a long time to increase their activity level enough to offset the setpoint and burn enough calories to aid in losing body fat.
4. Most successful dieters carefully monitor their daily caloric intake.
5. A few people simply will not alter their food selection. For those who will not (which will increase their risk for chronic diseases), the only solution to lose weight successfully is a large increase in physical activity, a negative caloric balance, or a combination of the two.

Perhaps the only exception to a decrease in caloric intake for weight loss purposes is in people who already are eating too few calories. A nutrient analysis (see Chapter 3) often reveals that long-term dieters are not consuming enough calories. These people actually need to increase their daily caloric intake and combine it with an exercise program to get their metabolism to kick back up to a normal level.

You also must learn to make wise food choices. Think in terms of long-term benefits (weight management) instead of instant gratification (unhealthy eating and subsequent weight gain). Making healthful choices allows you to eat more food, eat more nutritious food, and in-
gest fewer calories. For example, instead of eating a high-fat, 700-calorie scone, you could eat as much as one orange, one cup of grapes, a hard-boiled egg, two slices of whole-wheat toast, two teaspoons of jam, one-half cup of honey-sweetened oatmeal, and one glass of skim milk (see Figure 5.10).

You can estimate your daily energy (caloric) requirement by consulting Tables 5.3 and 5.4 and completing Activity 5.1. Given that this is only an estimated value, individual adjustments related to many of the factors discussed in this chapter may be necessary to establish a more precise value. Nevertheless, the estimated value does offer beginning guidelines for weight control or reduction.

The EER without additional planned activity and exercise is based on age, total body weight, height, and gender. Individuals who hold jobs that require a lot of walking or heavy manual labor burn more calories during
the day than those who have sedentary jobs (such as working behind a desk). To estimate your EER, refer to Table 5.3. For example, the EER computation for a 20-year-old man, 71 inches tall, who weighs 160 pounds, would be as follows:

1. Body weight (BW) in kilograms = 72.6 kg 
   
   (160 lb ÷ 2.2046) 
   
   Height (Ht) in meters = 1.8 m (71 × 0.0254) 
   
2. EER = 662 − (9.53 × Age) + (15.91 × BW) + (539 × Ht) 
   
   EER = 662 − (9.53 × 20) + (15.91 × 72.6) + (539 × 1.8) 
   
   EER = 662 − 190.6 + 1155 + 970 
   
   EER = 2,596 calories/day 
   
Thus, the EER to maintain body weight for this individual would be 2,596 calories per day.

To determine the average number of calories you burn daily as a result of exercise, figure out the total number of minutes you exercise weekly, then figure the daily average exercise time. For instance, a person cycling at 10 miles per hour five times a week, 60 minutes each time, exercises 300 minutes per week (5 × 60). The average daily exercise time, therefore, is 42 minutes (300 ÷ 7, rounded off to the lowest unit).

Next, from Table 5.4, find the energy expenditure for the activity (or activities) chosen for the exercise program. In the case of cycling (10 miles per hour), the expenditure is .05 calories per pound of body weight per minute of activity (cal/lb/min). With a body weight of 160 pounds, this man would burn eight calories each minute (body weight × .05, or 160 × .05). In 42 minutes he would burn approximately 336 calories (42 × 8).

Now you can obtain the daily energy requirement, with exercise, needed to maintain body weight. To do this, add the EER obtained from Table 5.3 and the average calories burned through exercise. In our example, it is 2,932 calories (2,596 + 336).

If a negative caloric balance is recommended to lose weight, this person has to consume fewer than 2,932 calories daily to achieve the objective. Because of the many factors that play a role in weight control, this 2,932-calorie value is only an estimated daily requirement. Furthermore, we cannot predict that you will lose exactly one pound of fat in one week if you cut your daily intake by 500 calories (500 × 7 = 3,500 calories, or the equivalent of one pound of fat).

The daily energy requirement figure is only a target guideline for weight control. Periodic readjustments are necessary because individuals differ, and the daily re-

---

### Table 5.3 Estimated Energy Requirement (EER) Based on Age, Body Weight, and Height

<table>
<thead>
<tr>
<th>Sex</th>
<th>EER Formula</th>
</tr>
</thead>
<tbody>
<tr>
<td>Men</td>
<td>EER = 662 − (9.53 × Age) + (15.91 × BW) + (539 × Ht)</td>
</tr>
<tr>
<td>Women</td>
<td>EER = 354 − (6.91 × Age) + (9.36 × BW) + (726 × Ht)</td>
</tr>
</tbody>
</table>

**Note:** Includes activities of independent living only and no moderate physical activity or exercise.

BW = body weight in kilograms (divide BW in pounds by 2.2046),

Ht = height in meters (multiply Ht in inches by 0.0254).

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### Table 5.4 Caloric Expenditure of Selected Physical Activities

<table>
<thead>
<tr>
<th>Activity*</th>
<th>Cal/lb/min</th>
<th>Activity*</th>
<th>Cal/lb/min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobics</td>
<td></td>
<td>Running (on a level surface)</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>0.065</td>
<td>8.5 min/mile</td>
<td>0.090</td>
</tr>
<tr>
<td>Vigorous</td>
<td>0.095</td>
<td>7.0 min/mile</td>
<td>0.102</td>
</tr>
<tr>
<td>Step aerobics</td>
<td>0.070</td>
<td>6.0 min/mile</td>
<td>0.114</td>
</tr>
<tr>
<td>Archery</td>
<td>0.030</td>
<td>Deep water**</td>
<td>0.100</td>
</tr>
<tr>
<td>Badminton</td>
<td></td>
<td>Skating (moderate)</td>
<td>0.038</td>
</tr>
<tr>
<td>Recreation</td>
<td>0.038</td>
<td>Skiing</td>
<td>0.060</td>
</tr>
<tr>
<td>Competition</td>
<td>0.065</td>
<td>Downhill</td>
<td>0.060</td>
</tr>
<tr>
<td>Baseball</td>
<td>0.031</td>
<td>Level (5 mph)</td>
<td>0.078</td>
</tr>
<tr>
<td>Basketball</td>
<td>0.033</td>
<td>Soccer</td>
<td>0.059</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.046</td>
<td>Stairmaster</td>
<td>0.070</td>
</tr>
<tr>
<td>Competition</td>
<td>0.063</td>
<td></td>
<td>0.070</td>
</tr>
<tr>
<td>Bowling</td>
<td>0.030</td>
<td>Vigorous</td>
<td>0.090</td>
</tr>
<tr>
<td>Calisthenics</td>
<td>0.033</td>
<td>Stationary Cycling</td>
<td>0.055</td>
</tr>
<tr>
<td>Cycling (on a level surface)</td>
<td>0.033</td>
<td>Vigorous</td>
<td>0.070</td>
</tr>
<tr>
<td>5.5 mph</td>
<td>0.033</td>
<td>Strength Training</td>
<td>0.050</td>
</tr>
<tr>
<td>10.0 mph</td>
<td>0.050</td>
<td>Swimming (crawl)</td>
<td>0.071</td>
</tr>
<tr>
<td>13.0 mph</td>
<td>0.071</td>
<td></td>
<td>0.071</td>
</tr>
<tr>
<td>Dance</td>
<td></td>
<td></td>
<td>0.050</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.030</td>
<td>25 yds/min</td>
<td>0.040</td>
</tr>
<tr>
<td>Vigorous</td>
<td>0.055</td>
<td>45 yds/min</td>
<td>0.057</td>
</tr>
<tr>
<td>Golf</td>
<td>0.030</td>
<td>50 yds/min</td>
<td>0.070</td>
</tr>
<tr>
<td>Gymnastics</td>
<td>0.033</td>
<td>Table Tennis</td>
<td>0.030</td>
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<tr>
<td>Light</td>
<td>0.030</td>
<td>Tennis</td>
<td>0.090</td>
</tr>
<tr>
<td>Heavy</td>
<td>0.056</td>
<td>Moderate</td>
<td>0.045</td>
</tr>
<tr>
<td>Handball</td>
<td>0.064</td>
<td>Competition</td>
<td>0.064</td>
</tr>
<tr>
<td>Hiking</td>
<td>0.040</td>
<td>Volleyball</td>
<td>0.030</td>
</tr>
<tr>
<td>Judo/Karate</td>
<td>0.086</td>
<td>Walking</td>
<td>0.045</td>
</tr>
<tr>
<td>Racquetball</td>
<td>0.065</td>
<td>4.5 mph</td>
<td>0.045</td>
</tr>
<tr>
<td>Rope Jumping</td>
<td>0.060</td>
<td>Shallow pool</td>
<td>0.090</td>
</tr>
<tr>
<td>Rowing (vigorous)</td>
<td>0.090</td>
<td>Water Aerobics</td>
<td>0.090</td>
</tr>
<tr>
<td>Running (on a level surface)</td>
<td>0.070</td>
<td>Vigorous</td>
<td>0.070</td>
</tr>
<tr>
<td>Moderate</td>
<td>0.050</td>
<td>Wrestling</td>
<td>0.085</td>
</tr>
</tbody>
</table>

*Values are for actual time engaged in the activity.

**Treading water.

Adapted from:


C. A. Bucher and W. E. Prentice, *Fitness for College and Life* (St. Louis: Times Mirror/Mosby College Publishing, 1989);


R. V. Hockey, *Physical Fitness: The Pathway to Healthful Living* (St. Louis: Times Mirror/Mosby College Publishing, 1989);

requirement changes as you lose weight and modify your exercise habits.

To determine the target caloric intake to lose weight, multiply your current weight by 5 and subtract this amount from the total daily energy requirement (2,932 in our example) with exercise. For our example, this would mean 2,132 calories per day to lose weight (160 × 5 = 800 and 2,932 − 800 = 2,132 calories).

This final caloric intake to lose weight should not be below 1,500 daily calories for most people. If distributed properly over the various food groups, 1,500 calories appears to be the lowest caloric intake that still provides the necessary nutrients the body needs. A multivitamin complex is recommended for diets that call for less than 1,500 calories. In terms of percentages of total calories, the daily distribution should be approximately 60 percent carbohydrates (mostly complex carbohydrates), less than 30 percent fat, and about 12 percent protein.

Many experts believe that a person can take off fat intake to about 20 percent of the total daily caloric intake. Because 1 gram of fat supplies more than twice the amount of calories that carbohydrates and protein do, the tendency when someone eats less fat is to consume fewer calories. With fat intake at 20 percent of total calories, the individual will have sufficient fat in the diet to feel satisfied and avoid frequent hunger pangs.

Further, it takes only three to five percent of ingested calories to store fat as fat, whereas it takes approximately 25 percent of ingested calories to convert carbohydrates to fat. Some evidence indicates that if people eat the same number of calories as carbohydrate or as fat, those on the fat diet will store more fat. Long-term successful weight loss and weight management programs are low in fat content.

Many people have trouble adhering to a low fat calorie diet. During times of weight loss, however, you are strongly encouraged to do so. Refer to Table 5.5 to aid you in determining the grams of fat at 20 percent of the total calories for selected energy intakes. Also, use the form provided in Activity 3.2 (Chapter 3, page 90) to monitor your daily fat intake. For weight maintenance, individuals who have been successful in maintaining an average weight loss of 30 pounds for more than six years are consuming about 24 percent of calories from fat, 56 percent from carbohydrates, and 20 percent from protein.

Breakfast is a critical meal while on a weight loss program. Many people skip breakfast because it’s the easiest meal to skip. Evidence indicates that people who skip breakfast are hungrier later in the day and end up con-

### Behavior Modification Planning

#### Healthy Breakfast Choices

Breakfast is the most important meal of the day. Skipping breakfast makes you hungrier later in the day and leads to overconsumption and greater caloric intake throughout the rest of the day. Regular breakfast eaters have less of a weight problem, lose weight more effectively, have less difficulty maintaining lost weight, and live longer. Skipping breakfast also temporarily raises LDL (bad) cholesterol and lowers insulin sensitivity, changes that may increase the risk for heart disease and diabetes. Here are some healthy breakfast food choices:

- Fresh fruit
- Low-fat or skim milk
- Low-fat yogurt
- Whole-grain cereal
- Whole-grain bread or bagel with fat-free cream cheese and slices of red or green pepper
- Hummus over a whole-grain bagel
- Peanut butter with whole-grain bread or bagel
- Low-fat cottage cheese with fruit
- Oatmeal
- Reduced-fat cheese
- Egg Beaters with salsa
- An occasional egg

**Try It** Select a healthy breakfast choice each day for the next 7 days. Evaluate how you feel the rest of the morning. What effect did eating breakfast have on your activities of daily living and daily caloric intake? Be sure to record your food choices, how you felt, and what activities you engaged in.

---

**Table 5.5** Grams of Fat at 10%, 20%, and 30% of Total Calories for Selected Energy Intakes

<table>
<thead>
<tr>
<th>Caloric Intake</th>
<th>10%</th>
<th>20%</th>
<th>30%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,200</td>
<td>13</td>
<td>27</td>
<td>40</td>
</tr>
<tr>
<td>1,300</td>
<td>14</td>
<td>29</td>
<td>43</td>
</tr>
<tr>
<td>1,400</td>
<td>16</td>
<td>31</td>
<td>47</td>
</tr>
<tr>
<td>1,500</td>
<td>17</td>
<td>33</td>
<td>50</td>
</tr>
<tr>
<td>1,600</td>
<td>18</td>
<td>36</td>
<td>53</td>
</tr>
<tr>
<td>1,700</td>
<td>19</td>
<td>38</td>
<td>57</td>
</tr>
<tr>
<td>1,800</td>
<td>20</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>1,900</td>
<td>21</td>
<td>42</td>
<td>63</td>
</tr>
<tr>
<td>2,000</td>
<td>22</td>
<td>44</td>
<td>67</td>
</tr>
<tr>
<td>2,100</td>
<td>23</td>
<td>47</td>
<td>70</td>
</tr>
<tr>
<td>2,200</td>
<td>24</td>
<td>49</td>
<td>73</td>
</tr>
<tr>
<td>2,300</td>
<td>26</td>
<td>51</td>
<td>77</td>
</tr>
<tr>
<td>2,400</td>
<td>27</td>
<td>53</td>
<td>80</td>
</tr>
<tr>
<td>2,500</td>
<td>28</td>
<td>56</td>
<td>83</td>
</tr>
<tr>
<td>2,600</td>
<td>29</td>
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<td>87</td>
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<td>2,700</td>
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<td>60</td>
<td>90</td>
</tr>
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<td>2,800</td>
<td>31</td>
<td>62</td>
<td>93</td>
</tr>
<tr>
<td>2,900</td>
<td>32</td>
<td>64</td>
<td>97</td>
</tr>
<tr>
<td>3,000</td>
<td>33</td>
<td>67</td>
<td>100</td>
</tr>
</tbody>
</table>
Monitoring Your Diet with Daily Food Logs

To help you monitor and adhere to a weight loss program, use the daily food logs provided in Activity 5.3. If the goal is to maintain or increase body weight, use Activity 5.4.

Evidence indicates that people who monitor daily caloric intake are more successful at weight loss than those who don’t self-monitor. Before using the forms in Activity 5.3, make a master copy for your files so you can make future copies as needed. Guidelines are provided for 1,200-, 1,500-, 1,800-, and 2,000-calorie diet plans. These plans have been developed based on the MyPlate and the Dietary Guidelines for Americans to meet the Recommended Dietary Allowances. The objective is to meet (not exceed) the number of servings allowed for each diet plan. Each time you eat a serving of a certain food, record it in the appropriate box.

To lose weight, you should use the diet plan that most closely approximates your target caloric intake. The plan is based on the following caloric allowances for these food groups:

- Grains: 80 calories per serving.
- Fruits: 60 calories per serving.
- Vegetables: 25 calories per serving.
- Dairy (use low-fat products): 120 calories per serving.
- Protein: Use low-fat (300 calories per serving) frozen entrees or an equivalent amount if you prepare your own main dish (see the following discussion).

As you start your diet plan, pay particular attention to food serving sizes. Take care with cup and glass sizes. A standard cup is 8 ounces, but most glasses nowadays contain between 12 and 16 ounces. If you drink 12 ounces of fruit juice, in essence you are getting two servings of fruit because a standard serving is three-fourths cup of juice.

Read food labels carefully to compare the caloric value of the serving listed on the label with the caloric guidelines provided above. Here are some examples:

- One slice of standard whole-wheat bread has about 80 calories. A plain bagel may have 200 to 350 calories. Although it is low in fat, a 350-calorie bagel is equivalent to almost four servings in the grains group.
- The standard serving size listed on the food label for most cereals is one cup. As you read the nutrition information, however, you will find that for the same cup of cereal, one type of cereal has 120 calories and another cereal has 200 calories. Because a standard serving in the grains group is 80 calories, the first cereal would be 1.5 servings and the second one 2.5 servings.
- A medium-size fruit is usually considered to be one serving. A large fruit provides more than one serving.
- In the dairy group, one serving represents 120 calories. A cup of whole milk has about 160 calories, compared with a cup of skim milk, which contains 88 calories. A cup of whole milk, therefore, would provide 1.33 servings in this food group.

Low-Fat Entrees

To be more accurate with caloric intake and to simplify meal preparation, use commercially prepared low-fat frozen entrees as the main dish for lunch and dinner meals (only one entree per meal for the 1,200-calorie diet plan; see Activity 5.3). Look for entrees that provide about 300 calories and no more than six grams of fat per entree. These two entrees can be used as selections for the protein group and will provide most of your daily requirement. Along with each entree, supplement the meal with some of your servings from the other food groups. This diet plan has been used successfully in weight loss research programs. If you choose not to use these low-fat entrees, prepare a similar meal using three ounces (cooked) of lean meat, poultry, or fish with additional vegetables, rice, or pasta that will provide 300 calories with fewer than six grams of fat per dish.

In your daily logs, be sure to record the precise amount in each serving. You also can run a computerized nutrient analysis to verify your caloric intake and...
Computing Your Daily Caloric Requirement

A. Current body weight (BW) in kilograms (body weight in pounds ÷ 2.2046) .................................................................
B. Current height (HT) in meters (HT in inches ÷ 0.0254) ........................................................................................................
C. Estimated energy requirement (EER) (Table 5.3, page 167)
   Men: EER = 663 – (9.53 × Age) + (15.91 × BW) + (539.6 × HT)
   Women: EER = 354 – (6.91 × Age) + (9.36 × BW) + (726 × HT)

D. Selected physical activity (e.g., jogging)

E. Number of exercise sessions per week ...........................................
F. Duration of exercise session (in minutes) ...........................................
G. Total weekly exercise time in minutes (E × F) ..................................
H. Average daily exercise time in minutes (G ÷ 7) ..............................
I. Caloric expenditure per pound per minute (cal/lb/min) of physical activity (use Table 5.4, page 167) .................................
J. Body weight in pounds ..................................................................
K. Total calories burned per minute of physical activity (I × J) ..........
L. Average daily calories burned as a result of the exercise program (H × K) .................................................................
M. Total daily energy requirement with exercise to maintain body weight (C + L) ...........................................................

Stop here if no weight loss is required; otherwise proceed to items N and O.

N. Number of calories to subtract from daily requirement to achieve a negative caloric balance (J × 5) .................................
O. Target caloric intake to lose weight (M – N) ≥ ................................

If more than one physical activity is selected, you will need to estimate the average daily calories burned as a result of each additional activity (steps D through L) and add all of these figures to M above.

This figure should never be fewer than 1,200 calories for small women or 1,500 calories for everyone else. See Activity 5.3 for the 1,200, 1,500, 1,800, and 2,000 calorie diet plans.
Weight Loss Behavior Modification Plan

Name: _________________________________ Date: _______________

Course: ___________________ Section: ___________ Gender: _______ Age: _______

1. Using Figure 2.5 (page 61) and Table 2.3 (page 60), identify your current stage of change regarding recommended body weight:

   Is it a realistic goal?

2. How much weight do you want to lose? ______ Is it a realistic goal? ______

3. Target caloric intake to lose weight (diet plan—see Activity 5.1, item O)

4. Based on the processes and techniques of change discussed in Chapter 2, indicate what you can do to help yourself implement a weight management program.

5. How much effort are you willing to put into reaching your weight loss goal?

   Indicate your feelings about participating in an exercise program.

6. Will you commit to participate in a combined aerobic and strength-training program?* Yes ______ No ______

   If your answer is “Yes,” proceed to the next question; if you answered “No,” please review Chapters 3–5 again and read Chapters 6–9.

7. Select one or two aerobic activities in which you will participate regularly.

   List facilities available to you where you can carry out the aerobic and strength-training programs.

8. Indicate days and times you will set aside for your aerobic and strength-training programs (5 or 6 days per week should be devoted to aerobic exercise and 1 to 3 nonconsecutive days per week to strength training).

   Monday: ________________________
   Tuesday: ________________________
   Wednesday: ________________________
   Thursday: ________________________
   Friday: ________________________
   Saturday: ________________________
   Sunday:  A complete day of rest once a week is recommended to allow your body to fully recover from exercise.

   Behavior Modification

   Briefly describe whether you think you can meet the goals of your aerobic and strength-training programs. What obstacles will you have to overcome, and how will you overcome them?

*Flexibility programs are necessary for adequate fitness, possible injury prevention, and good health but do not help with weight loss. Stretching exercises can be conducted regularly during the cool-down phase of your aerobic and strength-training programs (see Chapter 8).
Behavior Modification Planning

Weight Loss Strategies

1. **Make a commitment to change.** The first necessary ingredient is the desire to modify your behavior. You have to stop precontemplating or contemplating change and get going! You must accept that you have a problem and decide by yourself whether you really want to change. Sincere commitment increases your chances for success.

2. **Set realistic goals.** The weight problem developed over several years. Similarly, new lifetime eating and exercise habits take time to develop. A realistic long-term goal also will include short-term objectives that allow for regular evaluation and help maintain motivation and renewed commitment to attain the long-term goal.

3. **Weigh yourself regularly,** preferably at the same time of day and under the same conditions. Do not adapt and accept a higher body weight as a new stable weight. Make dietary and physical activity adjustments accordingly.

4. **Incorporate exercise into the program.** Choosing enjoyable activities, places, times, equipment, and people to work out with will help you adhere to an exercise program. (See Chapters 6–9.)

5. **Differentiate hunger and appetite.** Hunger is the actual physical need for food. Appetite is a desire for food, usually triggered by factors such as stress, habit, boredom, depression, availability of food, or just the thought of food itself. Developing and sticking to a regular meal pattern will help control hunger.

6. **Eat less fat.** Each gram of fat provides 9 calories, and protein and carbohydrates provide only 4. In essence, you can eat more food on a low-fat diet because you consume fewer calories with each meal. Most of your fat intake should come from unsaturated sources.

7. **Pay attention to calories.** Just because food is labeled “low-fat” does not mean you can eat as much as you want. When reading food labels—and when eating—don’t just look at the fat content. Pay attention to calories as well. Many low-fat foods are high in calories.

8. **Cut unnecessary items from your diet.** Substituting water for a daily can of soda would cut 51,100 (140 × 365) calories yearly from the diet—the equivalent of 14.6 (51,000 ÷ 3,500) pounds of fat.

9. **Maintain a daily intake of calcium-rich foods, especially low-fat or non-fat dairy products.**

10. **Add foods to your diet that reduce cravings,** such as eggs; small amounts of red meat, fish, poultry, tofu, oils, fats; and nonstarchy vegetables such as lettuce, green beans, peppers, asparagus, broccoli, mushrooms, and Brussels sprouts. Also increasing the intake of low-glycemic carbohydrates with your meals helps you go longer before you feel hungry again.

11. **Avoid automatic eating.** Many people associate certain daily activities with eating, for example, cooking, watching television, or reading. Most foods consumed in these situations lack nutritional value or are high in sugar and fat.

12. **Stay busy.** People tend to eat more when they sit around and do nothing. Occupying the mind and body with activities not associated with eating helps take away the desire to eat. Some options are walking; cycling; playing sports; gardening; sewing; or visiting a library, a museum, or a park. You also might develop other skills and interests not associated with food.

13. **Plan meals and shop sensibly.** Always shop on a full stomach, because hungry shoppers tend to buy unhealthy foods impulsively—and then snack on the way home. Always use a shopping list, which should include whole-grain breads and cereals, fruits and vegetables, low-fat milk and dairy products, lean meats, fish, and poultry.

14. **Cook wisely:**
   - Use less fat and fewer refined foods in food preparation.
   - Trim all visible fat from meats and remove skin from poultry before cooking.
   - Skim the fat off gravies and soups.
   - Bake, broil, boil, or steam instead of frying.
   - Sparingly use butter, cream, mayonnaise, and salad dressings.
   - Avoid coconut oil, palm oil, and cocoa butter.
   - Prepare plenty of foods that contain fiber.

**Effect of Food Choices on Long-Term Weight Gain**

Although still in its infancy, research published in 2011 on more than 120,000 people who were evaluated every four years over a 20-year period showed that food choices have a significant effect on weight gain.\(^{34}\) On average, study participants gained 17 pounds over the course of 20 years. Regardless of other lifestyle habits, individuals who consumed unhealthy foods gained the most weight, whereas those who made healthy food choices gained the least amount of weight. Although more research is needed, in this study, four-year weight change was most strongly associated with the consumption of potato chips, potatoes, sugar-sweetened beverages, unprocessed and processed red meats and inversely associated with the consumption of vegetables, whole grains, fruits, nuts, and yogurt. The take-home message: Consume more fruits, vegetables, whole grains,
• Include whole-grain breads and cereals, vegetables, and legumes in most meals.
• Eat fruits for dessert.
• Stay away from soda pop, fruit juices, and fruit-flavored drinks.
• Use less sugar, and cut down on other refined carbohydrates, such as corn syrup, malt sugar, dextrose, and fructose.
• Drink plenty of water—at least six glasses a day.

15. Do not serve more food than you should eat. Measure the food in portions and keep serving dishes away from the table. Do not force yourself or anyone else to “clean the plate” after they are satisfied (including children after they already have had a healthy, nutritious serving).

16. Try “junior size” instead of “super size.” People who are served larger portions eat more, whether they are hungry or not. Use smaller plates, bowls, cups, and glasses. Try eating half as much food as you commonly eat. Watch for portion sizes at restaurants as well: Supersized foods create supersized people.

17. Eat out infrequently. The more often people eat out, the more body fat they have. People who eat out six or more times per week consume an average of about 300 extra calories per day and 30 percent more fat than those who eat out less often.

18. Eat slowly and at the table only. Eating on the run promotes overeating because the body doesn’t have enough time to “register” consumption and people overeat before the body perceives the fullness signal. Eating at the table encourages people to take time out to eat and deters snacking between meals. After eating, do not sit around the table but, rather, clean up and put away the food to avoid snacking.

19. Avoid social binges. Social gatherings tend to entice self-defeating behavior. Use visual imagery to plan ahead. Do not feel pressured to eat or drink and don’t rationalize in these situations. Choose low-calorie foods and entertain yourself with other activities, such as dancing and talking.

20. Do not place unhealthy foods within easy reach. Ideally, avoid bringing high-calorie, high-sugar, or high-fat foods into the house. If they are there already, store them where they are hard to get to or see—perhaps the garage or basement.

21. Avoid evening food raids. Most people do really well during the day but then “lose it” at night. Take control. Stop and think. To avoid excessive nighttime snacking, stay busy after your evening meal. Go for a short walk; floss and brush your teeth, and get to bed earlier. Even better, close the kitchen after dinner and try not to eat anything 3 hours prior to going to sleep.

22. Practice stress management techniques (discussed in Chapter 12). Many people snack and increase their food consumption in stressful situations.

23. Get support. People who receive support from friends, relatives, and formal support groups are much more likely to lose and maintain weight loss than those without such support. The more support you receive, the better off you will be.

24. Monitor changes and reward accomplishments. Being able to exercise without interruption for 15, 20, 30, or 60 minutes; swimming a certain distance; running a mile—all these accomplishments deserve recognition. Create rewards that are not related to eating: new clothing, a tennis racket, a bicycle, exercise shoes, or something else that is special and you would not have acquired otherwise.

25. Prepare for slip-ups. Most people will slip and occasionally splurge. Do not despair and give up. Reevaluate and continue with your efforts. An occasional slip won’t make much difference in the long run.

26. Think positive. Avoid negative thoughts about how difficult changing past behaviors might be. Instead, think of the benefits you will reap, such as feeling, looking, and functioning better, plus enjoying better health and improving the quality of life. Avoid negative environments and unsupportive people.

Try It In your Online Journal or class notebook, answer the following questions: How many of the above strategies do you use to help you maintain recommended body weight? Do you feel that any of these strategies specifically help you manage body weight more effectively? If so, explain why.

Behavior Modification and Adherence to a Weight Management Program

Achieving and maintaining recommended body composition is certainly possible, but it does require desire and commitment. If weight management is to become a priority, people must realize that they have to transform their behavior to some extent.

Modifying old habits and developing new, positive behaviors takes time. Individuals who apply the management techniques provided in the Behavior Modification Planning box (pages 172–173) are more successful at changing detrimental behavior and adhering to a positive lifetime weight-control program. In developing a retraining program, you are not expected to incorporate all of the strategies given but should note the ones that apply to you. The form provided in Activity 5.5 will allow you to evaluate and monitor your own weight-management behaviors.
In the study, the social ties of more than 12,000 were examined over 32 years. The findings revealed that if a close friend becomes obese, your risk of becoming obese during the next two to four years increases 171 percent. The risk also increases 57 percent for casual friends, 40 percent for siblings, and 37 percent for the person’s spouse. The reverse was also found to be true. When a person loses weight, the likelihood of friends, siblings, or spouse to lose weight is also enhanced.

Furthermore, the research found that gender plays a role in social networks. A male’s weight has a greater effect on the weight of male friends and brothers than on female friends or sisters. Similarly, a woman’s weight has a far greater influence on sisters and girlfriends than on brothers or male friends. Thus, if you are trying to lose weight, choose your friendships carefully: Do not surround yourself with people who either have a weight problem or are still gaining weight.

The Simple Truth

There is no quick and easy way to take off excess body fat and keep it off for good. Weight management is accomplished by making a lifetime commitment to physical activity and proper food selection. When taking part in a weight (fat) reduction program, people also have to decrease their caloric intake moderately, use portion control, be physically active, and implement strategies to modify unhealthy eating behaviors.

During the process, relapses into past negative behaviors are almost inevitable. The three most common reasons for relapse are:

1. Stress-related factors (such as major life changes, depression, job changes, illness)
2. Social reasons (entertaining, eating out, business travel)
3. Self-enticing behaviors (placing yourself in a situation to see how much you can get away with: “One small taste won’t hurt” leads to “I’ll eat just one slice” and finally to “I haven’t done well, so I might as well eat some more”).

Making mistakes is human and does not necessarily mean failure. Failure comes to those who give up and do not build on previous experiences and thereby develop skills that will prevent self-defeating behaviors in the future. Where there’s a will, there’s a way, and those who persist will reap the rewards.
Daily Food Intake Record: 1,200 Calorie Diet Plan

Name: ____________________________ Date: ______________

Course: __________________________ Section: ______________ Gender: ________ Age: ________

**Instructions:**
The objective of the diet plan is to meet (not exceed) the number of servings allowed for the food groups listed. Each time you eat a specific food, record it in the space provided for each group, along with the amount you ate. Refer to the number of calories below to find out what counts as one serving for each group listed. Instead of the meat and beans group, you are allowed to have a commercially available low-fat frozen entree for your main meal (this entree should provide no more than 300 calories and fewer than 6 grams of fat). You can make additional copies of this form as needed.

<table>
<thead>
<tr>
<th>Grains (80 calories/serving): 6 servings</th>
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<th>Vegetables (25 calories/serving): 3 servings</th>
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<tr>
<th>Fruits (60 calories/serving): 2 servings</th>
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<thead>
<tr>
<th>Dairy (120 calories/serving, use low-fat milk and milk products): 2 servings</th>
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<tbody>
<tr>
<td>1</td>
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<table>
<thead>
<tr>
<th>Low-Fat Frozen Entree (300 calories and fewer than 6 grams of fat): 1 serving</th>
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<td>1</td>
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</table>

Today’s physical activity: __________________________ Intensity: ________ Duration: ________ min Number of steps: ________
**Daily Food Intake Record: 1,500 Calorie Diet Plan**

**Instructions:**  
The objective of the diet plan is to meet (not exceed) the number of servings allowed for the food groups listed. Each time you eat a specific food, record it in the space provided for each group, along with the amount you ate. Refer to the number of calories below to find out what counts as one serving for each group listed. Instead of the meat and beans group, you are allowed to have 2 commercially available low-fat frozen entrees for your main meal (these entrees should provide no more than 300 calories each and fewer than 6 grams of fat). You can make additional copies of this form as needed.

**Grains** (80 calories/serving): 6 servings

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**Vegetables** (25 calories/serving): 3 servings

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**Fruits** (60 calories/serving): 2 servings

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**Dairy** (120 calories/serving, use low-fat milk and milk products): 2 servings

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**Two Low-Fat Frozen Entrees** (300 calories and fewer than 6 grams of fat): 2 servings

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</tbody>
</table>

Today’s physical activity:  
Intensity:  
Duration: _min_  
Number of steps:  

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ACTIVITY 5.3

**Daily Food Intake Record: 1,800 Calorie Diet Plan**

**Instructions:**

The objective of the diet plan is to meet (not exceed) the number of servings allowed for the food groups listed. Each time you eat a specific food, record it in the space provided for each group, along with the amount you ate. Refer to the number of calories below to find out what counts as one serving for each group listed. Instead of the meat and beans group, you are allowed to have 2 commercially available low-fat frozen entrees for your main meal (these entrees should provide no more than 300 calories each and fewer than 6 grams of fat). You can make additional copies of this form as needed.

<table>
<thead>
<tr>
<th>Grains (80 calories/serving): 8 servings</th>
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<tbody>
<tr>
<td>1</td>
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<td>8</td>
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<table>
<thead>
<tr>
<th>Vegetables (25 calories/serving): 5 servings</th>
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<table>
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<tr>
<th>Fruits (60 calories/serving): 3 servings</th>
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<td>3</td>
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</table>

<table>
<thead>
<tr>
<th>Dairy (120 calories/serving, use low-fat milk and milk products): 2 servings</th>
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<table>
<thead>
<tr>
<th>Two Low-Fat Frozen Entrees (300 calories and fewer than 6 grams of fat): 2 servings</th>
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<td>2</td>
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Today’s physical activity: [ ] _______  Intensity: [ ] _______  Duration: [ ] _______ min  Number of steps: [ ] _______
**Daily Food Intake Record: 2,000 Calorie Diet Plan**

**Instructions:**
The objective of the diet plan is to meet (not exceed) the number of servings allowed for the food groups listed. Each time you eat a specific food, record it in the space provided for each group, along with the amount you ate. Refer to the number of calories below to find out what counts as one serving for each group listed. Instead of the meat and beans group, you are allowed to have 2 commercially available low-fat frozen entrees for your main meal (these entrees should provide no more than 300 calories each and fewer than 6 grams of fat). You can make additional copies of this form as needed.

**Grains** (80 calories/serving): 10 servings

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**Vegetables** (25 calories/serving): 5 servings

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**Fruits** (60 calories/serving): 4 servings

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**Dairy** (120 calories/serving, use low-fat milk and milk products): 2 servings

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**Two Low-Fat Frozen Entrees** (300 calories and fewer than 6 grams of fat): 2 servings

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Today’s physical activity: ___________  Intensity: ______  Duration: ______ min  Number of steps: ______

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178  Lifetime Physical Fitness and Wellness
Healthy Dietary Plan for Weight Maintenance or Weight Gain

Name: ___________________________ Date: ______________
Course: _________________________ Section: _______________ Gender: _______ Age: _______

I. Daily Caloric Requirement

A. Current body weight in pounds .................................................................
B. Current percent body fat ...........................................................................
C. Current body composition classification (Table 4.10, page 134) ....................
D. Total daily energy requirement with exercise to maintain body weight (use item M from Activity 5.1). Use this figure and stop further computations if the goal is to maintain body weight ..................................................
E. Target body weight (if your goal is to increase body weight) .........................
F. Number of additional daily calories to increase body weight (combine this increased caloric intake with a strength-training program, see Chapter 7) ..........................................................
G. Total daily energy (caloric) requirement with exercise to increase body weight (D + 500) ..........................................................

II. Strength-Training Program

For weight gain purposes, indicate three days during the week and the time when you will engage in a strength-training program.

III. Healthy Diet Plan

Design a sample healthy daily diet plan according to the total daily energy requirement computed in D (maintenance) or G (weight gain) above. Using Appendix B, list all individual food items that you can consume on that day, along with their caloric, carbohydrate, fat, and protein content. Be sure that the diet meets your recommended MyPlate number of servings from the various food groups.

Breakfast

<table>
<thead>
<tr>
<th>Food item</th>
<th>Amount</th>
<th>Calories</th>
<th>Carbohydrates (gr)</th>
<th>Fat (gr)</th>
<th>Protein (gr)</th>
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</table>
### Activity 5.4

**Healthy Dietary Plan for Weight Maintenance or Weight Gain (continued)**

#### Lunch

<table>
<thead>
<tr>
<th>Food item</th>
<th>Amount</th>
<th>Calories</th>
<th>Carbohydrates (gr)</th>
<th>Fat (gr)</th>
<th>Protein (gr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
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**Snack**

1. 

**Dinner**

1. 

2. 

3. 

4. 

5. 

6. 

7. 

8. 

**Totals:**

|          |        |          |                |          |              |

#### IV. Percent of Macronutrients

Determine the percent of total calories that are derived from carbohydrates, fat, and protein.

A. Total calories = __________

B. Grams of carbohydrates × 4 ÷ (total calories) = __________ %

C. Grams of fat × 9 ÷ (total calories) = __________ %

D. Grams of protein × 4 ÷ (total calories) = __________ %

E. Body weight (BW) in kilograms (BW in pounds divided by 2.2046) = __________ kg

F. Grams of protein per kilogram of body weight (grams of protein) ÷ (BW in kg) = __________ gr/kg

G. Please summarize your diet and protein intake to either maintain or gain weight.
Weight Management: Measuring Progress

I. Please answer all of the following:

1. State your feelings regarding your current body weight, your target body composition, and a completion date for this goal.

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2. Do you have an eating disorder? If so, express your feelings about it. Can your instructor help you find professional advice so that you can work toward resolving this problem?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

3. Is your present diet adequate according to the nutrient analysis? Yes No

4. State dietary changes necessary to achieve a balanced diet and/or to lose weight (increase or decrease caloric intake, decrease fat intake, increase intake of complex carbohydrates, and so on). List specific foods that will help you improve in areas in which you may have deficiencies and food items to avoid or consume in moderation to help you achieve better nutrition.

Changes to make: ______________________________________________________

________________________________________________________________________

________________________________________________________________________

Foods that will help: ______________________________________________________

________________________________________________________________________

________________________________________________________________________

Foods to avoid: __________________________________________________________

________________________________________________________________________
## II. Behavior Modification Progress Form

**Instructions:** On a weekly or bi-weekly basis, go through the list of strategies in the box on pages 172–173 and provide a “Yes” or “No” answer to each statement. If you are able to answer “Yes” to most questions, you have been successful in implementing positive weight management behaviors. (Make additional copies of this page as needed.)

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have made a commitment to change.</td>
<td></td>
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<tr>
<td>2. I set realistic goals.</td>
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<tr>
<td>3. I monitor body weight on a regular basis.</td>
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<td>4. I exercise regularly.</td>
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<td>5. I exercise control over my appetite.</td>
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<tr>
<td>6. I am consuming less fat in my diet.</td>
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<td>7. I pay attention to the number of calories in food.</td>
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<tr>
<td>8. I have eliminated unnecessary food items from my diet.</td>
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<tr>
<td>9. I include calcium-rich food in my diet.</td>
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<tr>
<td>10. I use craving-reducing foods in my diet.</td>
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<tr>
<td>11. I avoid automatic eating.</td>
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<tr>
<td>12. I stay busy.</td>
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<tr>
<td>13. I plan meals ahead of time and shop sensibly.</td>
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<tr>
<td>15. I do not serve more food than I should eat.</td>
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<tr>
<td>16. I use portion control in my diet and when dining out.</td>
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<tr>
<td>17. I do not eat out more than once per week.</td>
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<tr>
<td>When I do, I eat low-fat meals.</td>
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<tr>
<td>18. I eat slowly and at the table only.</td>
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<tr>
<td>19. I avoid social binges.</td>
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<tr>
<td>20. I avoid temptation by relocating or removing unhealthy foods.</td>
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<tr>
<td>21. I avoid evening food raids.</td>
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<tr>
<td>22. I practice stress management.</td>
<td></td>
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<tr>
<td>23. I have a strong support group.</td>
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<tr>
<td>24. I monitor changes and reward my accomplishments.</td>
<td></td>
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<tr>
<td>25. I prepare for lapses/relapses.</td>
<td></td>
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<tr>
<td>26. I think positive.</td>
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<tr>
<td>27. I make sensible adjustments in caloric intake and physical activity if my weight increases and stabilizes there for several days.</td>
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</tbody>
</table>
Assess Your Behavior

Log on to www.cengagebrain.com to access CengageNOW where you can update your pedometer log if you are tracking your steps.

1. Are you satisfied with your current body composition (including body weight) and quality of life? If not, are you willing to do something about it to properly resolve the problem?

2. Are physical activity, aerobic exercise, and strength training a regular part of your lifetime weight management program?

Assess Your Knowledge

Evaluate how well you understand the concepts presented in this chapter using the chapter-specific quizzing available in the online materials at www.cengagebrain.com.

1. During the last decade, the rate of obesity in the United States has
   a. been on the decline.
   b. increased at an alarming rate.
   c. increased slightly.
   d. remained steady.
   e. increased in men and decreased in women.

2. Obesity is defined as a body mass index (BMI) equal to or above
   a. 10.
   b. 25.
   c. 30.
   d. 45.
   e. 50.

3. Obesity increases the risk for
   a. hypertension.
   b. congestive heart failure.
   c. atherosclerosis.
   d. type 2 diabetes.
   e. all of the above.

4. Tolerable weight is a body weight
   a. that is not ideal but one that you can live with.
   b. that will tolerate the increased risk for chronic diseases.
   c. with a BMI range between 25 and 30.
   d. that meets both ideal values for percent body weight and BMI.
   e. All are correct choices.

5. When the body uses protein instead of a combination of fats and carbohydrates as a source of energy,
   a. weight loss is very slow.
   b. a large amount of weight loss is in the form of water.
   c. muscle turns into fat.
   d. fat is lost very rapidly.
   e. fat cannot be lost.

6. Eating disorders
   a. are characterized by an intense fear of becoming fat.
   b. are physical and emotional conditions.
   c. almost always require professional help for successful treatment of the disease.
   d. are common in societies that encourage thinness.
   e. All are correct choices.

7. The mechanism that seems to regulate how much a person weighs is known as
   a. setpoint.
   b. weight factor.
   c. basal metabolic rate.
   d. metabolism.
   e. energy-balancing equation.

8. The key to maintaining weight loss successfully is
   a. frequent dieting.
   b. very low calorie diets when “normal” dieting doesn’t work.
   c. a lifetime physical activity program.
   d. regular high-protein/low-carbohydrate meals.
   e. All are correct choices.

9. The daily amount of physical activity recommended for weight loss purposes is
   a. 15 to 20 minutes.
   b. 20 to 30 minutes.
   c. 30 to 60 minutes.
   d. 60 to 90 minutes.
   e. Any amount is sufficient as long as it is done daily.

10. A daily energy expenditure of 300 calories through physical activity is the equivalent of approximately ___ pounds of fat per year.
   a. 12
   b. 15
   c. 22
   d. 27
   e. 31

Correct answers can be found at the back of the book.
Chapter 5:

Notes

15. See note 14.

Suggested Readings
Answer Key

This page contains answers for this chapter only

Chapter 5
1. b  2. c  3. e  4. a  5. b  6. e  7. a  8. c  9. d  10. e
CHAPTER 5 CHECK YOURSELF
Physical Activity Guidelines for Weight Management

The following physical activity guidelines are recommended to effectively manage body weight:

- 30 minutes of physical activity on most days of the week if you do not have difficulty maintaining body weight (more minutes and/or higher intensity if you choose to reach a high level of physical fitness).
- 60 minutes of daily activity if you want to prevent weight gain.
- Between 60 and 90 minutes each day if you are trying to lose weight or attempting to keep weight off following extensive weight loss (30 pounds of weight loss or more). Be sure to include some high-intensity/low-impact activities at least twice a week in your program.