

A full-page photograph of a person with long dark hair, wearing a dark long-sleeved shirt and dark pants, running barefoot on a sandy beach. The person is captured in a dynamic running pose, moving from left to right. The background features a warm, golden sunset over the ocean, with waves visible in the distance. The overall mood is energetic and healthy.

SIXTH EDITION

Get Fit, Stay Fit

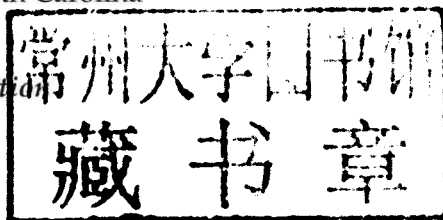
William E. Prentice

Get **FIT** Stay **FIT**

WILLIAM E. PRENTICE, PH.D., P.T., A.T.C.

Professor, Coordinator of the Sports Medicine Specialization,
Department of Exercise, and Sports Science
The University of North Carolina
Chapel Hill, North Carolina

Sixth Edition





GET FIT, STAY FIT, SIXTH EDITION

Published by McGraw-Hill, a business unit of The McGraw-Hill Companies, Inc., 1221 Avenue of the Americas, New York, NY 10020. Copyright © 2012 by The McGraw-Hill Companies, Inc. All rights reserved. Previous editions © 2009, 2007, and 2004. Printed in the United States of America. No part of this publication may be reproduced or distributed in any form or by any means, or stored in a database or retrieval system, without the prior written consent of The McGraw-Hill Companies, Inc., including, but not limited to, in any network or other electronic storage or transmission, or broadcast for distance learning.

Some ancillaries, including electronic and print components, may not be available to customers outside the United States.

This book is printed on acid-free paper.

1 2 3 4 5 6 7 8 9 0 DOC/DOC 1 0 9 8 7 6 5 4 3 2 1

ISBN 978-0-07-352385-9

MHID 0-07-352385-2

Vice President & Editor-in-Chief: *Michael Ryan*

Vice President & Director of Specialized Publishing: *Janice M. Roerig-Blong*

Publisher: *David Patterson*

Senior Sponsoring Editor: *Debra B. Hash*

Marketing Manager: *Caroline McGillen*

Project Manager: *Erin Melloy*

Design Coordinator: *Brenda A. Rolwes*

Cover Designer: *Studio Montage, St. Louis, Missouri*

Cover Image: © *Ultimate Group, LLC/ Alamy*

Buyer: *Sherry L. Kane*

Media Project Manager: *Sridevi Palani*

Compositor: *Aptara®, Inc.*

Typeface: *10/12 Palatino*

Printer: *R. R. Donnelley, Crawfordsville*

All credits appearing on page or at the end of the book are considered to be an extension of the copyright page.

Library of Congress Cataloging-in-Publication Data

Prentice, William E.

Get fit, stay fit / William E. Prentice. — 6th ed.
p. cm.

Includes bibliographical references and index.

ISBN-978-0-07-352385-9

1. Physical fitness. 2. Exercise. 3. Health. I. Title.

RA781.P67 2011

613.7—dc23

2011018755

PREFACE

If you believe what you hear, see, and read in the media, you would think that every person in America has become a “fitness junkie.” It is true that millions of people exercise in some way, shape, or form on a somewhat consistent basis. But the fact is that for the vast majority of Americans the thought of going out and “exercising” never even crosses their minds. Through TV and DVDs, on the Internet, in magazines or newspapers, our society is constantly bombarded by images that suggest the importance of being physically fit and healthy. It seems that people in your generation, in contrast to all the previous ones, are finally starting to realize that there really is a reason for living a healthy lifestyle and for incorporating regular exercise into that lifestyle.

Get Fit, Stay Fit is a text designed to tell you not only how you can go about getting yourself fit, but also why it is to your advantage to make fitness and exercise a regular part of your lifestyle. It begins by discussing the basic principles of fitness that apply to any type of exercise program, and then explains how being fit relates to a healthy lifestyle. Specific techniques and guidelines for developing cardiorespiratory endurance, for improving muscular strength and endurance, for increasing flexibility, and for maintaining appropriate body weight and composition are described in detail so that you can put together a personalized fitness program based on your individual needs. This book also provides recommendations

and suggestions on selecting and using the exercise equipment available to help you get fit, as well as tips for making your exercise program as safe and free of injury as possible.

FEATURES

- *Practical application chapters are dedicated to starting your own fitness program (3), practicing safe fitness (9), and becoming a wise consumer (10). These chapters cut through the confusion and provide essential information on how to start up, equip yourself, and safely execute an individual fitness program.*
- *Special boxes—Fit Lists, Health Links, and Safe Tips—highlight, summarize, and provide quick reference to important information.*
- *Lab Activities assist in evaluating a number of personal measures of fitness as well as providing guidelines for increased health.*
- *Key terms are in color and are defined in boxes to help build a working vocabulary of concepts, terms, and principles necessary for understanding, beginning, and maintaining any fitness program.*
- *Chapter pedagogy also includes chapter objectives, key terms, definition boxes, bulleted summaries, and suggested readings to enhance the learning process.*
- *All exercise safety information and illustrations have been updated to provide proper fitness techniques for a safe and effective fitness program.*

- Each chapter contains an expanded list of reviewed Web sites relevant to the chapter topic. Using the power of the World Wide Web as a resource, students will be able to obtain further information to take their studies beyond the classroom.
- An updated and expanded list of references provides a significant resource for students as well as instructors for further study of key issues and topics.

NEW TO THIS EDITION

Throughout the text in this sixth edition, multiple photos have been added to emphasize specific points in the text.

Highlights of the changes in each chapter are as follows:

CHAPTER 1

- Changed the approach to the wellness continuum to better reflect the philosophy that fitness is only one aspect of that continuum
- Updated information on Healthy People 2020
- Changed skill-related components to performance-related components
- Better emphasis on the target audience which is the average, non-athlete college student
- Updated the photos to reflect ordinary individual doing more normal activities

CHAPTER 2

- Added financial wellness to our list of wellness components
- Added more emphasis on spiritual wellness
- Added new information on the effects on cortisol on the stress response
- Added new information on a Type C personality
- Updated recommendations on levels of cholesterol
- Added information on the benefits of exercise as a cancer treatment
- Changed “Recreational Drugs” section to “Abused Illegal Drugs”

- Added new information on abused prescription drugs
- Added new information on OxyContin
- Added a new chart estimating the number of alcoholic drinks that will cause a specific level of impairment

CHAPTER 3

- Updated information on the warm-up
- Added new information on a dynamic warm-up
- Updated information on recommendation for how you should exercise
- Added new Fit List on the 2008 Physical Activity Guideline for Americans from the Centers for Disease Control

CHAPTER 4

- Updated the discussion of the FIT Principle
- Provided updated recommendations for the intensity of activity
- Provided updated recommendations for the frequency of activity
- Updated the method of calculating lower and upper limits of target heart rate range
- Updated ACSM recommendations for high, moderate, and low intensity exercise
- Added new expanded table on guidelines for continuous training
- Updated photos that show various training techniques for improving cardiorespiratory endurance

CHAPTER 5

- Emphasized that in females strength gains occur primarily as a result of increased neuromuscular efficiency rather than increases in the size of a muscle.
- Added many new and additional photos on different strength training techniques
- Added a new HealthLink on progressive resistance exercise

CHAPTER 6

- *Reorganized the discussion of the various stretching techniques to differentiate ballistic stretching versus dynamic stretching*
- *Emphasized the emergence of dynamic stretching as a widely used technique*
- *Added many new and additional photos on different stretching techniques*

CHAPTER 7

- *Added new 2010 Dietary Guidelines for Americans*
- *Replaced MyPyramid with the new MyPlate program*
- *Clarified the discussion of LDL versus HDL cholesterol*
- *Added new information on vegetarian diets*
- *Clarified information on potassium in the diet and lost in sweat*
- *Added a new table comparing the amount of calories, carbohydrates, sodium, and potassium in a variety of fluid replacement drinks.*
- *Identified additional specific food sources for the various types of nutrients*
- *Clarified and added new information regarding interpreting food labels*

CHAPTER 8

- *Added new information on caloric expenditure following exercise in the recovery period*
- *Emphasized getting help and treatment for eating disorders*

CHAPTER 9

- *Addressed misconception that a large percentage of heat is dissipated from the head*
- *Added new recommendations for wearing lightweight microfiber garments that allow for better evaporation of sweat*

CHAPTER 10

- *Added new information on using an incline treadmill*
- *Emphasized the importance of choosing good Web sites when seeking information on fitness*

ANCILLARY

TEST BANK

The Test Bank for *Get Fit, Stay Fit* contains more than 300 multiple choice, true-false, fill-in, and short essay test questions for convenience in preparing examinations. The Test Bank can be found on the Instructors Resource website: www.mhhe.com/getfit6e.

ACKNOWLEDGMENTS

In revising *Get Fit, Stay Fit*, my developmental editor Gary O'Brien and my project manager Jill Eccher have been instrumental in the development of the sixth edition, and have provided a great deal of help and support. The reviewers provided many constructive recommendations about content and organization. Their input and suggestions have been greatly appreciated and are reflected throughout the text. They include the following:

Joseph Cole
Trevecca Nazarene University

Joseph Coti
Southwestern Michigan College

Megan Franks
Lone Star College-North Harris

Paula Polittle
Concordia University

And finally, as always, this is for my wife Tena and our boys, Brian and Zach, who each day make my life more worthwhile.

By writing this book, I have tried to provide you with all the details you need to know about getting yourself fit and to stress the importance of developing a healthy lifestyle. But the bottom line is that to get fit, you need to stop reading about it and start doing it. There is no better time than now!

William E. Prentice

CONTENTS

Preface viii

1 Getting Fit: Why Should You Care? 1

Why should you care about being physically active? 1

Exercise and physical activity, 3

Healthy People 2020 Objectives, 3

What components of fitness are important to you? 7

Determining your reasons for wanting to be fit, 12

Determining how frequently you engage in physical activity, 12

How long will it take you to get fit? 12

Summary 13

Lab Activity 1-1: Importance of Physical Fitness 17

Lab Activity 1-2: Daily Fitness Schedule 19

2 Creating a Healthy Lifestyle 21

Why should you be concerned about your lifestyle? 21

What is the effect of stress on a healthy lifestyle? 23

How can you prevent coronary artery disease? 30

What is cancer? 34

What lifestyle habits are deterrents to fitness? 36

Creating a healthy lifestyle: your personal responsibility, 43

Summary 44

Lab Activity 2-1: Your Personal Stress Inventory 47

Lab Activity 2-2: Health Style: A Self Test 51

3 Starting Your Own Fitness Program 57

The program should be fun and enjoyable, 57

What are the basic principles of a fitness program? 58

Should you do a warm-up routine before you exercise? 61

What are the goals of your fitness program? 63

How should you exercise? 63

Where do you begin? 66

Precautions in beginning a fitness program, 66

Ready to begin? 67

Summary 67

Lab Activity 3-1: Medical History Questionnaire 69

Lab Activity 3-2: Planning for a Physical Activity Program 71

4 Developing Cardiorespiratory Fitness 73

Why is cardiorespiratory fitness important for you? 73

What is the difference between aerobic versus anaerobic activities? 74

How does exercise affect the function of the heart? 75

What determines how efficiently the body is using oxygen? 77

The FIT principle, 78

What training techniques can be used to improve cardiorespiratory endurance? 79

Good aerobic activities for improving cardiorespiratory endurance, 86

What is your level of cardiorespiratory endurance? 97

Summary 97

Lab Activity 4-1: Calculating Target Heart Rate 101

Lab Activity 4-2: The Rockport Fitness Walking Test 103

Lab Activity 4-3: Cooper's 12-Minute Walking/Running Test 111

5 Improving Muscular Strength, Endurance, and Power 113

Why is muscular strength important for everyone? 113

How are strength and muscular endurance related? 114

Why is muscular power important in sport activities? 114

Types of skeletal muscle contraction, 114

What factors influence how much strength you have? 115

What physiological changes occur to cause increased strength? 117

What are the techniques of resistance training? 118

Core stabilization training, 119

Assessment of muscular strength and endurance, 156

Summary 156

Lab Activity 5-1: Push-Ups 159

Lab Activity 5-2: Bent-Knee Sit-Ups 161

Lab Activity 5-3: Muscular Endurance Test 163

6 Increasing Flexibility Through Stretching 167

Why is it important to have good flexibility? 167

What structures in the body can limit flexibility? 168

What are the different stretching techniques? 170

Is there a relationship between strength and flexibility? 173

Stretching exercises, 175

Alternative stretching techniques, 181

How do you know if you have good flexibility? 183

Summary 185

Lab Activity 6-1: Trunk Flexion 187

Lab Activity 6-2: Trunk Extension 189

Lab Activity 6-3: Shoulder Lift Test 191

7 Eating Right 193

Why do you need to know about nutrition? 193

Basic principles of nutrition, 194

Nutrient requirements and recommendations, 210

Dietary Guidelines for Americans, 211

What is the role of nutrition in physical activity? 216

Food safety, 223

Summary 223

Lab Activity 7-1: Nutritional Knowledge Survey 227

Lab Activity 7-2: Assessing Your Nutritional Habits 229

Lab Activity 7-3: 7-Day Diet Analysis 231

8 Limiting Your Body Fat Through Diet & Exercise 233

Why should you be concerned about body fat? 233

What is body composition? 238

How do you achieve caloric balance? 240

What can you do to lose body fat? 243
 What if you want to increase lean body mass? 253

What is disordered eating? 254
 Summary 257

Lab Activity 8-1: Calculating Body Mass Index (BMI) 259

Lab Activity 8-2: Calculating Percent Body Fat Using Skinfold Measurements 261

Lab Activity 8-3: Determining Your Basal Metabolic Rate (BMR) 265

Lab Activity 8-4: Calculating Energy Expenditure 269

Lab Activity 8-5: Calculating Caloric Intake 273

Lab Activity 8-6: Worksheet for Estimating Caloric Balance 275

9 Practicing Safe Fitness 277

How can you prevent injuries? 277
 What types of injuries might occur in an exercise program? 279
 Treatment and management of injuries, 284
 What exercises should be avoided? 284

What precautions should you take when exercising in hot or cold environments? 288
 Physical activity during pregnancy, 291
 Summary 293

10 Becoming a Wise Consumer 295

Are you a wise consumer of fitness products? 295
 What to consider when buying fitness equipment, 296
 How should you choose appropriate clothing and shoes for exercise? 303
 What to look for in a health club, 305
 What to look for in fitness magazines, books, DVDs, and Web sites, 307
 The bottom line for the consumer, 308
 Summary 308

Appendix A Dietary Reference Intakes A

Credits C

Index I-1

Getting Fit Why Should You Care?

Objectives

After completing this chapter, you should be able to do the following:

- Explain why fitness is an important aspect of a healthy lifestyle.
- Give several reasons why being fit should be important to you.
- Discuss the physical, social, and psychological benefits of being fit.
- List the component parts of physical fitness.
- Determine your reasons for wanting to become physically fit.

So, you've finally decided it's time to get fit. Why is that? People have many different reasons and motivations for beginning a physical activity program. Have you decided that it's time to improve your overall health and well-being? Are you concerned about the way you look to your friends? Are you tired of being a couch potato? Are you interested in fitness primarily because you are required to take this fitness class? Whatever your motivation happens to be, consistently engaging in physical activity can not only make you physically fit but also can have many positive benefits on your style of living.

WHY SHOULD YOU CARE ABOUT BEING PHYSICALLY ACTIVE?

Have you noticed that it is virtually impossible to go through a day without being exposed to something involving some aspect of wellness or fitness? We eat, sleep, go to class, and some of

us even try to include some form of physical activity in our busy schedules. Fitness information comes from many sources. "Experts" give advice on television or radio and in magazines, books, and newspapers. Even our friends and classmates are willing to give opinions on the

KEY TERMS

<i>physical fitness</i>	<i>caloric expenditure</i>
<i>wellness</i>	<i>performance-related</i>
<i>health-related</i>	<i>components</i>
<i>components</i>	<i>speed</i>
<i>cardiorespiratory</i>	<i>power</i>
<i>endurance</i>	<i>neuromuscular</i>
<i>muscular strength</i>	<i>coordination</i>
<i>muscular endurance</i>	<i>balance</i>
<i>flexibility</i>	<i>agility</i>
<i>body composition</i>	<i>reaction time</i>
<i>caloric intake</i>	

best ways to work out or on how to lose weight. Furthermore, the image of the attractive, healthy, physically active person is used to market everything—clothing, food, cosmetics, health care products, sports equipment, weight loss programs—the list goes on.

Our society is characterized by a fast-paced lifestyle, with obligations and stresses that affect our physical and emotional well-being. A common misconception is that daily living activities incorporate enough physical activity to maintain overall health. Surveys indicate that virtually all adults believe that physical activity is a critical aspect of health and wellness and that regular physical activity is essential for themselves and for their children. Still, despite this increased interest in fitness and wellness, the U.S. Department of Health and Human Services reports that only 24 percent of adults participate in a minimum of 30 minutes of light-to-moderate physical activity at least five times per week and only 12 percent are active seven times per week. Approximately 60 percent of the population is somewhat active but fails to achieve exercise intensity levels necessary for improving cardiorespiratory endurance.

Unfortunately, approximately 25 percent of American adults are essentially sedentary and do not engage in any type of leisure-time physical activity. Technological advances, such as the automobile, television, elevators, escalators, and moving sidewalks, eliminate the need for physical exertion and contribute to a sedentary lifestyle. The 1996 *Surgeon General's Report of Physical Activity and Health* reviewed mounting evidence that relates physical

activity to reduced risks of a variety of health problems. According to the Center for Disease Control (CDC) regular physical activity substantially reduces the risk of dying of coronary heart disease and decreases the risk for stroke, colon cancer, diabetes, and high blood pressure. It also helps to control weight; contributes to healthy bones, muscles, and joints; helps to relieve the pain of arthritis; reduces symptoms of anxiety and depression; and is associated with fewer hospitalizations, physician visits, and medications. Being fit means that the various systems of your body are healthy and function efficiently to enable you to engage in work, in activities of daily living, and in recreational pursuits and leisure activities; also to be healthy, to resist hypokinetic diseases, and to meet emergency situations (Figure 1-1).

Fitness is not entirely dependent on physical activity. It is an important aspect of choosing to live a healthy lifestyle. Fitness affects the total person, including intellect, emotional stability, physical conditioning, and stress levels. In addition to fitness, the journey toward

physical fitness: Being physically fit means that the various systems of your body are healthy and function efficiently to enable you to engage in work, in activities of daily living, and in recreational pursuits and leisure activities; also to be healthy, to resist hypokinetic diseases, and to meet emergency situations.

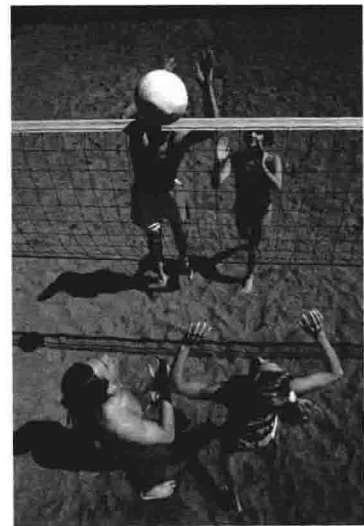


FIGURE 1-1. PHYSICAL FITNESS.

Being fit allows you to engage in both activities of daily living and recreational pursuits and leisure activities.

achieving a healthy lifestyle includes proper medical care, eating the right foods in the right amounts, appropriate physical activity that is adapted to individual needs and physical limitations, satisfying work, healthy play and recreation, and proper amounts of rest and relaxation. Engaging in physical activity to get yourself fit allows you to satisfy your needs regarding mental and emotional stability, social consciousness and adaptability, spirituality and morality, and physical health consistent with your heredity. This is the definition of the term **wellness**, which will be discussed in chapter 3.

EXERCISE AND PHYSICAL ACTIVITY

Are exercise and physical activity the same? The answer is, not necessarily. Clearly there exists a continuum, with a sedentary lifestyle at one end and aggressive fitness programs at the other end. So what exactly constitutes exercise? If an activity is harder (more intense) than what an individual normally does on a daily basis, this would be considered exercise. For example if you usually go for a walk each morning always at the same pace and for the same amount of time, then your morning walks would be considered physical activity, not exercise. Exercise must challenge the body's physiological systems, forcing them to work harder than they are accustomed to working. Over time, exercise will cause these physiological systems to improve and function more efficiently and thus they will adapt to the imposed demands. What may be considered exercise for one person may not be for another.

wellness: Satisfying your needs regarding mental and emotional stability, social consciousness and adaptability, spiritual and moral fiber, and physical health consistent with your heredity

Perhaps the distinction between the two is specific to an individual's current fitness status and lifestyle.

HEALTHY PEOPLE 2020 OBJECTIVES

Every 10 years, the U.S. Department of Health and Human Services (HHS) re-evaluates major risks to health and wellness, changing public health priorities, and emerging trends and innovations related to our nation's health preparedness and prevention over the past decade. Healthy People 2020 takes into consideration scientific insights and new knowledge of current data. Healthy People 2020 is a set of health objectives for the nation to achieve over the next decade. It can be used by many different people, states, communities, professional organizations, and others to help them develop programs to improve health. Healthy People 2020 builds on initiatives pursued over the past 3 decades. The 1979 surgeon general's report, *Healthy People*, and *Healthy People 2000: National Health Promotion and Disease Prevention Objectives* both established national health objectives and served as the basis for the development of state and community plans. Like its predecessors, Healthy People 2020 was developed through a broad consultation process, built on the best scientific knowledge and designed to measure programs over time. The 28 focus areas of Healthy People 2020 were developed by leading federal agencies with the most relevant scientific expertise. Additionally, comments on the draft objectives were received through a series of regional and national meetings and on an interactive Web site. The Secretary's Council on National Health Promotion and Disease Prevention Objectives for 2020 also provided leadership and advice in the development of national health objectives.

As in Healthy People 2010, the leading health indicators will be used to measure the health of the nation over the next 10 years. Each of the 10 leading health indicators has one or

more objectives from Healthy People 2020 associated with it. As a group, the leading health indicators reflect the major health concerns in the United States during the early 21st century. The leading health indicators were selected on the basis of their ability to motivate action, the availability of data to measure progress, and their importance as public health issues. The leading health indicators are:

- Physical activity
- Overweight and obesity
- Tobacco use
- Substance abuse
- Responsible sexual behavior
- Mental health
- Injury and violence
- Environmental quality
- Immunization
- Access to health care

Healthy People 2020 offers a simple but powerful idea: Provide health objectives in a format that enables diverse groups to combine their efforts and work as a team. It is a road map to better health for all. The initiative has partners from all sectors. Health Link Box 1-1 lists the Healthy People 2020 objectives for improving health, fitness, and quality of life through physical activity.

THE PHYSICAL BENEFITS OF BEING PHYSICALLY ACTIVE

Human beings are designed to be active creatures. Although changes in civilization have resulted in a decrease in the amount of activity needed to accomplish the basic tasks associated with living, the human body has not changed. Therefore, it is important to be aware of the requirements for good health and recognize the importance of vigorous physical activity in your life (Figure 1-2). If you do not, your health, productivity, and effectiveness are likely to suffer. Health Link Box 1-2 summarizes 10 physical benefits associated with physical activity.



FIGURE 1-2. PHYSICAL BENEFITS.

Physical activity is important in achieving good health.

THE SOCIAL REWARDS OF BEING PHYSICALLY ACTIVE

If you are willing to participate in physical activities that help keep you fit, you benefit from the outlets, companionship, and feelings of belonging inherent in such activities. Physical activity can provide a great mechanism for exploring strategies to resolve conflicts, act fairly, comply with rules and fair play, and generally develop a moral and ethical code of behavior. Participation in physical activity provides an opportunity for socializing (Figure 1-3). Physical fitness affects



FIGURE 1-3. SOCIAL REWARDS.

Participating in physical activity provides an opportunity for socializing.

HEALTH LINK 1-1

Healthy People 2020 Objectives to Improve Health, Fitness, and Quality of Life Through Daily Physical Activity

- Reduce the proportion of adults who engage in no leisure-time physical activity.
- Increase the proportion of adults that meet current Federal physical activity guidelines for aerobic physical activity and for muscle strength training.
- Increase the proportion of employed adults who have access to and participate in employer-based exercise facilities and exercise programs.
- Increase the proportion of physician office visits for chronic health diseases or conditions that include counseling or education related to exercise.
- Increase the proportion of adults who perform physical activities that enhance or maintain flexibility.
- Increase the proportion of adolescents that meet current physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.
- Increase the proportion of children and adolescents that meet guidelines for television viewing and computer use.
- Increase the proportion of the Nation's public and private schools that require daily physical education for all students.
- Increase the proportion of adolescents who participate in daily school physical education.
- Increase the proportion of adolescents who spend at least 50 percent of school physical education class time being physically active.
- Increase the proportion of the Nation's public and private schools that provide access to their physical activity spaces and facilities for all persons outside of normal school hours (that is, before and after the school day, on weekends, and during summer and other vacations).
- Increase the proportion of States and school districts that require regularly scheduled elementary school recess.
- Increase the proportion of school districts that require or recommend elementary school recess for an appropriate period of time.
- Increase the proportion of trips made by walking.
- Increase the proportion of trips made by bicycling.

the entire person, and rich dividends come to the person who concentrates on the development of the body as well as the mind.

THE PSYCHOLOGICAL BENEFITS OF BEING PHYSICALLY ACTIVE

Physical activity generally has a positive influence on a person's psychological health

throughout a lifetime cycle by improving health and enhancing function and quality of life. Some of the psychological benefits include enhanced motivation, increased self-perception and esteem, improved mood states, emotional well-being, reduction of stress and anxiety, and creation of a realistic body image. Physical activity has a positive impact on mental health and appears to alleviate the symptoms of depression, anxiety, and, to a lesser extent, panic disorder.

HEALTH LINK 1-2

Physical Benefits of Being Physically Active

1. Regular, vigorous activity increases muscle size, strength, and power and develops endurance for sustaining work and resisting fatigue.
2. Exercise strengthens the heart muscle and improves the efficiency of the vascular system in delivering oxygenated blood to the working tissues and in using it, thereby improving cardiorespiratory endurance.
3. Exercise improves the functioning of the lungs by deepening the respiration process.
4. Exercise helps to keep the digestive and excretory organs in good condition.
5. Muscular exercise enhances nerve-muscle coordination.
6. Exercise helps a person to maintain a healthy body weight by reducing the percentage of total body weight that is made up of fat tissue.
7. Exercise contributes to improved posture and appearance through the development of proper muscle tone, greater joint flexibility, and a feeling of well-being.
8. Physical activity generates more energy and thus contributes to greater individual productivity for both physical and mental tasks.
9. The person who is fit has more strength, energy, and stamina; an improved sense of well-being; better protection from injury (because strong, well-developed muscles safeguard bones, internal organs, and joints and keep moving parts limber); and improved cardiorespiratory function.
10. It is often the case that people who become physically active will pay more attention to such things as proper nutrition, rest, and relaxation and may also drink less alcohol and stop smoking because they do not want to undo the benefits gained through physical activity. They are likely to be committed to engaging in health-promoting, rather than health-harming, behavior.

www.health.gov/healthypeople/

Many people use regular exercise, especially of a recreational nature, as a means of mental relaxation. Exercise can play a significant role in reducing stress. It diverts attention from stress-producing thoughts to a more relaxing and positive focus. Exercise may also help us to feel better about ourselves and to feel that we are more capable of handling potential stress-producing situations. Exercise controls the release of a hormone called cortisol in response to stress. Prolonged cortisol release due to chronic stress can result in significant negative physiological changes. Some people say that

engaging in physical activity gives them an "exercise high." It is true that exercise causes the release of chemicals called endorphins in the brain that can positively affect your attitude and outlook.

It has also been shown that regular physical activity and increased physical fitness increase *serotonin* levels in the brain, which lead to improved mood and feelings of well-being. Serotonin is an important neurotransmitter (brain chemical) that contributes to a range of functions, including sleep and wake cycles, libido, appetite, and mood. Lack of serotonin has also been linked to depression.

THE BENEFITS OF EXERCISE IN THE AGING PROCESS

For the traditional student, at this point in your life it is likely that your physical health is, for the most part, fine. However, a fact that we wish we could change, but unfortunately cannot, is that aging begins immediately at birth and involves a lifelong series of changes in physiological and performance capabilities. These capabilities increase as a function of the growth process throughout adolescence, peak sometime between the ages of 18 and 30 years, then steadily decline with increasing age. Interestingly, this decline may be caused by the sociological constraints of aging as much as by biological effects. It is possible to maintain a relatively high level of physical function if you maintain an active lifestyle (Figure 1-4).

In most cases, after age 30, qualities such as muscular endurance, coordination, and strength begin to decrease. Furthermore, as we age, recovery from vigorous exercise requires a longer amount of time. Regular physical activity,



FIGURE 1-4. AGING AND ACTIVITY.

Maintaining an active lifestyle as you age can help to maintain a relatively high level of physical function.

however, tends to delay and in some cases prevent the appearance of certain degenerative processes. If you were active as a child, became fit as a teenager, and continue to stay fit throughout your life, it is very likely that you will have greater strength, flexibility, and cardiorespiratory health and a lower percentage of body fat than if you chose a more sedentary lifestyle. The good news is that it is NEVER too late to make a positive change in your style of living.

WHAT COMPONENTS OF FITNESS ARE IMPORTANT TO YOU?

Engaging in physical activities can have a positive effect on many different physical attributes. For the vast majority of people in our society, regardless of age, the focus should be on those components of fitness that are concerned with the development of qualities necessary to maintain a healthy lifestyle and to function efficiently physically. Those fitness components include cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition. Collectively, they are referred to as **health-related components**. Fit List Box 1-1 summarizes the fitness components.

Cardiorespiratory endurance is the ability to persist in a physical activity requiring oxygen for physical exertion without experiencing undue fatigue (Figure 1-5). If you go out

health-related components: components of a healthy lifestyle, including muscular strength, muscular endurance, cardiorespiratory endurance, flexibility, and body composition

cardiorespiratory endurance: the ability to persist in a physical activity requiring oxygen for physical exertion without experiencing undue fatigue