Foundations of

Physical Education, Exercise Science, and Sport

19e

Jennifer L. Walton-Fisette
Deborah A. Wuest

Mc Graw Hill Education

19th Edition

Foundations of Physical Education, Exercise Science, and Sport

Jennifer L. Walton-Fisette
Kent State University

Deborah A. Wuest
Ithaca College

Mc Graw Hill Education

FOUNDATIONS OF PHYSICAL EDUCATION, EXERCISE SCIENCE, AND SPORT,
NINETEENTH EDITION

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Brief Contents

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Preface

Was physical education or anatomy and physiology one of your favorite classes? Were you a high school athlete or did you play a club sport? Are you interested in fitness, physical activity, and sport? Most importantly, are you considering a career in a human movement field such as a physical education teacher, exercise science specialist, personal trainer, or sport administrator? Then this text is for you! Come join us on this educational journey to learn about physical activity, physical education, and sport. We will provide you with the most up-to-date information while recognizing that the dynamic field of kinesiology and its disciplines are ever changing in this fast-paced, technology-driven society in which we live.

We challenge students from the beginning of their careers to commit to ongoing development and growth as professionals in their disciplines. Students are encouraged to be advocates for physical activity and quality physical education, to value diversity and appreciate its many forms, and to work toward making opportunities to participate in physical activity available to all people throughout their lifespan. We hope that, as young leaders, they will work collaboratively with other dedicated professionals to address the issues facing us, the challenges ahead, and the realization of physical education, exercise science, and sport's potential to positively contribute to the lives of all people.

Organization

The 15 chapters of this book are organized into 4 parts. Part I provides students with an orientation to the field of kinesiology along with the field's disciplines. Chapter 1 focuses on the meaning and scope of contemporary physical education, exercise science, and sport. Emphasis is placed on understanding the scope of the disciplines and committing to professional development. In Chapter 2, students are introduced to the philosophy, goals, and objectives of physical education, exercise science, and sport. The last chapter in this part, Chapter 3, discusses the health and physical activity levels in our society, particularly in relation to the changing demographics, wellness movement, and fitness and physical activity movement.

In Part II, the historical foundations of the field and an overview of some of the disciplines are presented. The historical foundations are covered in Chapter 4, including our heritage from other countries and the significant influences on the growth of the field in the United States. In Chapter 5, an overview of motor behavior is provided. Chapter 6, biomechanics, is written by Dr. Deborah King, Ithaca College. Chapter 7 with its focus on exercise physiology and fitness follows. In Chapter 8, an overview of sport sociology is

presented, and Chapter 9 provides information on sport and exercise psychology. Chapter 10 focuses on physical education pedagogy and provides information on curriculum, teaching, and assessment.

Part III, which consists of four chapters, addresses professional considerations and career opportunities, including enhancing professional marketability. Chapter 11 focuses on professional development, including professional responsibilities, ethics, and certification. This edition includes information on social media and its use in networking and securing an internship and/or job. Chapter 12, on teaching and coaching careers, shows how opportunities for these careers have broadened from the school setting and school-age population to nonschool settings and people of all ages. In Chapter 13, employment opportunities for professionals interested in fitness- and health-related careers are discussed. Careers in sport management, sport communication, performance, and other sport-related careers are described in Chapter 14.

Part IV explores how professionals can be leaders and advocates and looks ahead to the future. The final chapter, Chapter 15, addresses two key professional responsibilities: leadership and advocacy. The textbook closes with a discussion of current and future trends.

Highlights of This Edition

The 19th edition of *Foundations of Physical Education, Exercise Science, and Sport* continues its dual emphasis on providing students with an overview of disciplinary knowledge and encouraging them to explore the expanding career opportunities. This edition reflects the dynamic nature of the field today and is designed for use in introductory and foundations courses. Specifically, the most significant change in this edition is an explicit emphasis placed on social justice, diversity, and cultural humility. These concepts and issues have been a component of the text for some time; however, we have created social justice boxes in each chapter to highlight the salient social issues that are concerning and prevalent related to the chapter focus. We believe, as physical education, exercise science, and sport professionals, that students and future professionals need to be educated about issues related to social justice and social inequalities.

The text continues its focus on the role of physical education, exercise science, and sport professionals in promoting lifespan participation in physical activity for all people. This text emphasizes the need for culturally competent professionals to work with our increasingly diverse population. The responsibility of professionals to serve as advocates for historically underserved populations is stressed; this work is essential if our goal of lifespan involvement in physical activity is to be achieved.

Updated information and statistics are used to help students stay abreast of developments in the field. Additional key changes to this edition are highlighted below:

- In the first chapter and throughout the remainder of the text, the term "subdisciplines" has been changed to "disciplines." Although we identify the current field as kinesiology, we acknowledge and understand that the initial subdisciplines were "sub" to the field of physical education; however, each of the disciplines operates and manages on its own.
- A focus on current trends has been included in each chapter. Salient factors and issues related to each chapter that are currently hot topics are discussed.
- Updated information on using social media to network and advance one's career is included.
- New end-of-chapter Discussion Questions are added to this edition and can be used by instructors to engage students' critical thinking skills in the classroom.
- Several chapters have been restructured based on government reports and policies that have significant applications for professional practice, such as *National Physical Activity Plan, Physical Activity Guidelines for Americans 2012 Midcourse Report, 2015 Dietary Guidelines and MyPlate Recommendations, Gender and Race Report*

Card in sports, SHAPE America Physical Education National Standards, and *Every Student Succeeds Act.*
- Since the future of physical education, exercise, and sport is closely related to the issues and challenges of today, this edition combines these topics in one final chapter. This final chapter closes the textbook with an emphasis on leadership and advocacy and discusses future trends.

We hope that readers will gain knowledge and inspiration through the topics and issues discussed in this text. We hope that they will aspire to be future leaders and agents of change as physical education, exercise science, and sport professionals.

Successful Features

The following pedagogical aids have been incorporated into this textbook:

Instructional Objectives. At the beginning of each chapter, the instructional objectives and competencies to be achieved by the students are listed. This identifies for the students the points that will be highlighted. Attainment of the objectives indicates the fulfillment of the chapter's intent.

Summaries. Each chapter ends with a brief review of the material covered, assisting the students in understanding and retaining the most salient points.

Discussion Questions. At the end of each chapter, discussion questions are provided to stimulate critical thinking. Students are encouraged to share their perspectives with their classmates and to explore different solutions to the problems and issues presented.

Self-Assessment Activities. Self-assessment activities are presented at the end of each chapter to enable students to check their comprehension of the chapter material. More activities using technology resources and tools are included.

References. Each chapter provides up-to-date references to allow students to gain further information about the subjects discussed in the chapter.

Internet Resources. Each chapter includes a *Get Connected* box, which lists Internet sites that provide up-to-date information about relevant topics. The self-assessment exercises include activities that draw on these Internet resources.

Photographs. Carefully chosen photographs, many new, have been used throughout the text to enhance the presentation of material and to illustrate key points.

Writing Style. Foundations of Physical Education, Exercise Science, and Sport has been written in a style that students find readable and that provides them with important insights into the foundations and the roles of physical education, exercise science, and sport in the world today. Students will find substantial information about the career and professional opportunities that exist for knowledgeable, dedicated, and well-prepared professionals committed to the promotion of lifespan involvement in physical activity for all people.

The nineteenth edition of *Foundations of Physical Education, Exercise Science, and Sport* is now available online with Connect, McGraw-Hill Education's integrated assignment and assessment platform. Connect also offers SmartBook for the new edition, which is the first adaptive reading experience proven to improve grades and help students study more effectively. All the title's website and ancillary content is also available through Connect, including:

- An Instructor's Manual for each chapter
- A full Test Bank of multiple-choice questions that test students on central concepts and ideas in each chapter
- Lecture Slides for instructor use in class

Acknowledgments and Dedications

The authors extend their appreciation to Dr. Deborah King, Ithaca College, for authoring Chapter 6. We also thank the reviewers for their thoughtful feedback. The reviewers of this edition include:

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This textbook would not have been possible without the outstanding professionals at McGraw-Hill who contributed in many ways to the completion of this project. Special thanks to Jamie LaFerrera for her help in getting this revision under way and her support throughout this effort. We also extend our appreciation to our editor, Erin Guendelsberger, for her patience and feedback.

In closing, the authors would like to acknowledge the people who helped support them throughout this endeavor.

Jennifer L. Walton-Fisette. This edition is lovingly dedicated to my wife, Theresa, and my children, Quinn and Harper, who have brought so much joy, love, and happiness to my life. I am truly grateful for their continued support of my professional endeavors. I want to also dedicate this edition with gratitude and love to my brother, Michael. This book is also dedicated to my coauthor, Deb, who has been a great mentor and friend for many years. Her work ethic, attention to detail, ability to wax poetic justice out of a salient concept, and thoroughness in staying on top of the latest research and trends have allowed this Foundations text to be a success for decades. I continue to learn so much from her and feel grateful that I get a first-hand experience of her brilliance, humbleness, and caring heart.

Deborah Wuest. I'd like to dedicate this edition to my daughter, Meriber, who has been supportive throughout this revision and the many that came before. This book is also dedicated to my early-morning writing companions—my cats Jake, Rosie, Mia, and Mira, and my dogs, Ally Goose and Bella. They were great company and, in their honor, a portion of the proceeds of this edition will be donated to the SPCA. Lastly, a special thank you to my co-author, Jen, who is the lead author for this edition. Jen's depth and breadth of knowledge of the field, her passion for learning, and her commitment to social justice are reflected throughout this textbook. Jen's enthusiasm for this revision, her attention to the myriad of details required, her humor in our e-mail exchanges, and her work ethic helped move this revision forward. I feel honored to have worked with Jen on this edition, as she is quietly establishing herself as one of the leaders of the field. Most importantly, I remain grateful for our professional relationship and personal friendship.

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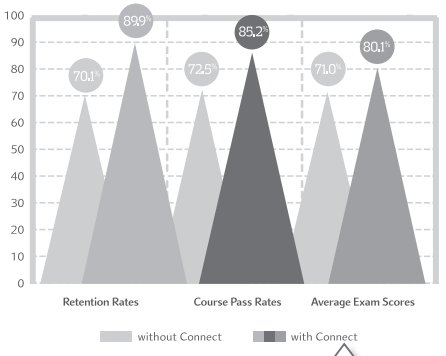

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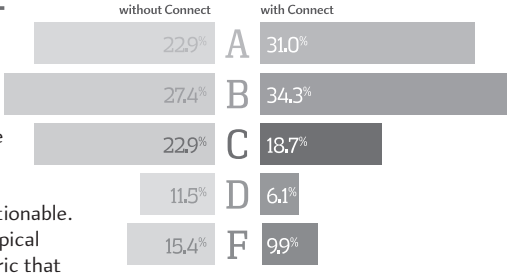

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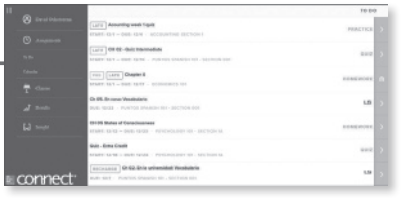

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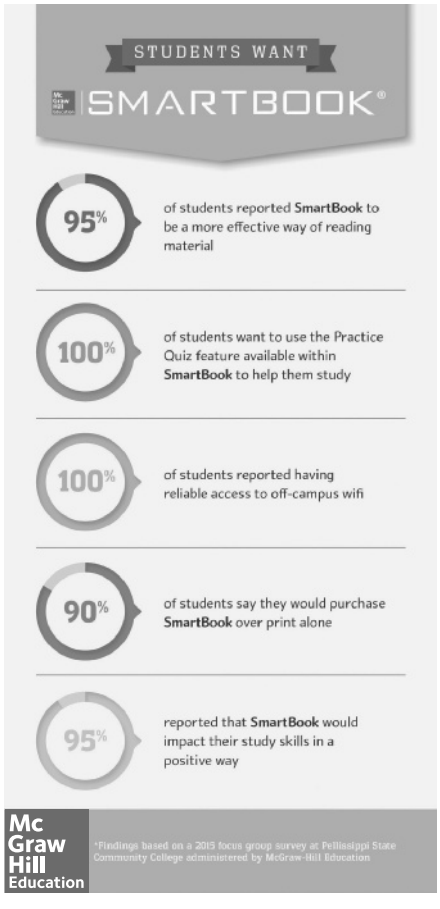

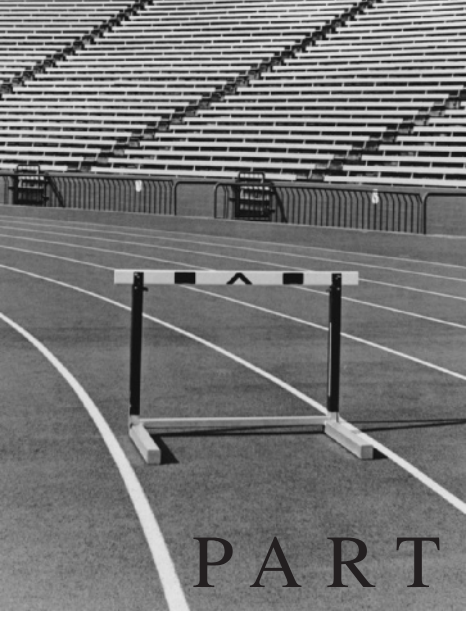

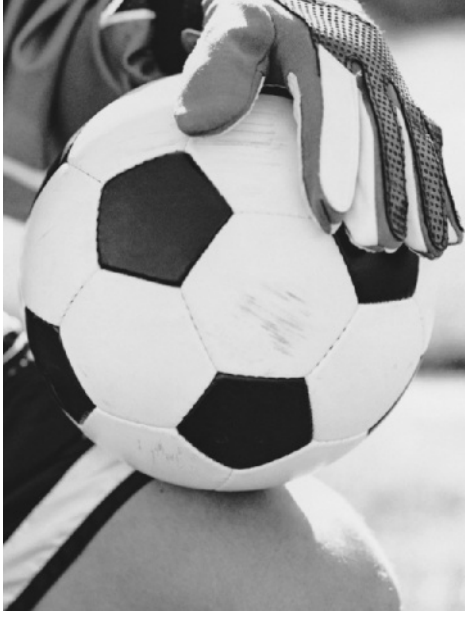

I Nature and Scope of Physical Education, Exercise Science, and Sport

Part I introduces the reader to physical education, exercise science, and sport. The first chapter sets the stage for the reader by providing definitions and an introduction to the specialized areas of study within physical education, exercise science, and sport. Chapter 1 concludes with a discussion of how to grow as a professional in physical education, exercise science, and sport. The second chapter includes the influences of various philosophies on programs and provides the reader with information about the objectives and assessment of physical education, exercise science, and sport. Chapter 3 describes the contribution of physical education, exercise science, and sport to society and health, and the critical role of professionals delivering services to people of all ages.

Physical education, exercise science, and sport are representative of the growing and expanding field of kinesiology. The growth of this field is reflected in the expanding knowledge base and the development of specialized areas of study. The expansion of physical education, exercise science, and sport has created a diversity of career options for professionals.

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CHAPTER 1

MEANING AND SCOPE

OBJECTIVES

After reading this chapter students should be able to—

- Discuss the nature of contemporary physical education, exercise science, and sport, and show how it has evolved during the past five decades.
- Define the following specialized areas of study: sport philosophy, sport history, sport sociology, sport and physical activity psychology, motor development, motor learning, biomechanics, exercise physiology, sports medicine/athletic training, physical education pedagogy, adapted physical activity/physical education, and sport management.
- Describe how the disciplines are interdisciplinary to the professions of physical education, exercise science, and sport relative to the field of kinesiology.
- Explain the relationship of physical education, exercise science, and sport to allied fields of study.
- Describe the different types of research reports and their application to physical education, exercise science, and sport.
- Identify social media resources that can inform the practice within the field of physical education, exercise science, and sport.

This is one of the most exciting, dynamic times in the history of physical education, exercise science, and sport. Unfolding before us is the vision of lifetime involvement in physical activity for all people. This powerful vision is compelling for physical educators, exercise scientists, and sport leaders who have the potential to put it into action, which can influence the well-being and quality of life of people of all ages.

Contemporary physical education, exercise science, and sport have evolved from a common heritage—the traditional program of physical education designed to prepare teachers to serve children and youth in the school setting. Since the 1960s, the foundation, scope, and focus of our programs have grown and changed tremendously. As physical education expanded, new disciplines of study—exercise science and sport—emerged. As the knowledge base comprising this multidimensional field grew, specialized areas of

SOCIAL JUSTICE

Defining Social Justice: Professionals who are committed to social justice strive to provide opportunities for equal access and to show sensitivity to those that are marginalized and less fortunate by challenging injustice and valuing diversity.

Talking Points

- Because of the development of the field of kinesiology and the growth of the disciplines within human movement, there is a wider range of expertise available from current and future professionals to best meet the needs of our diverse population across the lifespan.
- Physical activity initiatives and opportunities need to be provided to all individuals regardless of one's social identity and status [e.g., gender identity, race, sexual orientation, (dis)ability, socioeconomic status, and age] if we want to increase physical activity levels and decrease chronic and hypokinetic diseases.
- All aspects of human movement need to be advocated for and supported rather than placing emphasis on judging and critiquing the level or type of an activity over others (e.g., playing a sport is better than walking or doing yoga).
- Emphasis needs to be placed on the interrelatedness of the disciplines and allied fields instead of the disciplines operating as silos or in competition with one another.
- Establishing a critical perspective through scientific-based research will allow professionals to make informed decisions that influence their clients, players, employees, or students.

study evolved and exciting new career opportunities began to appear for qualified professionals. Today physical education, exercise science, and sport professionals serve people of all ages in a diversity of settings within a new and reformed field of study, kinesiology.

Providing an overview of the entire field of kinesiology is, quite admittedly, a challenge as it is expanding and changing rapidly. This virtual explosion of knowledge has led to the development of new areas of study that are highly specialized and discrete and yet, at the same time, highly interrelated and vitally connected. The expansion of the former field of physical education has led to considerable debate among professionals that focuses on such issues as the appropriate name for the discipline and how best to define the relationship between scientific research and professional practice. Despite the ongoing debate, the growing consensus is that the central focus of this complex, multifaceted field is human movement or, more generally, physical activity.[1] The current name of "the field" most notably and frequently used is kinesiology. Thus in this text, we will refer to the field as kinesiology; however, our specific emphasis will be placed on and within the disciplines of physical education, exercise science, and sport.

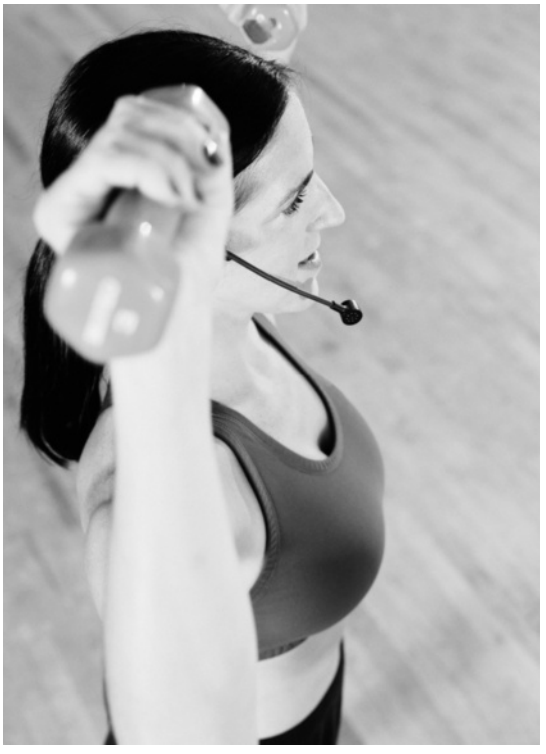
We now know that leading a physically active lifestyle can help prevent disease and positively contribute to health and well-being throughout the lifespan. If the health of our nation is to improve, physical education, exercise science, and sport professionals must make certain that all people have access to programs, regardless of their age, race, ethnicity, gender, gender identity, sexual orientation, ability/disability status, income, educational level, or geographic location. This is a challenge that awaits you as future professionals.

Career opportunities in physical education, exercise science, and sport range from teaching in the school setting to instructing in nonschool settings, such as leading group exercise classes in a community or corporate fitness setting.

Physical educators, exercise scientists, and sport leaders need to know how to read scientific and practitioner-based research. As the field continues to grow and change, this knowledge base will inform your professional practice and provide a clearer picture of all individuals across the lifespan within today's society. As we enter the next decade in the twenty-first century, new and more exciting opportunities and challenges await us.

CONTEMPORARY PHYSICAL EDUCATION, EXERCISE SCIENCE, AND SPORT PROGRAMS

The proliferation of physical education, exercise science, and sport programs during the last five decades has been remarkable. Programs have expanded from the traditional school setting to community, home, worksite, commercial, and medical settings. School-community partnerships bring sport instruction and fitness programs to adults in the community and offer increased opportunities for youth involvement. Community recreation programs offer a great variety of instruction and sport activities for people of all ages and abilities, such as tennis, golf, bowling, softball, yoga, and martial arts clubs.



Health club membership is booming. Today, over 54.1 million people belong to a health club, compared with only 20.7 million in 1990.[2] Members take advantage of a myriad of fitness classes and participate in resistance and cardiovascular training and in one-on-one nutritional counseling. Personal trainers work with clients in health clubs and in their homes. Adults seeking the convenience of working out at home boosted the sales of home exercise equipment to $3.77 billion a year, up from $990 million in 1990.[3] Walkers, joggers, bikers, and swimmers join the millions who meet the daily recommendation of including 30 minutes of physical activity into their lives.

Corporations offer employees comprehensive onsite health promotion programs, encompassing a wide range of fitness activities as well as cardiac rehabilitation and nutritional counseling. Many worksites offer smoking cessation, stress management, and occupational safety courses to their employees, who find it convenient to fit these

People of all ages enjoy athletic competition.
Courtesy of Sarah Rich

health-enhancing opportunities into their busy schedules. Hospitals sponsor cardiac rehabilitation programs and increasingly offer fitness programs to community members. Sports medicine clinics treat injured sport and fitness participants of all ages, no longer limiting their practice to the elite adult athlete.

People of all ages are seeking out sport opportunities in many different settings. Youth sports involve more than 45.7 million children a year.[4] Approximately 7.7 million athletes participate in interscholastic sports and over 560,000 participate in intercollegiate sports.[5–8] Sport events such as AAU basketball and travel teams, Senior Games, running events, Tough Mudders, and master's swimming competitions involve millions of adults in sport competitions. Community recreational leagues for basketball, softball, soccer, and volleyball provide increased opportunities for participation. Sport events such as the Super Bowl, the Olympics, the World Cup, and the National Collegiate Athletic Association basketball tournament capture the enthusiasm of millions of spectators. Girls and women are participating in sports and physical activities in record numbers.

School physical education programs focus on promotion of lifespan involvement in physical activity. Students learn the skills, knowledge, and attitudes that will enable them to participate in various physical activities throughout their lives. Elementary school physical education programs focus on helping children attain competency in the fundamental motor skills (e.g., throwing and catching) and movement concepts (e.g., balance) that form the foundation for later development of specialized games, sport, fitness, and dance activities. (See Chapter 5.) As children progress through school, skill and fitness development is accompanied by an increased knowledge and understanding of physical activity. High schools offer students the opportunity to choose from several different activities for their physical education program. Some instruction may take place in the community, increasing the range of activities that can be offered to students and encouraging students to use the community facilities during their leisure time. Courses in anatomy, exercise physiology, and athletic training may be included in the curriculum, further developing students' understanding and appreciation of physical activity. Intramural programs afford students of all skill levels the opportunity to compete against their classmates. Interscholastic athletics offer highly skilled boys and girls the chance to compete against students from other schools.

At the collegiate level, young adults enroll in courses in CrossFit or tennis, work out at fitness centers, join wellness and fitness classes, and take part in recreational sports programs. Intercollegiate athletic programs for men and women continue to expand, involving more participants and attracting greater interest from the public.

People are engaging in physical activity in record numbers. There is increased public recognition that being active is good for your health. Several national reports, such as the 2016 National Physical Activity Plan,[9] *Healthy People 2020,*[10] and *The Surgeon General's Vision for a Healthy and Fit Nation,*[11] present overwhelming evidence that people of all ages can improve their health and quality of life by including moderate amounts of physical activity in their daily lives. Although most people know that physical activity is good for them and participation in physical education, exercise science, and sport programs is at an all-time high, a closer look at the participation

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by children, adolescents, and adults reveals much cause for concern.

Despite the documented health benefits of physical activity, 80% of adults do not meet the recommended amount of aerobic and muscle-strengthening physical activity.[12] Young children and adolescents are more active than adults are, but their activity levels decrease with age. Only 27% of high schoolers met the recommendation for aerobic capacity and muscle-strengthening activity.[13] In today's society, many children and youth are inactive, unfit, and overweight, placing them at increased risk to develop many chronic diseases.

In the United States, the prevalence of overweight and obesity among children, adolescents, and adults has risen at an alarming rate during the past 30 years. Concerned that health problems associated with overweight and obesity could reverse many of the nation's recent health gains, the US Surgeon General in 2010 issued a *Vision for a Healthy and Fit Nation*.[11] The Surgeon General called for individuals and groups across the United States to assist Americans in balancing healthful eating with regular physical activity. Ensuring daily, quality physical education in the schools, incorporating more physical activity into daily life, and increasing opportunities for physical activity at worksites were among the action priorities.

In 2013, with poor diet and physical inactivity identified as the second leading cause of preventable death in the United States, the Centers for Disease Control and Prevention's (CDC) Division of Nutrition, Physical Activity, and Obesity again called for America to get active and eat healthier. Numerous initiatives developed by the CDC and Department of Health and Human Services encourage Americans to increase the amount of physical activity in their lives and to make healthier dietary choices.[14] These public health initiatives reflect the important role of physical activity in health, not only in terms of quantity of life but in having a healthier quality of life.

Further examination of health status and physical activity patterns in the United States reveals health disparities and fitness inequities among different population groups. Age, socioeconomic status, race, ethnicity, gender, educational attainment, and geographic location were found to influence physical activity levels. Inactivity is greatest among women, minorities, the economically and educationally disadvantaged, people with disabilities, and the aged.[10] These populations have less access to services and face other barriers to the adoption and maintenance of physically active lifestyles. Their limited opportunities for physical activity adversely affect their health, their quality of life, and, ultimately, their lifespan.

Involvement in physical activity should begin at an early age and continue throughout one's life. School physical education programs are the primary avenue for helping children and youth learn the skills, knowledge, and attitudes to lead a healthy, physically active lifestyle. Health policy reports recognize the important contribution physical education can make to health and call for daily, high-quality physical education for all students K–12.[10] Unfortunately, the number of children and youth participating in daily physical education programs has declined. Daily participation in physical education by high school students decreased from 42% in 1991 to 25% in 1995, and rose slightly to 29% in 2013.[13,15] Many lifelong habits (e.g., drug and alcohol abuse, smoking, lack of physical activity) and many diseases (e.g., type 2 diabetes, heart disease) have their roots in childhood. That's why it is important to develop positive health habits early in life. Over 50 million students are enrolled in public and private elementary and secondary schools in the United States and are projected to reach 56.5 million by the 2025–2026 academic year, with a slight increase in public schools and a significant decrease in private schools.[16] Imagine the health benefits if each of these students had access to daily quality physical education pre-K–12. Increasing the number of children and youth that have the opportunity to participate in quality physical education programs on a daily basis is an important priority.

The phenomenal growth of physical education, exercise science, and sport programs—the expansion to new settings and the greater inclusion of people of all ages and abilities—has created a wide array of career opportunities for students interested in these exciting professional areas. Employment opportunities range from the traditional career of teaching physical education and coaching in the schools to sport instruction and fitness-related careers in community and commercial facilities. Increasingly common are career opportunities in cardiac rehabilitation, athletic training, and worksite health promotion. Careers in sport marketing, sport management, and sport communication are growing in popularity.

The main challenges facing professionals are increasing the level of physical activity by people across the nation and addressing inequities in physical activity opportunities. As physical education, exercise science, and sport professionals, we must make a greater commitment to reach out to these populations and involve them in our programs. We must address the specific barriers that inhibit the adoption and maintenance of physical activity by different population groups, utilize new approaches that are sensitive to the needs of increasingly diverse populations, and improve access by developing quality public programs in schools, recreation centers, worksites, and health care settings. All people have the right to good health and the opportunity to be physically active throughout their lifespan.

As you begin your professional career, make a commitment to service. Commit yourself to creating opportunities for all people—regardless of age, income, education, race, ethnicity, gender, sexual orientation, geographic location, or ability—to enjoy and to benefit from lifespan participation in physical activity.

Physical Education, Exercise Science, and Sport Defined

Physical education, exercise science, and sport share a common focus—human movement or, more generally, physical activity. Yet, each discipline

HEALTHY PEOPLE 2020—PHYSICAL ACTIVITY OBJECTIVES

- PA-1: Reduce the proportion of adults who engage in no leisure-time physical activity.
- PA-2: Increase the proportion of adults who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.
- PA-3: Increase the proportion of adolescents who meet current Federal physical activity guidelines for aerobic physical activity and for muscle-strengthening activity.
- PA-4: Increase the proportion of the Nation's public and private schools that require daily physical education for all students.
- PA-5: Increase the proportion of adolescents who participate in daily school physical education.
- PA-6: Increase regularly scheduled elementary school recess in the United States.
- PA-7: Increase the proportion of school districts that require or recommend elementary school recess for an appropriate period of time.
- PA-8: Increase the proportion of children and adolescents who do not exceed recommended limits for screen time.
- PA-9: Increase the number of States with licensing regulations for physical activity provided in childcare.
- PA-10: 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).
- PA-11: Increase the proportion of physician office visits that include counseling or education related to physical activity.
- PA-12: (Developmental) Increase the proportion of employed adults who have access to and participate in employer-based exercise facilities and exercise programs.
- PA-13: (Developmental) Increase the proportion of trips made by walking.
- PA-14: (Developmental) Increase the proportion of trips made by bicycling.
- PA-15: (Developmental) Increase legislative policies for the built environment that enhance access to and availability of physical activity opportunities.

Source: US Department of Health and Human Services. *Healthy People 2020: Improving the Health of Americans*. Washington, D.C.: US Government Printing Office, 2010.

offers a unique approach as to how human movement and physical activity are learned, enhanced, or achieved. Each of these disciplines is defined in this section as well as in the box on page 10.

Physical education is an educational process that uses physical activity as a means to help individuals acquire skills, fitness, knowledge, and attitudes that contribute to their optimal development and well-being. In this definition, the term *education* refers to the ongoing process of learning that occurs throughout our lifespan. Education, just like physical education, takes place in a variety of settings and is not limited to a specific age group. Homeschooling, continuing education through distance learning, worksite health promotion programs, and preschools are just some of the expanded settings for education and physical education programs. Teachers today may be called instructors, leaders, directors, or facilitators. Today's students span the age range, from the very young exploring movement skills in a preschool program to the older adults learning how to play golf through a community recreation program.

Most physical education programs today are based on a developmental model. This model purports that physical education, through the use of

Exercise physiologists study the body's short- and long-term adaptations to exercise.

Source: U.S. Air Force photo by Spencer P. Lane

carefully structured physical activity, contributes to the development of the whole person. Physical education includes the acquisition and refinement of motor skills, the development and maintenance of fitness for optimal health and well-being, the attainment of knowledge about physical activities, and the fostering of positive attitudes conducive to lifelong learning and lifespan participation.

Within the last five decades, there has been an increase in the scholarly study of physical education. Research continues to expand our knowledge with respect to the preparation of physical education teachers, teacher effectiveness, teaching methods, improvement of student learning, and it also provides us with new insights on coaches' and athletes' behaviors.

Exercise science is the scientific analysis of exercise or, more inclusively, physical activity. To study physical activity, exercise scientists draw upon scientific methods and theories from many different disciplines, such as biology, biochemistry, physics, and psychology. The application of science to the study of physical activity led to rapid expansion of the knowledge base of exercise science. As the knowledge base of exercise science grew, so did our understanding of the effects of physical activity on various systems of the body. The significant role that physical activity plays in preventing disease and promoting health became clearer. Exercise's value as a therapeutic modality in the treatment of disease and the rehabilitation of injuries became better known.

Exercise science is a very broad area of study, encompassing many different aspects of physical activity. Through research, scholars gain new insights into how people's movements develop and change across their lifespan and further expand their understanding of how people learn motor skills. Analysis of the performance of motor skills using biomechanics leads to improvement in skill efficiency and effectiveness. Researchers' exploration of the limits and capacities of performers has enabled athletes of all abilities to perform at higher levels of achievement. The psychological effects of physical activity on well-being and strategies to enhance adherence to exercise and rehabilitation programs are some other areas of study within exercise science.

Sports are highly organized, competitive physical activities governed by rules. Rules standardize the competition and conditions so that individuals can compete fairly and achieve specified goals. Sports provide meaningful opportunities to demonstrate one's competence and to challenge one's limits. Competition can occur against an opponent or oneself.

People of all ages and abilities engage in sports for enjoyment, personal satisfaction, and the opportunity to attain victory and/or obtain rewards. The level of competition ranges from recreational sport to elite sport. When sport is highly developed, governing bodies regulate sport and oversee its management. *Athletics* refers to highly organized, competitive sports engaged in by skillful participants. At this level, coaches play a significant role, athletes are highly skilled, specially trained officials ensure the fairness of the competition, records are kept, events are promoted through the media, and spectators assume an important role. Sports occupy a prominent position in our society.

Since the early 1970s, there has been an enormous interest in the scholarly study of sport. These sport studies have focused on the significant