Curriculum Review www.curriculumreview.ca
Ministry of Education

Ontario

Proposed Revisions
The Ontario Curriculum
Grades 11 - 12

Health and Physical Education

Exercise Science, Grade 12
PSE4U

April 2009

Exercise Science, Grade 12 PSE4U
University Preparation

This course focuses on the study of human movement and of systems, factors, and principles involved in human development. Students will learn about the effects of physical activity on health and performance, the evolution of physical activity and sports, and the factors that influence an individual's participation in physical activity. The course prepares students for university programs in physical education, kinesiology, recreation, and sports administration.

Prerequisite: Any Grade 11 university or university/college preparation course in science, or any Grade 11 or 12 open course in health and physical education

A. The Basis of Movement

Overall Expectations

By the end of this course, students will:

A1. demonstrate an understanding of the structure and function of various body systems and their physiological relationship to human movement;

A2. demonstrate an understanding of basic laws of physics and biomechanical principles related to improving movement.

Specific Expectations

Anatomy and Physiology

By the end of this course, students will:

1.1 use correct anatomical terminology when describing human movement *(e.g., anatomical position, planes, axes, and basic movement terms such as flexion and extension, terms pertaining to body position such as anterior and superior);*

1.2 identify the major parts of the musculoskeletal system (*e.g., muscles and bones)* and describe the ways in which they relate to human movement *(e.g., according to their location, structure, function, and characteristics)*;

1.3 describe the articular system *(e.g., classification of joints, structure of joints and joint mechanics)* as it relates to human movement *(e.g., elbow as a hinge joint allows for flexion and extension, shoulder as a ball and socket joint allows for various movement such as abduction and adduction, flexion and extension, medial and lateral rotation)*;

1.4 explain skeletal muscle contraction according to the sliding filament theory and describe its relationship to human movement *(e.g., concentric, eccentric and static contractions);*

1.5 describe the three energy systems and explain their contribution to muscle contraction and physical activity (*e.g., ATP/PC system is used for short burst of movement such as a high jump, the anaerobic system is used for an 800 metre event, and the aerobic system is used for continuous activity*);

1.6 explain the relationship between the cardiorespiratory system, the production of energy and the removal of waste products in the working muscles *(e.g. the transportation of nutrients and oxygen and the removal of lactic acid)*;

1.7 describe the acute and chronic effects of physical activity on the body *(e.g. acute effects such as increased heart rate and breathing frequency, increased cardiac output and stroke volume, increased endorphin levels and chronic effects such as muscular hypertrophy, increased cardiorespiratory endurance).*

Biomechanics

By the end of this course, students will:

2.1 explain the laws of physics as they relate to movement *(e.g. Newton's three laws of motion, types of motion, levers and the law of levers*);

2.2 describe the biomechanical principles *(e.g. related to stability, the relationship between force and movement, linear and angular motion)* and their relationship to improving movement;

2.3 use the appropriate laws of physics and/or biomechanical principles to analyse the efficiency of a movement pattern during physical activity *(e.g., sprint start and the Law of action/reaction)*

B. Motor Development and Human Performance

Overall Expectations

By the end of this course, students will:

B1. demonstrate an understanding of individual differences in growth and development;

B2. demonstrate an understanding of how motor learning affects skill acquisition and performance;

B3. demonstrate an understanding of the ways in which nutrition and training affect human performance.

Specific Expectations

Growth and Development

By the end of this course, students will:

1.1 identify the stages of development from infancy to adulthood and describe the factors that affect physical growth and development;

1.2 demonstrate an ability to design a movement-based activity appropriate to an age and stage of development.

Motor Learning

By the end of this course, students will:

2.1 describe the phases of movement *(e.g., preparatory, execution, follow-through*) to analyse a skill *(e.g. for a golf swing, the preparatory phase involves the backswing of the club from the starting position, the execution phase involves the forward drive and moment of contact between the ball and the club and the follow-through involves the deceleration and path of the club after striking the ball)*;

2.2 describe the stages of motor learning *(e.g., cognitive, associative, autonomous*) and the role of feedback and transferability in skill acquisition;

2.3 describe the physical and psychological factors that affect skill performance *(e.g., fatigue, visualization, motivation, audience).*

Nutrition and Training

By the end of this course, students will:

3.1 describe the relationship between nutrition and human performance *(e.g., ensuring caloric and nutrient balance to support optimal performance)*;

3.2 analyse the effects of various performance-enhancing methods and substances (*e.g., carbohydrate loading, nutritional and herbal supplements, drugs, steroids, blood doping)* on human performance;

3.3 analyse the effects of training on human performance *(e.g., by applying appropriate training principles to achieve personal goals such as enhancing health-related fitness or enhancing performance in sport, and by choosing appropriate training methods to maximize fitness/health gains, or competitive performance, by avoiding overtraining*)

3.4 analyse the effects of different environmental conditions *(e.g., air quality, altitude, climate)* can have on the body during physical activity.

C. Physical Activity and Sport in Society

Overall Expectations

By the end of this course, students will:

C1. describe the evolution of physical activity and sport;

C2. analyse the relationship of society and culture to physical activity and sport;

Specific Expectations

Physical Activity and Sport

By the end of this course, students will:

1.1 describe the historical development of physical activity and sport *(e.g., basic survival needs, training for military purposes, athletic competition, physical education as part of the school curriculum, emphasis on personal lifelong fitness);*

1.2 describe factors that influence participation in physical activity and sport *(e.g., current trends, built environment, demographics, role of technology, environmental conditions, personal perceptions of physical activity)*;

1.3 analyze issues in society related to physical activity and sport *(e.g. equal access to physical activity and sport, increased sedentary lifestyles, rising obesity rates, increased health care costs, violence in sports, cheating in sports)*;

Teacher Prompt: "The built environment is defined as the arrangement of activities or land uses within community settings, and the nature of the physical connections between the places where we live, work or play. An emerging body of evidence suggests there is a relationship between the built environment, physical activity, rising rates of overweight and obesity and heart disease and stroke. In what ways can a built environment promote physical activity?"
Student Response: "The ways in which the community is planned affects levels of physical activity, for example, ensuring neighbourhoods are safe will encourage people to be active. In addition, if there are sufficient sidewalks that have lights, as well as having accessible bike paths and parks, this would provide safe places for people to be active."

1.4 identify prominent Canadians involved in physical activity and sport and describe their contributions.

Society and Culture

By the end of this course, students will:

2.1 analyze the relationship between business, sport and physical activity *(e.g., by exploring the nature of sponsorship, by comparing amateur versus professional sport, by investigating the growth of private fitness industries)*;

2.2 explain the importance of being an informed consumer with regards to physical activity and sport;

2.3 describe societal and cultural factors *(e.g., gender representation, ethno-cultural differences, diverse skills and abilities)* that influence the availability and accessibility of sports and physical activity programs;

2.4 describe the benefits of school and community physical activity and sports programs for themselves and for society *(e.g., increased fitness, health enhancement and participation, promotes psychological well-being, better school spirit)*;

2.5 identify career opportunities in fields related to physical activity and sports.