



Learning Objectives

Exercise Theory



Exercise Theory

Unit 1: A Focus on Leadership

Chapter 1: Leadership

Objective I: Defining the leadership role

Sub-objectives:

- Identify basic principles that underlie the role of the fitness leader
- State seven philosophies and/or actions of a fitness leader
- List responsibilities and benefits related to being a fitness leader

Objective II: Identify values, qualities, strategies and skills of leadership

Sub-objectives:

- Identify your personal values for fitness leadership
- State qualities and skills that according to research may help people meet the demands of leadership
- Identify strategies the fitness leader can use in a role as a health educator and promoter of wellness
- Identify one's leadership skills

Objective III: Examining skills and styles of leadership

- Indicate the leadership styles associated with situational leadership
- Apply the instructional leadership styles to situations in fitness leadership
- Prepare a list of tips for fitness leaders to consider when choosing a leadership style
- Describe your personal leadership style

Chapter 2: Leadership Communication

Objective I: Effective and efficient communication

Sub-objectives:

- Identify the elements of communication
- State methods to create and maintain interest when two people are communicating
- Distinguish between effective and efficient communication
- List characteristics of leaders who are effective communicators
- Indicate techniques to maintain effective and efficient verbal communication

Objective II: Verbal and non-verbal communication

Sub-objectives:

- Distinguish between verbal and non-verbal communication
- State the impact of non-verbal communication techniques

Objective III: Questions and feedback

Sub-objectives:

- List reasons for asking questions
- Describe different types of question styles
- List and describe hints for giving and receiving feedback
- List strategies that fitness leaders may use when providing feedback to participants in a fitness class

Objective IV: Knowing your Audience

Sub-objectives:

- Describe the profile of the adult learner

Chapter 3: Understanding the Health Behavior of your Client

Objective I: Creating a positive environment

Sub-objectives:

- Introduce the physical activity/exercise motivation and adherence problem in Canada
- Review reasons for lack of participation and adherence to physical activity and fitness programs
- Understand principles underlying a participant centered approach to learning

Objective II: The personal image

Sub-objectives:

- Understand the concept of exercise identity
- List methods a fitness leader could use to take a positive approach to health related fitness
- Define the term self-efficacy
- Describe how fitness belief, exercise motive image, athletic image, fitness goals and sex image impact a participant's exercise identity

Objective III: Impact of the leader

Sub-objectives:

- Indicate how a fitness leader can empower a participant
- Indicate techniques leaders could use to motivate class participants
- Identify uses and types of need assessments and the reasons for goal setting

Objective IV: Promotion of attitude and behaviour change

Sub-objectives:

- List the six steps of the stages of change model and the processes associated with movement between stages
- State action strategies at each stage of the stages and processes of change model to change health behaviour

Unit 2: Health and Fitness

Chapter 4: The Differences Between Physical Activity, Exercise and Fitness

Objective I: Defining health, physical activity, quality of life and active living

Sub-objectives:

- Describe the difference between being healthy and fit
- Describe the term physical activity
- Identify characteristics associated with the term quality of life
- Describe what is meant by the term active living

Objective II: Define the variables of the FITT principle

Objective III: Health and fitness related benefits of physical activity

Sub-objectives:

- Identify the benefits of daily physical activity
- Define the term physical fitness
- Indicate the relationship between the terms health and physical fitness

Chapter 5: The Wellness Concept

Objective I: Defining wellness

Sub-objectives:

- Define the term wellness
- Explain the term lifestyle
- Identify and define the dimensions of wellness

Objective II: Connections: relating wellness and health

Sub-objectives:

- Indicate interconnection of physical health and other areas of wellness
- Demonstrate the interaction of dimensions of wellness
- List and describe 5 factors related to single bouts of exercise that help to reduce stress
- Describe lifestyle behaviours that can and cannot be modified and how they increase or decrease the risk of health related problems

Objective III: Promoting wellness

Sub-objectives:

- Describe the role of the fitness leader in promoting wellness to class participants

Chapter 6: Basic Components of Physical Fitness

Objective I: Defining fitness related terms

Sub-objectives:

- Differentiate between performance related fitness and health related fitness
- Define the terms cardiovascular fitness, aerobic and maximum oxygen consumption,

muscular strength, muscular endurance, flexibility and body composition

Objective II: Aerobic system and responses to training

Sub-objectives:

- Define maximal aerobic power and maximum aerobic capacity
- Identify exercise related changes in the cardiovascular system which lead to increased cardiovascular efficiency

Objective III: Importance of muscular strength and muscular endurance

Sub-objectives:

- List the benefits of balanced muscle strength
- Describe the role of muscular endurance in posture and injury prevention

Objective IV: Stretching and flexibility

Sub-objectives:

- State the benefits of having good flexibility
- List factors that limit flexibility
- Differentiate between stretching and flexibility
- Describe static flexibility, ballistic stretching and PNF stretching
- Describe the stretch and myostatic reflex of the muscle
- Differentiate between passive and active stretching

Objective V: Health risks and body fat

Sub-objective:

- Identify elevated health risks associated with excess body fat

Unit 3: Anatomy and Applied Movement Mechanics

Chapter 7: Basics of Anatomy

Objective I: Define the terms - anatomy and biomechanics

Objective II: The skeletal system

Sub-objectives:

- State the five important functions of the skeletal system
- Identify the bones of the axial and appendicular skeleton
- Identify factors contributing to bone density and bone loss with aging
- Differentiate between the long, short, flat and irregular bones

Objective III: Defining anatomical, directional and regional terms

Sub-objectives:

- Define terms associated with anatomical position

Objective IV: Joints and their actions

Sub-objectives:

- State the function of cartilage
- Describe the three planes of motion
- Indicate the characteristics of fibrous, cartilaginous and synovial joints
- Identify causes of joint stiffness
- Describe the following synovial joints: hinge, condyloid, ball and socket, sliding, saddle and pivot
- Describe the following terms: flexion, extension, abduction, adduction, rotation, circumduction, hyperextension, lateral flexion, dorsiflexion, plantar flexion, eversion, inversion, supination, pronation, horizontal abduction, horizontal adduction, elevation, depression, retraction, protraction, upward rotation (of the shoulder girdle) and how they relate to specific joint actions of the: neck and spine, knee, hip, and shoulder (Glossary)

Objective V: Ligaments, muscles and their functions

Sub-objectives:

- State the functions of ligaments and their attachments
- Describe the fleshy and fibrous attachment of muscle to bone
- State three types of muscles found in the human body
- State the four functional properties of muscle tissue
- Describe the four roles of muscle
- State the difference and give an example of a one joint muscle and a two joint muscle
- Describe the general structure of a muscle

Objective VI: The muscular system

Sub-objective:

- Identify the major muscle groups and their functions (rectus femoris, vastus medialis, vastus intermedialis, vastus lateralis, biceps femoris, semitendinosis, semimembranosis, gluteus minimus, gluteus medius, gluteus maximus, gracilis, iliopsoas, biceps, triceps, trapezius, rhomboids, serratus anterior, latissimus dorsi, pectoralis major, pectoralis minor, deltoids, rotator cuff, gastrocnemius, soleus, tibialis anterior, adductors, abductors, transverse abdominals, internal obliques, external obliques, rectus abdominus, erector spinae, sartorius)
- Identify the agonist or antagonist of a muscle pair (quadriceps/hamstrings, gluteus maximus/iliopsoas, biceps/triceps, trapezius, rhomboids/serratus anterior, latissimus dorsi/ pectoralis major, medial rotators/lateral rotators of the rotator cuff, gastrocnemius, soleus/ tibialis anterior, adductors/ abductors, abdominals/erector spinae)
- In a given exercise identify the joint action and the prime mover during the concentric, eccentric and isometric phases of the movement

Objective VII: Lever systems

Sub-objectives:

- Define the terms lever and fulcrum
- Demonstrate ways to increase stability considering: center of mass and base of support

- Explain one way in which inertia affects movement
- Describe the three classes of levers
- Indicate how resistance force, length of lever and the angle of pull can alter forces on a muscle

Chapter 8: Exercise Analysis

Objective I: Safe physical activity practices

Sub-objectives:

- Identify and describe the four components of exercise analysis - the SEAT model (Glossary)
- Identify potential risks to joint structures associated with various exercise movements
- Identify precautionary measures for exercise participants designed to prevent injury and increase safety for the following: warm-up or cool-down , body alignment, rate of progression, dynamic movement (ballistic/dynamic stretching, intensity, high impact activity, cross training, range of motion

Unit 4: Basics of Physiology

Chapter 9: The Cardiovascular System

Objective I: The heart: structure and circulation

Sub-objectives:

- Describe the main objective of cardiovascular exercise: “the aerobic effect”
- Identify the structure of the heart
- Differentiate between the systemic and pulmonary circulation
- Indicate the flow of blood through systemic and pulmonary circulation
- Describe the exchange of oxygen and carbon dioxide in the lungs and at the utilization sites
- Describe the flow of gases and nutrients between blood and tissue as it flows through capillaries
- Indicate how the blood is “pushed” and “milked” through the veins
- Describe what happens when blood pooling occurs

Objective II: Blood pressure

Sub-objectives:

- Define blood pressure - systolic and diastolic pressure
- Identify normal blood pressure range and factors affecting blood pressure
- Indicate what “hypertension” means
- State how blood pressure responds to exercise

Objective III: Performance parameters of the heart

Sub-objectives:

- Define cardiac output
- Indicate how cardiac output can be increased by exercise
- Describe the impact of exercise on stroke volume

Objective IV: State the role of iron in carrying oxygen

Sub-objectives:

- State the role of iron in carrying oxygen
- Describe iron deficiency anemia

Objective V: Respiratory responses to exercise

Sub-Objectives:

- Identify responses of the respiratory system to exercise
- Describe guidelines for breathing during muscular conditioning exercise

Chapter 10: Energy Production

Objective I: Energy production in the body

Sub-objectives:

- Identify the body's sources of food for energy production
- State the function of ATP
- Describe the immediate, short term and long term energy pathways
- Identify the symptoms of high lactic acid levels in the body

Objective II: Interaction of energy systems during work

Sub-objectives:

- Describe the energy continuum
- Explain steady state exercise

Unit 5: Principles of Training and Workout Design

Chapter 11: Basic Training Principles

Objective I: Physical training principles

Sub-objectives:

- Explain the physical training goal of adaptability
- Describe the variables to be considered when selecting the intensity of an exercise
- Identify the various methods for monitoring the level of intensity of exercise
- Indicate the time or duration of exercise and the factors to consider
- Identify the criteria to consider when determining the frequency of exercise
- Identify the criteria for selecting type of exercise
- Define the energy cost of physical activity
- Indicate the relationship between the training variables of duration, intensity and frequency
- Define the principles of specificity and progressive overload
- Explain the terms - training threshold, ceiling effect, rest and recovery - as used in training and overtraining and as they apply to the principle of overload
- Define the principle of reversibility

Objective II: Defining overtraining

Sub-objectives:

- Indicate how a fitness participant can avoid overtraining and chronic fatigue

Chapter 12: The Components of Workout Design

Objective I: Components of the fitness class

Sub-objectives:

- Identify and describe the different components of a workout or fitness class
- Explain the physiological responses to each component

Chapter 13: Monitoring Exercise Intensity

Objective I: Physiological responses to exercise

Sub-objectives:

- List the normal signs of the acute effects of exercise

Objective II: Monitoring heart rate during exercise

Sub-objectives:

- Indicate why heart rate is useful for monitoring the intensity of exercise or the amount of physiological stress
- Explain the term target heart rate
- Demonstrate how to take a carotid and radial pulse
- Calculate the target heart rate using the Karvonen and the CPAFLA target heart rate zone methods

Objective III: Perception of effort

Sub-objectives:

- State what is meant by Ratings of Perceived Exertion
- Describe the use of the Dyspnea scale and talk test in monitoring exercise intensity

Chapter 14: Designing, Planning and Delivering

Objective I: The program planning cycle

Sub-objectives:

- State the 5 steps in the program planning cycle
- Discuss the importance of careful planning
- Identify the benefits of planning and consequences of failing to plan

Objective II: Evaluation

Sub-objectives:

- Discuss the importance of evaluation

Chapter 15: Health Screening

Objective I: Health screening instruments and procedures

Sub-objectives:

- Explain the importance of screening for health status in previously sedentary participants
- State the purpose of health screening prior to adopting physical activity
- Describe the PAR-Q and its use with apparently healthy clients
- Explain how to deal with non compliance with PAR-Q requirements

Unit 6: Nutrition

Chapter 16: Understanding Nutrition

Objective I: Nutrients and their functions

Sub-objectives:

- List the six major classes of nutrients and their functions
- Compare carbohydrates, fats and proteins on: contribution to energy systems; energy contained; amount of energy contributed and recommended intake
- Differentiate between the carbohydrates: glucose, glycogen, simple, complex, and fibre
- Give examples of saturated, mono-unsaturated and poly-unsaturated fats
- Differentiate between dietary and blood cholesterol
- Indicate the sources and role of cholesterol
- Explain the terms essential amino acids, non-essential amino acids, complete and incomplete proteins

Objective II: Nutritional supplements

Sub-objectives:

- Summarize the pros and cons of taking protein supplementation
- List the key findings regarding vitamin and protein supplementation
- Differentiate between water soluble and fat soluble vitamins on the source, function, type and intake
- List the intake and food sources of the key major and trace minerals

Objective III: Hydration and dehydration

Sub-objectives:

- Describe the role of water in the body and the factors that cause dehydration
- Identify the impact of dehydration on performance
- Identify steps to take to prevent dehydration during exercise

Objective IV: Promotion of healthy nutrition

Sub-objectives:

- State the five key steps that all adults should take to promote nutritional health
- List the three central principles upon which the Canada's Food Guide is based
- State recommendations about eating before and after exercise
- Identify factors to consider to evaluate nutritional information

- Identify the food groups outlined in Canada's Food Guide to Healthy Eating and recommended servings
- Identify nutritional recommendations for active individuals

Chapter 17: Weight Management

Objective I: Assessing degrees of fatness

Sub-objectives:

- Differentiate between overweight and overfat
- Discuss the methods utilized to determine body weight and body composition

Objective II: Energy balance and weight control

Sub-objectives:

- Define and explain the energy balance equation
- Differentiate between metabolism and metabolic rate relative to rest and exercise
- Identify means of promoting weight loss
- Discuss the importance of aerobic exercise and muscle conditioning for "fat loss"
- Summarize the findings regarding diet as a method of losing weight

Objective III: Eating disorders

Sub-objectives:

- Describe anorexia nervosa and bulimia nervosa

Appendix & Glossary – Canada's Physical Activity Guide to Healthy Active Living

- Explain the activities, recommended activity ranges, and general principles of Canada's Physical Activity Guide

FITNESS THEORY

GLOSSARY OF TERMS

Living Healthy, Eating Healthy

- For active individuals who exercise regularly, nutrition is important in ensuring all energy requirements are met. Active individuals will need to take in a larger amount of calories to match the increased caloric expenditure that occurs through exercise. Recommended daily servings are listed on the Canada's food guide 'rainbow' and the larger end of the scale will ensure that increased amounts of the energy nutrients are taken in. (carbohydrates, fats and protein).
- During exercise there are large losses of water. It is important to prevent dehydration by increasing fluid intake before, during and after exercise. Dehydrating fluids such as coffee, tea, alcohol and other caffeinated beverages should be avoided. These fluids are diuretics and can increase fluid loss. Try water, juices and milk.
- Non-energy nutrients such as vitamins and minerals are also required to stay healthy. However, with a well-balanced and healthy diet, the active individual should rarely require supplements.

Canada's Physical Activity Guide to Healthy Active Living (CPAG)

- According to CPAG it is recommended to accumulate 60 minutes of physical activity everyday to stay healthy or to improve your health. The goal can be reached by building physical activity into your daily routine. There are three activity groups: endurance, strength and flexibility. It is recommended that you do endurance activities 4-7 days per week, strength activities 2-4 days per week and flexibility activities 4-7 days per week. (Refer to the Appendix of the Fitness Theory Manual)

Neck Movements and Muscle(s) that are responsible for those movements.

<u>Movement</u>	<u>Muscles involved</u>
Flexion	Longus coli, scalene, sternocleidomastoid
Hyperextension	Splenius capitis, semispinalis capitis, cervicis
Lateral Flexion	Iliocostalis cervicis, longissimus capitis, cervicis, splenius capitis, cervicis
Rotation	Rotators, semispinalis capitis and cervicis, multifidus, splenius cervicis

Spinal movements

- As there are various joints in the spine, different movements can be possible. One type of joint is the joint between the skull and the first vertebrae (atlanto-occipital). This joint will allow flexion and extension of the head, and slight lateral flexion to either side. The joint that is between the first and second vertebrae (atlanto-axial) allows rotation of the head. The joint that is between the vertebrae (intervertebral) will allow flexion, extension, lateral flexion, and rotation of the vertebral column. The movements that the spine does not allow: extension, hyperextension, adduction and abduction.

Joint Safety

- Joints and surrounding structures can be harmed when movements go beyond the normal range of motion. Taking a joint beyond its normal range of motion so that it is no longer properly aligned can damage the ligaments, which over time can lead to greater injury. Overall movement is dependent on the joint structure so each joint may have different levels of flexibility.
- There are some exercises which must be done carefully so a joint is not taken beyond the normal range of motion. For example, lunges and squats should only be done so that the angle between the hamstrings and gastrocnemius muscle is no less than 90° and the knee is aligned over the foot. Avoid allowing the knee to extend past the foot as it may injure the knee joint.
- Stretches that move the joints out of alignment or their normal plane of motion are also not recommended. (E.g. Hurdler's stretch, rapid twisting of the trunk, neck circles that allow neck hyperextension)

SEAT model: it is a model used to evaluate whether or not a chosen exercise is appropriate to a certain group or client.

- S – Safety – most important; if the exercise is not safe in terms of stabilization, joint structure/safety, alignment or if the exercise is simply too high risk for the person or group another choice should be made
- E – Effectiveness – is the exercise accomplishing what you or the client hopes to? i.e. If the intent is to increase strength, then is the exercise actually doing that or should another exercise be selected? Is the exercise just “fluff” because it looks good or people “like” it?
- A – Applicability – is the exercise functional? That is, will it help to improve performance for the group or individual? For example, choosing pushups for a group of people who work in an office/computer environment is not as applicable as doing seated rows with tubing, because the anterior muscles (pectoralis minor) tend to be short, tight and strong for people in desk jobs, whereas the muscles of the mid-back tend to be weak and lengthened.
- T – Time Efficient – number of repetitions. Keeping repetitions low and resistance mid to high, will allow for effectiveness in a shorter period of time. In general, people do not perform endless repetitions in their life, so doing so in a class is not very functional. We see this commonly in classes where leaders perform hundreds of abdominal curl-ups for example, however, there is no real benefit to doing this, and it is certainly not functional since most people do not find themselves lying on their backs curling up against gravity very often.

Sources:

Brooks, D. (2001). *Effective Strength Training: Analysis and Technique for Upper Body, Lower Body, and Trunk Exercises*. Human Kinetics: Champaign, IL.

Moore, K., Dalley, A. (1999). *Clinically Oriented Anatomy*. 4th Ed. Lippincott Williams & Wilkins. Philadelphia, PA.

Tortora, G. (1999). *Principles of Human Anatomy*. John Wiley & Sons, Inc. New York, NY.