

Lesson Plan

Muscular System

Goals of the Lesson

Cognitive: Students will be able to identify the structures and functions of the muscular system. Students will also learn disorders, medical terms, and medical abbreviations involving the muscular system.

Psychomotor: N/A

Affective: Students will gain appreciation for the interactions of the skeletal and muscular systems.

Learning Objectives (LO)

- LO-1 Compare the location and function of smooth, cardiac, and skeletal muscles.
- LO-2 Describe the typical structure of a skeletal muscle.
- LO-3 Briefly describe the mechanism of muscle contraction.
- LO-4 Explain how muscles work together to produce movement.
- LO-5 Describe the main types of movements produced by muscles.
- LO-6 List some of the criteria for naming muscles, and give examples of each.
- LO-7 Identify and use the roots pertaining to the muscular system.
- LO-8 Describe at least seven disorders that affect muscles.
- LO-9 Interpret abbreviations pertaining to muscles.

Assessments

- Module Quiz
- Section 2 Exam
- Final Exam

Estimated Time on Task

- Learning content, 45 min
- Practice activities, 30 min
- Module quiz, 10 min

Learning Objective 1

Compare the location and function of smooth, cardiac, and skeletal muscles.

Outline

- Smooth muscle
 - Walls of the hollow organs and ducts
 - Operates involuntarily
 - Responsible for peristalsis
- Cardiac muscle
 - Makes up the myocardium of the heart wall
 - Operates involuntarily
 - Responsible for the heart's pumping action
- Skeletal muscle
 - Attached to bones
 - Responsible for voluntary movement
 - Maintains posture
 - Generates a large proportion of body heat

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Pin a large, unlabeled diagram of muscle types (refer to image on PPT slide 6.) to a large soft board. Ask students to identify the three types of muscle and describe the factors that differentiate them.

Materials

Large, unlabeled diagram of muscle types

Web Resources

[Explanation of the Three Types of Muscle](#)

[Types of Muscular Tissue](#)

[How the Muscular System Works: Ted Talk](#)

Learning Objective 2

Describe the typical structure of a skeletal muscle.

Outline

- Fascicles
 - Bundles of muscle cells or fibers
 - Held together by connective tissue
- Fascia
 - Sheath of connective tissue covering each muscle
 - Connective tissues merge to form the tendons that attach the muscle to bones

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Pin a large, unlabeled poster depicting the structure of a skeletal muscle to a soft board (refer to image on PPT slide 7) Pull various flash cards with the meanings of structures of a skeletal muscle. Ask the students for the name of the structure that matches the definition being shown.

Materials

Large, unlabeled poster of the structure of skeletal muscle; Medical terminology flash cards; Medical dictionaries

Web Resources

[Types of Muscular Tissue](#)

Learning Objective 3

Briefly describe the mechanism of muscle contraction.

Outline

- Neuromuscular junction
- Skeletal muscles are stimulated to contract by motor neurons of the nervous system
 - Acetylcholine
 - Actin and myosin
 - ATP and calcium
- Most skeletal muscles contract rapidly to produce movement and then relax rapidly unless stimulation continues
 - Tonus

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Divide the class into pairs or small groups. Based on the information from the module and PPT slides, have them write down the correct order of the actions that must take place at the neuromuscular junction to result in a muscular contraction and movement.

Web Resources

[How the Muscular System Works: Ted Talk](#)

[Types of Muscular Tissue](#)

Learning Objective 4

Explain how muscles work together to produce movement.

Outline

- Muscles work in pairs to produce movement
 - Agonist
 - Prime mover
 - Synergist
 - Antagonist
- Origin
- Insertion

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Pin a large, labeled poster depicting the muscular system to a large soft board. Ask the students to identify origins, insertions, prime movers, and antagonists in the skeletal muscles shown in the poster. Allow the students to use a dictionary to confirm their answers.

Materials

Large, labeled poster depicting the muscular system; Medical dictionaries

Learning Objective 5

Describe the main types of movements produced by muscles.

Outline

- Types of movements produced by muscles
 - Flexion
 - Extension
 - Abduction
 - Adduction
 - Circumduction
 - Rotation
 - Dorsiflexion
 - Plantar Flexion
 - Inversion
 - Eversion
 - Pronation
 - Supination

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Divide the class into pairs. Randomly distribute flash cards of the various movements. Instruct one student to demonstrate the action on the card while the other student tries to name the movement. Allow the students to take turns naming and demonstrating.

Materials

Medical terminology flash cards.

Web Resources

[The Muscular System Explained in 6 Minutes](#)
[Introduction to Anatomy – Movement](#)

Learning Objective 6

Describe at least seven disorders that affect muscles.

Outline

- Criteria for naming muscles
 - Location
 - Direction of fibers
 - Size
 - Shape
 - Number of attachment points (heads)
 - Action

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Ask students to refer to the superficial muscles (anterior and posterior) and work in groups to identify the criterion/criteria by which muscles have been named.

Web Resources

[More in Depth into Types of Muscles](#)

Learning Objective 7

Identify and use the roots pertaining to the muscular system.

Outline

- Roots Pertaining to Muscles

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Randomly distribute flash cards with roots pertaining to muscles and other word parts appropriate to the muscular system, one card per student. Instruct the students to build as many terms as they can by matching their word parts with other students' word parts. Instruct the students to write their terms on the board. Verify their answers with a dictionary.

Materials

Medical terminology flash cards; Medical dictionaries

Learning Objective 8

Define and list the functions of the integumentary system

Outline	Instructor's Notes
<ul style="list-style-type: none"> • Muscular dystrophy • Multiple-system disorders involving muscles <ul style="list-style-type: none"> • Polymyositis • Fibromyalgia syndrome (FMS) • Chronic fatigue syndrome • Myasthenia gravis • Amyotrophic lateral sclerosis 	<ul style="list-style-type: none"> • Stress injuries <ul style="list-style-type: none"> • Repetitive strain injury • Damages to soft tissue <ul style="list-style-type: none"> • Sprain • Muscle strain • Bursitis • Tenosynovitis or tendinitis • Upper extremity conditions <ul style="list-style-type: none"> • Rotator cuff (RTC) injury • Epicondylitis • Carpal tunnel syndrome • Trigger finger • Lower extremity conditions <ul style="list-style-type: none"> • Hamstring strain • Shin-splint • Achilles tendinitis

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Divide the class into groups. Give each group a different case study concerning a disorder pertaining to the muscular system. Ensure that the disorder is not identified by name and that the subject's identifying information is removed or obscured. Give each group a medical dictionary to clarify the meanings of any difficult words in the case study. Have each group read their case studies and determine the disorder being described. Ask students to discuss and write short notes on their cases in terms of cause and description of the patient's condition, possible treatment or surgery suggested, etc. After several minutes, ask a volunteer from each group to explain their group's case.

Materials

Several case studies pertaining to different muscular disorders; Medical dictionaries

Web Resources

[The Basic Science of Tendons and Tendonitis](#)

[Rotator Cuff Tears](#)

[Myasthenia Gravis](#)

Learning Objective 9

Interpret abbreviations pertaining to muscles.

Outline

- Abbreviations pertaining to muscles

Instructor's Notes

Resources and Activities

Resources

PPT slides, Pre-test, Practice Activities, Module Quiz, Section 2 Exam, Final Exam

Activities

Randomly distribute two sets of flash cards: one with the abbreviations, and a second with the expanded forms. Instruct each student to find his or her match. Then have each pair present to the class their abbreviation and its significance.

Materials

Medical terminology flash cards; Medical dictionaries
