

INHE Study Guide – Module 2 Exam 1

Skeletal System, Joints, and Muscular System

Skeletal System (Foundation of the Body)

Key Concepts

- Bones are **living tissues**, not just structural support
- Primary functions:
 - Support the body
 - Protect organs
 - **Produce blood cells** (inside bone)

Bone Physiology

- Bones are constantly changing through:
 - **Development (growth)**
 - **Remodeling (repair and adaptation)**
- Different cells:
 - Build bone
 - Break down bone
 - Maintain bone structure

Bone Structure

- Long bones have **two ends** (important for joints)
- Ends are covered with **smooth cartilage**:
 - Reduces friction
 - Allows smooth movement

Skeletal Organization

Two Main Divisions

- **Axial Skeleton**
 - Skull, spine, rib cage
 - Function: protection and posture
- **Appendicular Skeleton**
 - Arms and legs
 - Function: movement

Bone Markings

- Depressions and projections
- Serve as:
 - Muscle attachment points
 - Joint formation structures

Joints & Movement

Joint Function

- Joints are where bones meet
- Determine how movement occurs

Types of Movement

You must understand:

- Movements that **decrease joint angle**
- Movements **toward the midline**
- Movements in **anterior (forward) direction**

Synovial Joints

- Freely movable joints
- Contain **synovial fluid**:
 - Reduces friction
 - Nourishes joint

⚠ Joint Conditions & Posture

Common Joint Issues

- Fluid buildup → swelling
- Crystal deposits → pain/inflammation
- Cartilage breakdown → reduced mobility

Postural Conditions

- Spine has natural curves
- Excessive curvature leads to:
 - Imbalance
 - Strain
 - Dysfunction

👤 Muscular System (Movement System)

Main Functions

- Movement
- Posture
- Stability

Muscle Properties

- Ability to **respond to stimuli**
- Ability to **contract and produce force**

⚡ Muscle Physiology

Contraction Basics

- Muscles contract using **specific proteins**
- Proteins interact to create force

Muscle Attachments

- Muscles attach to bones via connective tissue
- Two types:
 - **Stable attachment (origin)**
 - **Movable attachment (insertion)**

📌 Muscle Roles

Muscles work together in groups:

- **Prime movers** → create movements
- **Synergists** → assist movement
- **Antagonists** → oppose/control movement

👉 This balance creates **smooth, controlled motion**

🔄 Muscle Contractions

You must understand:

- **Concentric contraction**
 - Muscle shortens
- **Isometric contraction**
 - Muscle produces force without movement

Neuromuscular Control

How Muscles Are Activated

- Nervous system sends signals to muscles
- A **chemical messenger (neurotransmitter)** triggers contraction

Energy & Calcium

- Muscle contraction requires:
 - **ATP (energy source)**
 - **Calcium (released inside muscle cells)**

Protective Mechanisms

The body prevents injury through:

- **Muscle spindles**
 - Detect rapid stretch
 - Cause reflex contraction
- **Golgi tendon organs**
 - Detect excessive tension
 - Cause muscle relaxation

Common Conditions

Be familiar with:

- Chronic widespread pain conditions
- Inflammation due to overuse
- Muscle/tendon injuries (tears, strains)
- Neck-related conditions from sudden movement or imbalance

How to Study for This Test


Focus on:

- Understanding **structure** → **function relationships**
- Connecting systems:
 - Bones + joints + muscles
- Recognizing **cause and effect** of dysfunction

Key Study Strategy

Ask yourself:

- How does this structure function?
- How does it relate to movement?
- What happens when it fails?

 If you can answer these, you are ready.