



Unit 6: Skeletal System

Subject Area: Science	Course: Anatomy & Physiology		
Unit Title: Skeletal System	Grade(s): 11 & 12	Start: October/ March	End: October/ March
Unit Summary: This unit discusses the skeletal system, which includes bones, cartilage, and ligaments. The unit begins by covering the functions of the skeletal system, including support, protection, movement, mineral storage, and blood cell formation. It then delves into the different types of bones found in the body, their structure, and the different types of bone cells. The unit also covers the different types of joints found in the body, including fibrous, cartilaginous, and synovial joints, and the movements they allow. Additionally, it discusses the different types of cartilage, such as hyaline and fibrocartilage, and their functions in the body. Furthermore, the unit covers the different stages of bone development, including ossification and bone growth, and explains the factors that can affect bone growth and development, such as hormones and nutrition. It also covers the process of bone remodeling and repair, and the factors that can lead to bone loss, such as osteoporosis. Finally, the unit concludes with a discussion of the different types of bone fractures and their classifications based on the severity of the injury. It also covers some of the diagnostic tools used to assess bone health, such as X-rays and bone density tests, and the various treatments for bone fractures and diseases of the skeletal system.			

Stage 1: Desired Results

Massachusetts Learning Standards

LS1. From Molecules to Organisms: Structures and Processes

- HS-LS1-2. Develop and use a model to illustrate the key functions of animal body systems, including (a) food digestion, nutrient uptake, and transport through the body; (b) exchange of oxygen and carbon dioxide; (c) removal of wastes; and (d) regulation of body processes.



Unit 6: Skeletal System

- HS-LS1-3. Provide evidence that homeostasis maintains internal body conditions through both bodywide feedback mechanisms and small-scale cellular processes.

Vision of a Graduate Performance Outcome(s)

Innovative Thinker

An innovative thinker is someone who:

- Uses reasoning to question, process, and evaluate Information.
- Is curious, creative, resourceful, and adaptable when looking for solutions.

Approaches challenges as opportunities for growth.

Balanced Life

An individual with a balanced life is someone who:

- Identifies and maintains the characteristics of relationships that support overall personal health and wellness.
- Demonstrates skills for self-awareness, self-regulation, and self-advocacy.
- Applies strategies to prioritize, manage time, and organize responsibilities, and adjusts routines accordingly to support health and happiness.
- Identifies and maintains interests and/or passions that foster overall health and happiness.

Lifelong Learner

A lifelong learner is someone who:

- Explores a variety of learning opportunities and experiences to inform life decisions.
- Takes ownership of their learning by adapting to change, responding to feedback, and demonstrating persistence.



Unit 6: Skeletal System

- Finds the curiosity and motivation within themselves to identify opportunities for personal growth and self-improvement.

Effective Communicator

An effective communicator is someone who:

- Selects, uses, and interprets types of communication (verbal, non-verbal, digital) according to context and audience.
- Collaborates with others in order to achieve desired learning outcomes.
- Engages others with differing opinions through thoughtful, healthy discourse.
- Presents information in a purposeful manner to a variety of audiences in order to inform, influence, motivate, and/or entertain.

Transfer (Authentic, relevant application of learning to new situations)

Students will be able to independently use their learning to...

You have been hired as a health and wellness consultant to design a bone health program for a group of middle-aged adults. Your task is to create a comprehensive program that will help improve bone health and reduce the risk of osteoporosis.

Task Requirements:

1. Research the various factors that contribute to bone health, including nutrition, exercise, and lifestyle factors.
2. Develop a nutrition plan that is rich in calcium, vitamin D, and other essential nutrients that are critical for bone health.
3. Design an exercise program that includes weight-bearing exercises, resistance training, and flexibility exercises that can help improve bone density and reduce the risk of fractures.
4. Incorporate lifestyle changes that can help improve bone health, such as reducing alcohol and caffeine intake, quitting smoking, and getting adequate sleep.



Unit 6: Skeletal System

5. Create educational materials that explain the importance of bone health and provide tips and strategies for maintaining strong and healthy bones.
6. Present your bone health program to the group of middle-aged adults, providing detailed instructions and guidance on how to follow the program and achieve optimal bone health.
7. Monitor and evaluate the program's effectiveness over time, making adjustments as needed to ensure that participants are achieving their bone health goals.

Meaning

Enduring Understandings

Students will understand that...

- The skeletal system provides structural support for the body, protects internal organs, and plays a key role in movement and locomotion.
- Bones are living tissues that undergo constant remodeling and repair throughout life, and are influenced by a variety of factors including nutrition, exercise, and hormonal balance.
- The structure and function of bones are intimately linked, with different types of bones having unique shapes and features that allow them to perform specific functions in the body.
- Disorders of the skeletal system can have significant impacts on overall health and quality of life, and prevention and treatment strategies should be tailored to individual needs and risk factors.
- Understanding the anatomy and physiology of the skeletal system is critical for healthcare

Essential Questions

Students will consider...

- What are the key functions of the skeletal system, and how do bones contribute to overall health and wellbeing?
- How do bones develop and grow, and what factors influence their structure and composition?
- What are the different types of bones in the body, and how do their shapes and features relate to their functions?
- How does the skeletal system interact with other organ systems, such as the muscular and nervous systems, to facilitate movement and coordination?
- What are some common disorders and injuries of the skeletal system, and what strategies can be used to prevent or treat them?

Unit 6: Skeletal System

professionals, athletes, and anyone interested in promoting lifelong bone health	
Acquisition	
Knowledge Students will know... • Anatomy and structure of bones • Bone development and growth • Types of bone tissue • Bone metabolism and the role of hormones • The process of bone remodeling and repair • Factors that influence bone health, such as nutrition, exercise, and lifestyle factors • Risk factors for osteoporosis and other bone diseases • Strategies for improving bone health and reducing the risk of bone diseases. • Bones • Cartilage • Joints • Articulations • Diarthrosis • Amphiarthrosis • Synarthrosis • Synovial joint • Joint capsule • Synovial membrane	Skills Students will be skilled at... • Research skills to gather information related to bone health, nutrition, exercise, and lifestyle factors. • Analytical skills to evaluate the information gathered and design a comprehensive bone health program. • Nutrition knowledge to develop a nutrition plan that is rich in calcium, vitamin D, and other essential nutrients for bone health. • Exercise physiology knowledge to design an exercise program that includes weight-bearing exercises, resistance training, and flexibility exercises that can help improve bone density and reduce the risk of fractures. • Communication skills to present the bone health program to the group of middle-aged adults and provide detailed instructions and guidance on how to follow the program. • Monitoring and evaluation skills to track the progress of participants in the program and make adjustments as needed to ensure that they are achieving their bone health goals.



Unit 6: Skeletal System

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