Topic 1: Anatomy

Content Area: **Science**
Course(s): **IB Sports, Exercise & Health Science**
Time Period: **1st Marking Period**
Length: 3 weeks

Unit Overview

Skeletal: Students will be able to distinguish anatomically and physiologically between appendicular & axial skeletons, using appropriate anatomical directional terms. In addition, students will be able to not only describe the 4 types of bones found in the skeleton but also be able to label and describe the anatomy of a long bone. Students will also be able to outline the functions of various connective tissues associated with the skeletal system (cartilage, ligaments & tendons). Students will be able to describe the movements of all six types of synovial joints as well as outline the anatomical features common to them.

Muscular: Students will be able to distinguish between the three types of muscle in the body as well as outline the characteristics in common to all. Students will be able to identify and describe the components of a muscle as well as identify by location of 20 large muscles in the body.

STAGE 1- DESIRED RESULTS

2020 New Jersey Student Learning Standards- Science

DCI: HS-LS1-2

CCC: Patterns, Scale, Proportion & Quantity, Structure & Function
S&EP: Asking questions/defining problems, developing and using models, planning and carrying out investigations, analyzing and interpreting data, using mathematics and computational thinking, constructing explanations, engaging in argument from evidence, obtaining, evaluating & communicating information

Essential Questions

How does the skeletal allow us to move?

How does the structure of bones & joints support their function?

How does the body allow for different types of flexibility, movement and range of motion?

How do muscles allow us to move? Which muscles work to control specific body movements?

Enduring Understanding

Students will understand the movement systems of the body in order to gain the foundation necessary to understand
biomechanics and muscle metabolism.

Students will know…

Vocabulary: axial, appendicular, long, short, flat, irregular, epiphysis, spongy bone, articular cartilage, diaphysis, compact bone, bone marrow, marrow cavity, blood vessel, periosteum, inferior, superior, proximal, distal, medial, lateral, posterior, anterior, anatomical position, cartilage, ligaments, tendons, joint, fibrous joint, cartilaginous joint, synovial joint, synovial membrane, synovial fluid, bursae, meniscus, articular capsule, hinge joint, ball and socket joint, condylar joint, pivot joint, saddle joints, contractility, extensibility, elasticity, atrophy, hypertrophy, nerve stimulus, capillaries, smooth muscle, cardiac muscle, skeletal muscle, epimysium, perimysium, endomysium, muscle fibre, myofibril, sarcomere, actin, myosin, muscle origin, muscle insertion

Students will be able to…

1.1.1 distinguish anatomically between the axial and appendicular skeleton
1.1.2 distinguish between the axial and appendicular skeleton in terms of function
1.1.3 state the four types of bone
1.1.4 draw an annotate the structure of long bones
1.1.5 apply anatomical terminology to the location of bones (vocab: inferior, superior, proximal, distal, medial, lateral, posterior, anterior) assuming anatomical position
1.1.6 outline the functions of connective tissue (limited to cartilage, ligaments and tendon)
1.1.7 define the term *joint*
1.1.8 distinguish between the different types of joints in relation to movement permitted (limited to fibrous, cartilaginous and synovial joints)
1.1.9 outline the features of a synovial joint (vocab: articular cartilage, synovial membrane, synovial fluid, bursae, meniscus, ligaments, articular capsule)
1.1.10 list the different types of synovial joints (vocab: hinge, ball and socket, condyoid, pivot, gliding and saddle)
1.2.1 outline the general characteristics common to muscle tissue (vocab: contractility, extensibility, elasticity, atrophy, Hypertrophy, nerve stimuli, capillaries)
1.2.2 distinguish between the different types of muscle (smooth, cardiac, skeletal)

1.2.3 annotate the structure of skeletal muscles (epimysium, perimysium, endomysium, muscle fibre, myofibril, sarcomere, actin, myosin)
1.2.4 define the terms origin & insertion of muscles
1.2.5 identify the location of skeletal muscles in various regions of the body

STAGE 2 - EVIDENCE OF LEARNING

Formative Assessment

- 3- Minute Pause
- A-B-C Summaries
- Analogy Prompt
- Choral Response
- Debriefing
- Exit Card / Ticket
- Hand Signals
- Idea Spinner
- Index Card Summaries
- Inside-Outside Circle Discussion (Fishbowl)
- Journal Entry
- Misconception Check
- Observation
- One Minute Essay
- One Word Summary
- Portfolio Check
- Questions & Answers
- Quiz
- Self-Assessment
- Student Conference
- Think-Pair-Share
- Web or Concept Map

Authentic Assessments

Skeletal Diagram – label bones, distinguish between axial/appendicular, identify anatomical directions

T-chart – comparing 3 types of joints by structure & function

Synovial joint model – build an anatomically correct clay model of a synovial joint and identify each component

Venn Diagram – compare/contrast 3 types of muscles

Origin/insertion model – students label on each other origin/insertion of top 20 muscles

Muscle Diagram – label structures & layers of a skeletal muscle

Finger Length Lab – complete investigation of correlation between finger length & sporting ability; follow format of IA
investigation as practice for students

Benchmark Assessments

1.1 Quiz
1.2 Quiz
UNIT 1 TEST (comprised of Paper 1 & Paper 2 type questions)

STAGE 3- LEARNING PLAN

Instructional Map

Review "I can" statements to identify learning objectives
Learn gross anatomical structures and then microscopic structures
Relate functions to structures
Practice using appropriate terminology to describe directions, regions & structures
Practice constructing open ended responses
Review "I can" statements to self-assess knowledge

Modification/Differentiation of Instruction

Differentiation Strategies for Special Education Students

- Remove unnecessary material, words, etc., that can distract from the content
- Use of off-grade level materials
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Time allowed
- Level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Varied homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary

- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Ability to work at their own pace
- Present ideas using auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment
- Differentiated checklists and rubrics, if available and appropriate

Differentiation Strategies for Gifted and Talented Students

- Increase the level of complexity
- Decrease scaffolding
- Variety of finished products
- Allow for greater independence
- Learning stations, interest groups
- Varied texts and supplementary materials
- Use of technology
- Flexibility in assignments
- Varied questioning strategies
- Encourage research
- Strategy and flexible groups based on formative assessment or student choice
- Acceleration within a unit of study
- Exposure to more advanced or complex concepts, abstractions, and materials
- Encourage students to move through content areas at their own pace
- After mastery of a unit, provide students with more advanced learning activities, not more of the same activity
- Present information using a thematic, broad-based, and integrative content, rather than just single-subject areas

Differentiated Strategies for ELL Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in “chunks”
- Varied texts and supplementary materials, including visuals
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language.
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill

- Provide cross-content application of concepts
- Allow students to work at their own pace
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Role play
- Provide graphic organizers, highlighted materials
- Strategy and flexible groups based on formative assessment

Differentiation Strategies for At Risk Students

- Remove unnecessary materials, words, etc., that can distract from the content
- Provide appropriate scaffolding
- Limit the number of steps required for completion
- Gradually increase the level of independence required
- Tiered centers, assignments, lessons, or products
- Provide appropriate leveled reading materials
- Deliver the content in "chunks"
- Varied texts and supplementary materials
- Use technology, if available and appropriate
- Differentiate homework and products
- Varied questioning strategies
- Provide background knowledge
- Define key vocabulary, multiple-meaning words, and figurative language
- Use audio and visual supports, if available and appropriate
- Provide multiple learning opportunities to reinforce key concepts and vocabulary
- Meet with small groups to reteach idea/skill
- Provide cross-content application of concepts
- Presenting ideas through auditory, visual, kinesthetic, & tactile means
- Provide graphic organizers and/or highlighted materials
- Strategy and flexible groups based on formative assessment

504 Plans

Students can qualify for 504 plans if they have physical or mental impairments that affect or limit any of their abilities to:

- walk, breathe, eat, or sleep
- communicate, see, hear, or speak
- read, concentrate, think, or learn
- stand, bend, lift, or work

Examples of accommodations in 504 plans include:

- preferential seating
- extended time on tests and assignments
- reduced homework or classwork
- verbal, visual, or technology aids
- modified textbooks or audio-video materials

- behavior management support
- adjusted class schedules or grading
- verbal testing
- excused lateness, absence, or missed classwork
- pre-approved nurse's office visits and accompaniment to visits
- occupational or physical therapy

Peer Tutoring

Repeated Drill and Practice

Cooperative Grouping

Teacher notes

Use of additional reference materials

Modification Strategies

- Cooperative Grouping
- Extended Time
- Frequent Breaks
- Highlighted Text
- Interactive Notebook
- Modified Test
- Oral Directions
- Peer Tutoring
- Preferential Seating
- Re-direct
- Repeated Drill and Practice
- Shortened Assisgnment
- Teacher Notes
- Tutorials
- Use of Additional Reference Materials
- Use of Audio Resources

Differentiation Strategies

High Preparation

- Alternative Assessments
- Choice Boards
- Games and Tournaments
- Group Investigations
- Guided Reading
- Independent Research / Project
- Interest Groups
- Learning Contracts
- Leveled Rubrics
- Literature Circles
- Multiple Intelligence Options
- Multiple Texts
- Personal Agendas
- Project Based Learning (PBL)
- Stations / Centers
- Think-Tac-Toe
- Tiered Activities / Assignments
- Varying Graphic Organizers

Low Preparation

- Choice of Book / Activity
- Cubing Activities
- Exploration by Interest (using interest inventories)
- Flexible Grouping
- Goal Setting With Student
- Homework Options
- Jigsaw
- Mini Workshops to Re-teach or Extend Skills
- Open-ended Activities
- Think-Pair-Share by Readiness, Interest, or Learning Style
- Use of Collaboration
- Use of Reading Buddies
- Varied Journal Prompts
- Varied Product Choice
- Varied Supplemental Materials
- Work Alone / Together

Horizontal Integration- Interdisciplinary Connections

See Appendix

Vertical Integration- Discipline Mapping

9th grade – Biology
10th grade – Chemistry
11th grade – Anatomy & Physiology
12th grade – Physics

Additional Materials

Sports, Exercise and Health Science by Oxford University Press (classroom set & PDF in Canvas)