Year 8
Subject: Biology
Topic/Unit: Skeleton, Muscles and Movement
When:

Huntington School
Learn and succeed

Overview: Why this? Why now?
This unit allows pupils to comprehend how biological structures facilitate physical movement. Exploring the skeleton and musculature provides foundational knowledge of human physiology, demonstrating how internal organs are protected and how blood cells are produced. Introducing biomechanics at this stage bridges biological systems with physical forces, showing that bones function as simple levers. This contextualises mathematics through real-world applications, such as calculating turning forces and investigating muscle strength.

Building on...building to:
- **Building on**: Primary science concepts of animal classification, basic human anatomy, and physical forces.
- **Building to**: Secondary-level biological concepts of musculoskeletal systems, cellular respiration, physical mechanics, moments, and rigorous scientific enquiry.

Sequence summary:
- **The Skeletal System**: Identifying major human bones (including the cranium, femur, and vertebrae)6. Exploring the four primary functions of the skeleton: support, protection, movement, and blood cell production.
- **Comparative Anatomy**: Examining how different vertebrate skeletons are adapted to their environments, comparing flight adaptations (pelican wing bones), aquatic locomotion (tuna spine)8, and terrestrial movement (cheetah or wallaby limbs).
- **Joints and Connective Tissues**: Investigating joint types (hinge, ball-and-socket, pivot, ellipsoid, and saddle1 alongside the roles of cartilage, synovial fluid, ligaments, and tendons. Understanding arthritis as the wearing down of protective cartilage.
- **Practical Dissection**: Conducting a chicken leg dissection to observe muscle bundles, tendons, ligaments, cartilage, and marrow, while strictly emphasising laboratory safety.
- **Muscles and Antagonistic Pairs**: Learning how muscles only pull by contracting and relaxing219 and operate in antagonistic pairs (such as the biceps and triceps).
- **Week 6: Biomechanics and Forces**: Measuring grip strength using a dynamometer5 while controlling scientific variables. Calculating joint turning forces.

Key Vocabulary:
Cranium, femur, vertebrae6, bone marrow, cartilage, synovial fluid, ligament (connects bone-to-bone), tendon (connects muscle-to-bone), antagonistic pairs, moment, pivot, effort, load, dynamometer.

Assessments:
Formative assessment is conducted via low-stakes mini-whiteboard retrieval quizzes. Practical skills are assessed during the dissection and variables investigation. Summative assessment utilises a standard progress check on skeletons, muscles, and biomechanical calculations.

Able and interested:
Pupils can explore advanced bicep force calculations, research high-jump biomechanics (the Fosbury Flop), investigate prosthetic limbs, or explore careers in video game design and animation.

Inclusion, Personal Development and Wider Skills:
Collaborative laboratory activities promote teamwork and effective communication. Exploring joint care (such as arthritis), sports injuries, and personal fitness links biological science directly to lifelong physical health and development.

Homework and Independent Learning: Students will complete a task set on the SPARX online platform. The task is based on the current topic but also includes consolidation on previous topics. It will automatically adjust the level of challenge as the student complete the activities.