

The Skeletal System

Topic: Human Body Systems

Grade Level: Sixth Grade

Timing: This is one lesson in the human body systems unit. Following the Montessori approach, timing should remain fluid, allowing for students to request deeper exploration of areas they find particularly intriguing, therefore, while this lesson is designed to span a one-week period, extra time should be allowed when planning.

Science Standards: **MS-LS1** From Molecules to Organisms: Structure and Processes

NGSS: **MS-LS1-3** Use argument supported by evidence for how the body is a system interacting subsystems composed of groups of cells.

Science and Engineering Practices:

MS-LS1-2 Develop and use a model to describe phenomena.

MS-LS1-7 Develop a model to describe unobservable mechanisms.

MS-LS1-5/MS-LS1-6 Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do so in the future.

MS-LS1-6 Science knowledge is based upon logical connections between evidence and explanations.

Disciplinary Core Ideas:

MS-LS1-3 In multicellular organisms, the body is a subsystem of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions.

Crosscutting Concepts:

MS-LS1-8 Cause and effect relationships may be used to predict phenomena in natural systems.

MS-LS1-3 Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.

MS-LS1-2 Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among its parts, therefore complex natural structures/systems can be analyzed to determine how they function.

Goals/Objectives:

Students will be able to identify the main functions of the skeletal system and how it is structured. Students will be able to identify the main organs associated with the skeletal system.

Materials Needed:



1 - Skeletal System
Complete 5E Lesson

Glue Sticks

Key Vocabulary

Scapula – Also known as the shoulder blade, this bone connects the humerus with the clavicle

Clavicle – Also known as the collarbone, this is a long bone that serves as a strut between the scapula and the sternum

Humerus – The long bone in the upper arm

Radius – One of the two large bones of the forearm

Ulna – One of the two large bones of the forearm

Tibia – Also known as the shin bone, it is the larger, stronger front bone in the leg below the knee

Fibula – The smaller, long bone in the leg below the knee. It runs parallel with the tibia and plays a significant role in stabilizing the ankle.

Patella – Also known as the knee cap, the patella protects the knee joint

Femur – Also known as the thigh bone, the femur is the largest bone in the human body which runs from the hip to the knee

Skull – The skull is a bony structure present in all vertebrates, made up of the cranium and mandible, which protects the brain and supports the structures of the face

Mandible – The mandible is the lower bone of the skull also known as the jaw bone

Cranium – The cranium is the upper bone of the skull which protects the brain

Tendon – A flexible but inelastic cord of tissue attaching a muscle to a bone.

Ligament – A short band of tough, flexible tissue which connects two bones or cartilages or holds together a joint

Cartilage – A smooth elastic tissue or a rubber-like padding that covers and protects the ends of long bones at the joints, and is a structural component of the rib cage, the ear, the nose, the bronchial tubes, the intervertebral discs, and many other body components.

Axial – The part of a skeleton that consists of the head and the trunk of a vertebrate

Appendicular – The portion of a skeleton of vertebrates consisting of the bones that support the appendages

Muscle – A type of soft tissue found in most animals which help produce force and motion

Homeostasis – Maintaining normal, stable conditions within the human body

1. Engage

Display the objectives using the “I can” statements

“I can identify the main functions of the skeletal system and how it is structured.”

“I can identify the main organs associated with this system.”

Have a student read the statements and the class will discuss what their meaning is for a few minutes.

Have students watch the Dr. Bones Show:

Bones – The Dr. Binocs Show, Learn Videos for Kids <http://goo.gl/C9mvjr> (case-sensitive)

Have students discuss what they already know about the skeletal system and answer these questions:

- What is the main purpose of the skeleton?
- Name several bones and organs they protect.
- Where are half of the body's bones located?
- How many bones does an infant have when born?
- How many bones does an adult human have?

Discuss these common misconceptions:

- Students may believe that bones are not made of tissue.
- Students may believe that bones do not have blood flowing through them.
- Students may believe that bones do not grow.

2. Explore

Students will participate in a Kesler Science Station Lab utilizing eight centers: explore, illustrate, read, watch, organize, write, research, and assess. Each station is described in detail within the packet with all of the required diagrams and printouts included. Each station has a directions sheet along with task cards explaining each step required.

Explore it! – This step helps students understand the concepts. Students work as a group to discuss each step as presented on their task cards and then each student will record their own answers on their lab sheet provided.

Illustrate It! – Students will use the diagram and colored pencils provided to label any 10 of the major bones in the human body. They will also shade the axial skeleton red and the appendicular skeleton green.

Read It! – Students will read a specific passage addressing the skeletal system. They may take notes in their science journals. They will then complete the task cards on their lab sheets.

Watch It! – Students will watch a video on YouTube about the skeletal system and complete the task cards provided on their lab sheets.

Research It! – Students will use laptop computers to access the web site provided and complete the task cards provided on their lab sheets.

Write It! – (To be completed after the Read, Watch, Research, and Explore stations). Students will answer each of the task card questions on their lab sheets in complete sentences.

Organize It! – (To be completed after the Read, Watch, Research, and Explore stations). Students will use the diagram provided to answer the task card questions on their lab sheets.

3. Explain

Using the printouts provided, students will make a body systems foldable to include in their science journal. There are both color and black and white versions. The color version should be completed first and attached permanently

in the students' science journals using glue sticks or staples. Time permitting, the black and white version can be completed and colored in for the students to use as a study aid outside of class. This foldable will be used when addressing all of the body systems in each lesson throughout this unit.

4. Elaborate

Students will complete the Skeletal System Choice Project. During this time, students will use one of several research ideas provided about the skeletal system which has not yet been covered during our lesson or some other facts they find interesting. Examples include:

- Types of joints
- Types of bones
- Names of all the bones
- How the bones make blood
- How the bones store minerals
- How the bones provide homeostasis
- Types of connective tissue
- How connective tissue is damaged and repaired

They are given six different methods by which they can present what they have learned to the class including creating a Prezi, creating a tri-fold display board, creating a poster, creating a bulletin board, making an original video, or using their own original idea which has been approved by the teacher.

5. Evaluate

Students will be given a written assessment consisting of 20 multiple choice, fill-in-the-blank, and written response questions. Once everyone has completed the assessment and it has been turned in, go over the questions and responses with the class as a whole group, allowing for constructive dialogue among students.