Anatomy Browser

Middle School - Skeletal System: Bone Structure

TERM 2013

LOCATION G+L+S

PROGRAM VideoGames and Learning

Overview of Lesson

This lesson begins with Anatomy Browser to explore the skeletal system and its relationship to the human body. Then youth will take a closer look at bone structure by creating a bone model.

Materials Needed

PVC piping (Already cut into small sections.)
PVC pipe installation
Modeling clay
Pipe cleaners (Preferably blue and red.)
Square piece of cloth
Tape/glue
Scissors

Substitutions:
PVC piping – Cardboard roll
PVC pipe installation – Dish sponge
Pipe cleaners – Wire, yarn
Cloth – Paper

Optional: SMART Board, Projector, Laptops, iPads

Content of Lesson

Part I: Exploring the Skeletal System

The instructor may display Anatomy Browser for the entire group using a SMART Board, HDMI hook up or projector. Take time solely exploring the skeletal system (Settings: Body Browser, Skeletal System, Isolate), then exploring it in tandem with other body systems. Encourage youth to participate by asking questions and taking turns using Anatomy Browser.

Optional: have the class use Anatomy Browser independently or in small groups using iPads or laptops.

While using Anatomy Browser, guide group discussion and spark student curiosity with questions such as:

1. What do you think happens when you break a bone?
2. Why are bones an important part of the body?
3. How many bones do you think a hand has? How many do you see?

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Review the main functions of the skeletal system, such as:

1. Support
2. Protection
3. Movement

Part II: Constructing a Bone Model

Divide students into small groups of 3 or 4 and disperse the modeling supplies.

Construct the models:

- Have students begin with the blue and red pipe cleaners. Mould a thick layer of modeling clay (bone marrow) around the pipe cleaners (blood vessels).
- If not already pre cut by instructor, have youth cut down the PVC insulation (spongy bone) to reveal the open cavity.
- Place insulation around the modeling clay.
- Slide insulation piece into PVC piping (compact bone)
- Wrap piping in the cloth (periosteum) and secure with tape or glue.
- Wrap the additional pipe cleaners around the model to represent additional blood vessels.

Within their groups, have students label the corresponding parts of the model according to the lesson vocabulary.

Wrap up the lesson with a group discussion. Ask youth if they can make any connections between the main bone functions they discovered with Anatomy Browser and their models.

Vocabulary

Cortical / Compact bone- Outer shell, supports whole body, protects organs, works as a lever for movement, stores and releases calcium.
Cancellous / Spongy bone- Softer, weaker, and more flexible.
Bone Marrow- Flexible tissue in center of bone, produces red blood cells and lymphocytes.
Blood Vessels- Carry blood to and from the heart, enable an exchange of water and chemicals between the blood and surrounding tissues.
Periosteum- Membrane surrounding the bone, essential in growth, healing, and nourishment.

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Learning Objectives

Students will be able to follow multi-step sets of directions while staying on task.

Students will be able to make connections between previous experiences and the classroom lesson on the model of bone structure.

Students will be able to participate in a discussion that requires them to recall game play.

Students will be able to label the selected parts of the bone (see vocabulary), as demonstrated using their constructed models.

Educational Standards

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

(HS-LS1-2) Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.

(MS-LS1-2) Develop and use a model to describe the function of a cell as a whole and ways parts of cells contribute to the function.

Technical Specifications

Anatomy Browser

This game is available on multiple platforms and can be played with minimal technical knowledge. The game can be freely played in any web browser or on the iPad (iPad link PC link). For the PC version, the computers will need to have the free Unity Web player. This plugin installs automatically when the game is loaded for the first time.