STEM Learning Module Template

PISA Team:

Name	Grade	School
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Strand(s): Skeletal System

Grade(s): Ilhem-4th Meagan- 4th
Fatima-4th Patricia-3rd

Key Science Terms: skeletal system, digestive system, bone function, prey, pellet, organisms, fossils, joints, ball and socket joints, gliding joints, hinge joints, cartilage, exoskeleton, endoskeleton, calcium, nutrition, molting

Key Science Concepts:

- The human body is made up of many organ systems.
- The skeleton is a system of the human body.
- The skeleton is made of bones with different shapes and sizes.
- The shape of the bones often gives you a clue of its function.
- The different functions of the bones: provide structure, protection for the organs (i.e. skull protects brain, rib cage protects heart and lungs), facilitate movement (long bones).
- The human skeleton can be compared to the skeleton of a rodent.
- A point where two or more bones connect is called a joint.
- There are movable and non-movable joints in the body.
- The three types of movable joints are ball and socket, gliding, and hinge.
- Friction is the rubbing of two surfaces.
- Cartilage is present in joints to prevent friction between bones.
- Exoskeletons are skeletons outside the body (crustaceans, snails), while endoskeletons are skeletons inside the body (humans).
- Calcium keeps our bones strong.

NJCCC Standards:

5.5 (Characteristics of Life) All students will gain an understanding of the structure, characteristics, and basic needs of organisms and will investigate the diversity of life.

5E's	Procedure	Assessment Attach all assessments	Materials/ Handouts Attach all handouts
Engage Days/Hours: 1day/45min	**Key Questions:** • What is the skeletal system? • Why do we have a skeleton? • What would we look like without our skeletal system? **Key Concepts:** • The human body is made up of many organ systems. • The skeleton is a system of the human body. • The different functions of the bones: provide structure, protection for the organs (i.e. skull protects brain, rib cage protects heart and lungs), facilitate movement (long bones). **Procedure:** • Students take pre-test and attempt to represent in a diagram the skeletal system. Select students will present their diagrams to the class for feedback. • Discuss the importance of Mr. James Bones in our bodies. • Infer the overall function of the skeletal system by imagining what we would	**Pre-test**-Draw what you think the human skeleton looks like and label as many as you can.	Pre-test handout. Life size Mr. James Bones. Mr. Bones Skeletal system

	look like without it. • Introduce The Human body Reader and encourage them to look through it to develop questions. * P.S. 6 find a reader*		hand-out.
Explore Days/Hours: 2day/135mins	**Key Questions:** • Why are our bones shaped differently? • What functions do our curved bones serve? • What functions do our long bones serve? • Do you think an animal's skeletal system is similar to humans? **Key Concepts:** • The skeleton is made of bones with different shapes and sizes. • The shape of the bones often gives you a clue of its function. • The human skeleton can compared to the skeleton of a rodent. **Procedure:** • Students will play matching game to match a bone with the organ it protects. • The teacher will use Mr. Bones to show examples of more bones and discuss their functions, she will pick a bone and ask students what	Successful dissection of owl pellet and group work.	Owl pellets, toothpicks, oak tag, mini magnifying glass, glue, bone reference handout, paper plates, zip loc bags. Foss Science Reader, Barn Owl article. (Al-Ghazaly) Life size Mr. James Bones

	function it serves. • Owl Pellet Activity 1. Discuss the digestive system of an owl and explain an owl pellet. 2. Have students predict what could be found in an owl pellet. 3. Students begin owl pellet activity in pairs, by carefully dissecting the pellet and extracting the thin bones. 4. Students identify the different bones using bone reference hand-outs and their familiarity with their own bones. 5. If time allows students attempt to glue and label bones on a piece of oak tag.	
Explain Days/Hours: 2 days/90 min	Key Questions: • Why do our bodies move freely if the bones are so rigid? • What are joints? • What are the different	Floppy rag doll Example of Hinges and ball/socket joints (i.e. nut crackers, door hinges) Foss Science Reader (article

types of joints?
- What is cartilage and what is its purpose?
- What is friction?

Key Concepts:
- A point where two or more bones connect is called a joint.
- There are movable and non-movable joints in the body.
- The three types of movable joints are ball and socket, gliding, and hinge.
- Friction is the rubbing of two surfaces.
- Cartilage is present in joints to prevent friction between bones.

Procedure:
- Guided Practice: the teacher hands out Foss Science readers. Students read and discuss the lesson.
- Teacher will provide the students with a detailed explanation on joints and cartilage by using pictures of different joints and pinpointing different body parts.

- The teacher asks students to move different parts of their body and credit the movement to the correct joint.

about joints)

Wrap-Up Handout. (Mr. James Bones)

	• Wrap up: Using a picture of the human skeleton, students circle and label as many joints as possible.		
Elaborate Days/Hours: 1 day/45 min	Key Questions: • What is an exoskeleton/endoskeleton? • What keeps our bones healthy? Key Concepts: • Exoskeletons are skeletons outside the body (crustaceans, snails), while endoskeletons are skeletons inside the body (humans). • Calcium keeps our bones strong. Procedure: • Students read article from Foss reader and discuss the difference between exo and endoskeletons. They compare and contrast the two bone structures. If time allows, students look at pictures of different crustaceans and discuss the importance of molting. • Students read the bone poem and try to figure out the underlined bone terms using the context clues. • Students research five types of food that will	Students write free verse bone poem.	Foss Science Reader Pictures of Crustaceans

	keep their bones healthy and strong, and five other types that will make their bones weak. They must also list the reasons why it's healthy or not.		
Evaluate Days/Hours: 1 day/45 min	Procedure: • Review all key concepts. • Hand out science study guide and review it before the test. (Ilhem) • **Post-test:** students retake pretest along with a unit test. • **Final Inquiry Project:** students break chicken bones supplied by teacher and engineer the best way to bind them back together. Students must keep in mind that their material must be effective under the most severe circumstances. Students' final product must meet two criteria: 1. must sit in body temperature water for 24 hours without any change. 2. Must hold the most amount of clay. (student/group with the most durable material wins 100 grand.	**Post-test** **Inquiry project**	Post-test handout. Broken chicken bones, heavy play dough Inquiry project handout

Timeline: Create a timeline for this project.
Ms. O'Grady: 7 days 9 periods (Sept/Oct)

Ms. Corrigan: To be announced
Ilhem: about 2 weeks (Human Body Unit)
Pollination EIE — Structures of Life (3rd Grade in October)
Water Water Everywhere EIE — Land and Water (3rd Grade in December)
Fatima: 1 day math extension. Refer to math extension handout. (Statistics Unit)
EIE will be incorporated through out the curriculum for all teachers.

Resources:
http://www.kathimitchell.com/boneterm.htm
http://www2.asd.wednet.edu/Pioneer/barnard/lessons/bodysys/skel/skelws.htm
www.spacejack.org/.../skeleton_complete.jpg