Project-Based Learning Unit
Skeletal and Muscular Systems
Christa DiBonaventura
Northwest Elementary

Grade Level: 3

Essential Question:
How does our skeletal and muscle systems work?

Subquestions:
1. What are bones made of?
2. What do bones do to help our bodies?
3. What are muscles and what purpose do they serve?
4. How do muscles work?
5. What are the different types of joints and how do they work?
6. Describe where each type of joint can be found on your body?

Objectives:

Science Goals

Goal 4: The learner will conduct investigations and use appropriate technology to build an understanding of the form and function of the skeletal and muscle systems of the human body.

4.1 Identify the skeleton as a system of the human body.

4.2 Describe several functions of bones:
   • Support.
   • Protection.
   • Locomotion.

4.3 Describe the functions of different types of joints:
• Hinge.
• Ball and socket.
• Gliding.

4.4 Describe how different kinds of joints allow movement and compare this to the movement of mechanical devices.

4.5 Observe and describe how muscles cause the body to move.

**English Language Arts Goals**

**Goal 4:** The learner will apply strategies and skills to create oral, written, and visual texts.

4.1 Read aloud grade-appropriate text with fluency, comprehension, and expression.

4.2 Use oral and written language to:
   - present information in a sequenced, logical manner.
   - discuss.
   - sustain conversation on a topic.
   - share information and ideas.
   - recount or narrate.
   - answer open-ended questions.
   - report information on a topic.
   - explain own learning.

4.6 Compose a draft that conveys major ideas and maintains focus on the topic by using preliminary plans

4.10 Explore technology as a tool to create a written product.

**Real World Connections:**

Students will actively engage in a presentation of the skeletal and muscle systems given by a local physician.
Activities:
1. The students will label a skeleton diagram.
2. Students will also participate in an interactive game using the internet.
3. Students will make a skeleton using paper plates.
4. Students will build an arm model after reading about the different types of joints online.
5. Students will add muscles to the model of the arm and joint.
6. Students will locate different types of joints, bones, and muscles during a game of Simon Says.
7. Students will create a model of the skeletal and muscular systems using different shapes of pasta.

Final Product/Presentation Description:

Using IMovie, students will work in three different groups to develop a video clip/presentation of each component (bones, muscles, joints). Students will demonstrate their knowledge by providing important information and showing examples. Students will also provide information on ways to protect the skeletal and muscular systems. Student presentations will be available for others to view and for students to share with the parents at a PBL night.

Evaluation of Product (Rubric):

See attached rubric
Activity Title: Understanding Bones and Bone Composition

Objectives Addressed:

4.1 Identify the skeleton as a system of the human body.
4.2 Describe several functions of bones:
   • Support.
   • Protection.
   • Locomotion.

Materials Needed:
Internet, chart paper, markers, Dem Bones by Bob Barner, paper plates, yarn, one cardboard tube per student, small rocks, kitchen sponges, masking tape

Approximate Time Needed: one week

Activity Description:

Teacher will read Dem Bones, by Bob Barner and label a skeleton diagram on chart paper. The teacher and student may sing the song with Dem Bones several times of time allows. Students will also write a descriptive paragraph about what the human body would be like if we had no bones. Students will also read an online article about the importance of the skeletal system at http://yucky.kids.discovery.com/noflash/body/pg000124.html
Students will also participate in an online game using either or both of these two sites. 
http://www.klbschool.org.uk/interactive/science/skeleton.htm
http://sv.berkeley.edu/showcase/pages/bones.html

Students will learn about the composition of bones by creating a bone using a cardboard tube, masking tape, sponge, and rocks. For more information, use the following site
http://www.henry.k12.ga.us/curriculum/mybody/skel_lessons.htm

Students will also create a model of the skeleton using paper plates and yarn.
Activity Title: Joints

Objectives Addressed:

4.3 Describe the functions of different types of joints:
   • Hinge.
   • Ball and socket.
   • Gliding.

4.4 Describe how different kinds of joints allow movement and compare this to the movement of mechanical devices.

Materials Needed:
skills sticks, styrofoam ball, bottle cap, masking tape
Internet, guide for building an arm model

Approximate Time Needed: 1-2 days

Activity Description:
Students will go to
   www.bbc.co.uk/schools/ks3bitesize/science/biology/skeleton2_3.shtml
and read about the purpose and different types of joints. Students will then create an arm model following the directions from the website
   www.galaxy.net/~k12/body/bones.shtml
Activity Title: Muscles

Objectives Addressed:

4.5 Observe and describe how muscles cause the body to move.

Materials Needed:
arm model, internet, small and large rubber bands, pipe cleaner, and scissors

Approximate Time Needed: 1-2 days

Activity Description:
Students will read the muscle overview from YuckyKids at the website [http://yucky.kids.discovery.com/flash/body/pg000123.html](http://yucky.kids.discovery.com/flash/body/pg000123.html)
Students will also interactively label the muscles of the body at the website [http://www.kidport.com/Grade5/Science/BodyMuscles.html](http://www.kidport.com/Grade5/Science/BodyMuscles.html)
This labeling seems to never end, but is good practice in learning where muscles are.

Students will then add muscles using rubber bands to their arm model.
Activity Title: Skeletal and Muscular Systems model

Objectives Addressed:

Materials Needed:
pasta of different shapes, construction paper, glue, directions

Approximate Time Needed: 1 day

Activity Description:
Students will create models of the skeletal and muscular system using different shaped pasta. (elbow macaroni, rotini, etc.) Students decide which shapes could represent bones, joints, or muscles.

Students will also demonstrate knowledge by playing Simon Says to show where bones, joints, and muscles are.
Activity Title: Learning Video

Objectives Addressed:

4.2 Use oral and written language to:
- present information in a sequenced, logical manner.
- discuss.
- sustain conversation on a topic.
- share information and ideas.
- recount or narrate.
- answer open-ended questions.
- report information on a topic.
- explain own learning.

4.6 Compose a draft that conveys major ideas and maintains focus on the topic by using preliminary plans

4.10 Explore technology as a tool to create a written product.

Materials Needed:
video camera, digital camera, IMovie software, EZedia,

Approximate Time Needed: 1-2 weeks

Activity Description:

Students will be divided into three groups: bones, joints, muscles. Each group is responsible for creating their own video clip about either bones, joints, or muscles. Students will use the information they gained to share
information and point to various points on their body. For example, the students in the bone group would share information about the importance of bones, where the largest and smallest bones are, and show other major bones. Students are also responsible for conveying different ways to take care of that aspect of our body. Students will then individually create a slide show in EZedia with each group’s presentation of their part.

Be sure to incorporate enrichment teachers whenever possible.

Resources:

**Bones**

http://yucky.kids.discovery.com/noflash/body/pg000124.html  
http://www.klbschool.org.uk/interactive/science/skeleton.htm  
http://sv.berkeley.edu/showcase/pages/bones.html

**Muscles**

http://yucky.kids.discovery.com/flash/body/pg000123.html  
http://www.kidport.com/Grade5/Science/BodyMuscles.htm

**Joints**

www.bbc.co.uk/schools/ks3bitesize/science/biology/skeleton2_3.shtml

**Projects**

http://www.eduref.org/cgi-bin/printlessons.cgi/Virtual/Lessons/Arts/Visual_Arts/ARA0023.html  
www.galaxy.net/~k12/body/muscles.shtml  
www.galaxy.net/~k12/body/bones.shtml  
http://www.henry.k12.ga.us/curriculum/mybody/skel_lessons.htm