Samantha Loomis

**Subject Area:** Biology

**Grade Level:** 9/10

**Unit Title:** The Human Body (Day 3)

**Lesson Title:** The Muscular System

**Learning Goals:**

9.4.1.1.1 Students will explain how cell processes are influenced by internal and external factors, such as temperature, and how cells and organisms respond to changes in their environment to maintain homeostasis.

9.4.1.1.2 Students will describe how the functions of individual organ systems are integrated to maintain homeostasis in an organism.

**Materials:**

National Geographic's Biology textbook for each student

Projector and computer with internet access

11x17 blank paper for Venn-diagrams

Skeletal and Muscular Systems PPT

Muscular System PPT packet for each student (printed as handouts, 3 slides to a page with lines for notes)

**1. Anticipatory Set (~5 minutes):**

*Good morning! How's is everybody feeling today?*

*To start, I would like you to get with the same partner from the beginning of class yesterday and take out your Question Sea on the muscular system reading. (*Give them time to do this.) *Whoever answered a question yesterday will share an* *under-the-surface question today. The other partner will then do their best to orally give the answer to the question. You can hold on to your question sea until the end of class.*

While they are doing this, hand out the muscular system PPT packet and blank 11x17 paper, and be listening to check for appropriate questions and a general understanding of the reading.

**2. Objectives:**

Content Objectives:

Students will understand functions and components of the three muscle types and the two muscle fiber types (monitor orally).

Students will understand how the muscular system contributes to homeostasis (homeostasis chart).

Language Objectives:

Students will compare and contrast the three types of muscle.

Students will discuss how the two muscle fiber types relate to athletics.

Students will summarize how the muscular system contributes to homeostasis.

**3. Input and Modeling (~30 minutes):**

Show the PPT in chunks.

1. After 3 muscle types:

Model how to do a 3-circle Venn-diagram.

*Right now, you are all going to be making Venn-diagrams to compare and contrast the 3 muscle types. I'm guessing that most of you are familiar with a 2-circle Venn-diagram, but for this we need to use 3 circles. It will look something like this:* (draw a 3 circle Venn-diagram on the board).  *Who would like to give me a category to put in this Venn-diagram? It does not have to be science related. (*Call on a student volunteer. Fill in the Venn-diagram for the category they suggest with at least one characteristic in each of the 7 spaces. ) *Now you may draw out the 3 circles of your diagram. Label each circle with the names of the three muscle types. Then fill in the diagram with at least two characteristics, descriptions, or drawings in each blank space. You will definitely be able to do more! I want you to work silently for the first 5 minutes. After that, feel free to share ideas with people sitting near you. I will give you 10 minutes. Any questions before we get started?*

After 5 minutes let students know that they can talk to people sitting near them.

2. After slow and fast-twitch muscles:

*Although almost all sports use both fast and slow-twitch muscle fibers, most sports rely more heavily on one than the other. We are going to list a bunch of examples of both sports and specific athletes that use each type of muscle fibers. For example, I would say that Lance Armstrong relies on slow-twitch fibers because he is a long distance biker and that requires endurance.* (Write Lance Armstrong on the board under slow-twitch fibers.) *Raise your hand if you have an example you would like to share.*  (Start calling on students. Write their responses on the board under each fiber type. Stop after there are 5 examples for each fiber type.)

3. After slow and fast-twitch muscles (again):

*At this point, I want you to think about what we've learned so far and predict the functions of the muscular system.*  *I will give you 2 minutes to look back in your notes and write down THREE predictions. Then find a partner and each of you should share one of your predictions.* (Give students 2 minutes to write and 3 minutes with their partner. Then get the class' attention.) *Would anybody like to share their own or their partner's prediction?* (Call on 2 or 3 students that want to share, as time allows.)

Finish the PowerPoint.

**5. Check for Understanding (~5 minutes):**

The last section of muscular system PowerPoint includes 6 review multiple choice questions. These questions serve as a formative assessment to let both me and the students know how they are doing. Each student already has 4 notecards with the letters a-d written on them. As I bring each question up, they will hold up the answer they think it is. Quickly scan the class' answers and reteach the particular concept if many students were incorrect.

*At this time, please return to your seats and take out your multiple choice notecards. As I bring up each question slide hold the corresponding answer card up so that I can see it. Please o not look at your classmate's answers. I will spend about 30 seconds on each slide unless we need to go back and review. Again, this is a perfect time to ask questions, so don't be afraid to ask. Don't forget that this presentation is online, so you can practice these questions again at home.*

**6. Guided Practice:**

Walk around and listen to student discussions during each of the stopping points (as well as during the anticipatory set). Ask higher level (Bloom's taxonomy) questions during this time, to probe for and encourage deeper thinking.

**7. Closure (~10 minutes):**

When there are ~10 minutes left of class, get students' attention. (It may be necessary to cut short the review questions at the end of the PowerPoint)

*Now that you've read about the muscular system and and we've talked about it today, we should have a pretty good idea of how it contributes to homeostasis. Please turn to your homeostasis chart in your notebook so we can fill it in for the muscular system. Raise your hand if you can tell me one way that the muscular system contributes to homeostasis.* Write responses on the board. If necessary, remind students of the functions of the muscular system. Have everyone fill in their homeostasis chart for the muscular system with a sentence in their own words. The sentence should be similar to:

“The muscular system contributes to homeostasis by allowing movement to seek a more favorable or safe environment, and aiding in digestion, excretion, and breathing.

**8. Independent Practice:**

*For homework tonight, I want you to pick a life application question from either your own or your partner's Question Sea. Write down that question, and answer it in a paragraph before class tomorrow. You may type or write your response. Please turn in your Question Sea on your way out of class. Thank you!*