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**Subject Area:** Biology

**Grade Level:** 9/10

**Unit Title:** The Human Body

**Lesson Title:** Review of Integumentary, Skeletal, and Muscular Systems

**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.

9.4.4.2.4 Students will explain how environmental factors and personal decisions affect personal and community health.

9.4.4.2.5 Students will recognize that a gene mutation in a cell can result in uncontrolled cell division called cancer, and how exposure of cells to certain chemicals and radiation increases mutations and thus increases the chance of cancer.

**Materials:**

 National Geographic's Biology, 2009

 Overhead projector and pen

 Vocabulary words written on slips of projector paper (see modeling step)

 2 Envelopes, each containing:

Notecards with all chapter 32 vocabulary words written on them (one card per word)

Several blank notecards

**1. Anticipatory Set:**

Instruct students to complete the after reading section of the “Anticipation Guide” (day 1) and make sure that they include explanations. Call on volunteers to provide the correct answers and clear up any confusion students may have.

**2. Objectives:**

After categorizing vocabulary words, students will understand how the integumentary, skeletal, and muscular systems (and the vocabulary words of each system) are related with 100% accuracy.

**3. Input:**

Tell students:

 **“**Today we will be forming connections between all our vocabulary words from this chapter by categorizing them. You will be given a set of 27 vocabulary words.

 1. First you will separate these words by grouping words that have something in common.

 2. Then you will create category names for each group. There are no right or wrong answers, HOWEVER...

 3. You must be able to explain your categories and justify your reasons for including each the words in a category.**”**

**4. Modeling:**

Model on an overhead projector how to do a word sort using the following words from a previous unit. Words should be written on small pieces of overhead paper so that they can be moved around as I group them.

 cell walls

DNA

 Legionella

 Lyme disease

 ribosomes

 rodlike

salmonella

 spherical

spiral

strep throat

These words could be sorted as follows (possible categories are in italics, do not write these):

*Bacteria shapes/types:*

spiral

 rodlike

 spherical

B*acterial diseases:*

strep throat

salmonella

 Lyme disease

 Legionella

T*hings bacteria cells contain:*

DNA

 cell walls

 ribosomes

**5. Check for Understanding:**

Ask students to think of category headings they could use for the groups I created. Have student volunteers share their ideas and write them above each group of words (as long as they make sense).

**6. Guided Practice:**

Divide students into groups of 3 or 4Hand each group an envelope containing notecards with all the vocabulary words from chapter 32 (listed below). Give each member of a group a role card stating:

You are the PRESENTER. At the end of this activity you will present your group's categories to the class, justify how the words fit into each category, and explain how your categories relate to each other.

You are WORD SORTER #1. You will work with WORD SORTER #2 to create at least 3 category headings and write them on the blank notecards provided (in pencil). Then move words beginning in A-M into these categories.

You are WORD SORTER #2. You will work with WORD SORTER #1 create at least 3 category headings and write them on the blank notecards provided (in pencil). Then move words beginning in O-Z into these categories.

You are the JUSTIFIER. As the WORD SORTERS place the word cards in categories you must tell your group how each words fits into its category. If you can not justify a particular word in a category, you may tell the word sorters to reconsider their placement.

actin

appendicular skeleton

axial skeleton

cardiac muscle

compact bone

dermis

epidermis

hair follicle

involuntary muscle

keratin

ligament

melanin

myofibril

myosin

ossification

osteoblast

osteoclast

osteocyte

red bone marrow

sarcomere

sebaceous gland

skeletal muscle

smooth muscle

spongy bone

tendon

voluntary muscle

yellow bone marrow

Instruct students to first discuss the meanings of each of the words, before assuming their roles

Monitor students during this process and try to encourage groups to categorize differently so that students can see different ways to connect the words. If students are straying from their given roles, point to their role card and remind them to follow it.

Possible category headings include:

 1. skeletal system, muscular system, integumentary system

 2. tissues, cells, organs

 3. connective tissue, muscular tissue, nervous tissue, epithelial tissue

\*If one group is advanced they should be encouraged to group differently than the first option listed

**7. Independent Practice:**

Periodically ask the JUSTIFIER to share explain their groups categories to me, and give some examples of why specific words fit into each category.

Groups that finish early may add subcategories within their categories.

I may also ask groups who finish very early to start over and re-categorize in a completely new way.

Have each group present their category choices to the class and give some examples of why specific words fit into each category (as time allows).

**8. Closure:**

To summarize, go to the board and write some of the most common category headings that groups came up with.

“For homework, I would like each of you to recategorize the words we used today. using at least 3 categories. You must use different categories than your group used during class. However, you may use some of your other classmates categories that I have listed in the board. Please write or type the category headings and the words in each category using the word list that I am about to pass out. Also, write at least one sentence explaining how the categories interact with each other. I will collect this in class tomorrow.”