Skeletal System Lesson

Students will read an engaging reading passage about what the skeletal system does and has a little activity called "Jumbled Bones" that has the students make a small human skeleton for their notebooks. Students will then explore, in small groups, chicken bones with magnifying glasses. The students will look at the bones for evidence of structure and components and they will speculate about purpose the bone served based on its physical appearance. Next, they will watch a short video clip about how red blood cells are produced. The teacher will follow-up with a class discussion about "How the skeletal, respiratory and circulatory systems work together to maintain homeostasis" and students will write a summary explanation in their interactive notebooks. For further elaboration, students will watch a video clip "Bones Narrated" which is a guided tour of the skeleton and its functions, and do a virtual game called "Build a Skeleton" which allows students to drag bones to create a human skeleton. Lastly, students will be evaluated on their knowledge of the skeletal system and its functions by creating a poster to present and explain to the teacher.

Subject(s): Science, English Language Arts
Grade Level(s): 6
Intended Audience: Educators
Instructional Time: 4 Hour(s)
Resource supports reading in content area: Yes
Keywords: skeletal, bone marrow, homeostasis, body system
Instructional Component Type(s): Lesson Plan, Virtual Manipulative, Video/Audio/Animation, Text Resource
Resource Collection: CPALMS Lesson Plan Development Initiative

ATTACHMENTS
ChickenBoneMarrowInvestigation.docx
interactivenotebookingentryrubricforHomeostasis.docx
SkeletonIANIllustrationRubric.xlsx
SkeletonPosterRubric.xlsx

LESSON CONTENT
Lesson Plan Template: General Lesson Plan
Learning Objectives: What should students know and be able to do as a result of this lesson?
- Students will identify and investigate the general functions of the major body systems of the human body.
- Students will explain the importance of homeostasis to a healthy functioning body.
- Students will determine how the skeletal, respiratory and circulatory systems work together to maintain homeostasis.
- Students will be able to synthesize information from readings, interactive websites and discussions and then apply this new information into their presentations on the skeletal system.

Prior Knowledge: What prior knowledge should students have for this lesson?
- Students will need to have prior experience with science note-booking.
- Students will need to have prior knowledge of summarizing a text.

Guiding Questions: What are the guiding questions for this lesson?
1. How do the skeletal, respiratory and circulatory systems work together to maintain homeostasis? Teachers can explain that blood cells are created in the bone marrow inside of the bones of the skeletal system, oxygen is added through respiration by the lungs of the respiratory system, and transported through the body via the blood vessels of the circulatory system. An excellent way to get the students to think about homeostasis is to explain how when the exercise they can feel their heart beating faster, shortness of breath and muscle fatigue. Have them discuss what the body does to balance itself and return it to a state of homeostasis.

2. What is the general function of the skeletal system? The skeletal system creates a frame for our bodies. It gives the body shape, supports all of our tissues and protects our vital organs.

3. Why is homeostasis important to a healthy functioning body? It is important for a healthy body to maintain homeostasis. All organisms function optimally at a state of balance. External factors like temperature, stress, physical exertion, etc., will disturb the eternal balance, which threatens the health of the body. Body systems will work together to return the body to its normal balanced state called “homeostasis.”

Teaching Phase: How will the teacher present the concept or skill to students?

1. The teacher will lead a discussion about the functions and parts of the skeletal system during the “engage” part of the lesson.
2. The teacher will use the document projection camera to make a class model of a human skeleton and its parts with input from students, during the “engage” part of the lesson.
3. The teacher will give the students sliced chicken bones and magnifiers so students can observe the bone marrow (Teacher note: Be sure to follow the steps in the link provided below. The activity specifically suggests using cooked chicken bones so be sure to prepare this ahead of time.)
4. The teacher will circulate and point out the bone marrow and ask leading questions to help the students relate what they are seeing to blood cell production, during the “explore” part of the lesson.
5. The teacher will discuss and clarify the information contained in the video clip about blood cell production, during the “explore” part of the lesson.

Guided Practice: What activities or exercises will the students complete with teacher guidance?

1. (ENGAGE) In groups of 2 or 3, students will read the engaging reading passage also available on CPALM5 from the following link: [http://www.cpalms.org/Public/PreviewResource/Preview/57270](http://www.cpalms.org/Public/PreviewResource/Preview/57270). The teacher should print the article prior to the lesson for each group of students. After students read the passage they will create the large skeleton from the following link: [http://www.eskeletons.org/resources.html](http://www.eskeletons.org/resources.html) (click on the drop down for Activities/Teaching Resources, click on Life Size Printouts, click on Juvenile Homo Sapiens printer friendly to access the skeletal document)
2. The teacher can have the students create their skeletons as a class, the teacher can build one skeleton as they project it with a document camera for easy viewing or each student can create their own depending on time. Students can label the skeletal parts on their diagrams if the teacher chooses.
3. (EXPLORE) The students will observe the inside of chicken wing bones and make observations about the bone marrow inside the bone. 

Chicken Bone Marrow Investigation [Chicken Bone Marrow Investigation.doc](http://www.cpalms.org/Public/PreviewResource/Preview/57270)

Students will examine prepared bones with magnifiers to see inside bone marrow and examine the craters that are created when production of blood cells occurs.

Preparing Chicken Bones for Class:

1. First, the teacher should eat some chicken wings and save the bones.
2. Put the bones in water and boil it until all the tendons, ligaments and excess meat has fallen off.
3. Since the bones have been boiled they should be soft enough to carefully slice at different angles for different views for the students.
4. Let the bones dry completely.

Materials needed:

- sharp knife (used by teacher only)
- chicken bones, prepared for student use
- magnifying glass and/or microscopes
- ziploc bags
- disposable rubber gloves

Students will work in pairs or small groups to examine bones with magnifying glasses. The students will look at the bones for evidence of the structures and components they may have been part of blood cell production. The students will infer about the purpose the bone served based on its physical appearance. Encourage them to pay attention to the weight of the bones, and to try to scratch the bones with their fingernail or with a thumbtack. Point out the craters and ask leading questions about where and how blood cells are made and what other system is aided by this.

The students will then watch the short video clip about bone marrow, and blood cells. Video Clip - [http://pcofiowa.adam.com/content.aspx?productid=1176pid=17&did=000104](http://pcofiowa.adam.com/content.aspx?productid=1176pid=17&did=000104)

2. (EXPLAIN) The teacher will then lead a class discussion about “How do the skeletal, respiratory and circulatory systems work together to maintain homeostasis?” and students will write a summary in their interactive notebooks.

3. (ELABORATE) The students will watch a video clip and read along to “Bones Narrated” and then play the game “Build a Skeleton” at: [http://medtopolis.com/virtual-body/](http://medtopolis.com/virtual-body/)

4. (EVALUATE) In groups of 2 or 3, students will create a poster by tracing one of the students in the group on large rolls of newsprint (or poster paper taped together) and drawing and labeling the major bones of their body.

Independent Practice: What activities or exercises will students complete to reinforce the concepts and skills developed in the lesson?

The students will make an illustration of the skeleton and its parts, they will write a summary on how some body systems interact, they will do a hands-on investigation of the inside of bones, they will do a virtual lab to build a skeleton and for their final task they will make a poster.

Closue: How will the teacher assist students in organizing the knowledge gained in the lesson?

1. The teacher will model how to draw a skeleton and identify the parts and provide and provide feedback.
2. The teacher will review summarizing and writing in their interactive notebook and provide feedback.
3. The teacher will show the students how to make a poster and provide and review the accompanying rubric.

Summative Assessment
Skeletal System Poster (Evaluate Section) - The teacher will review/grade the student-created skeletal drawings from their interactive notebooks using a rubric. (you may choose to use the rubric attached) SkeletonPosterRubric.xlsx

Formative Assessment

Formative Assessment options:

1. Skeleton Illustration in Interactive Notebook (Engage Section): The teacher will review with the student the skeletal drawings from their interactive notebooks and discuss the parts and functions and clear up any misconceptions.

2. Summary about Homeostasis (Explain Section) - The teacher will conduct a discussion about “How do the skeletal, respiratory and circulatory systems work together to maintain homeostasis?” from their interactive notebooks.

Feedback to Students

- The teacher will direct a whole group discussion about labelling the parts of the skeleton and going over the illustrations the students made in their notebooks and pointing out areas that need to be improved upon and clarifying any misconceptions they may have.
- The teacher will lead a class discussion about “How do the skeletal, respiratory and circulatory systems work together to maintain homeostasis?” using guiding questions and leading the students to the correct answers. The teacher will go over the illustrations with the students in their notebooks and point out areas that need to be improved upon and clarify any misconceptions they may have.
- The teacher will evaluate each student's poster using the rubric to go over it with the students in their notebooks and pointing out areas that need to be improved upon and clarifying any misconceptions they may have.

ACCOMMODATIONS & RECOMMENDATIONS

Accommodations:

- For those students that may need it, you could print the skeleton for them to assemble in their notebooks, instead of drawing.
- Students with reading difficulties may work in groups/pairs to go through the note taking worksheet together.
- Hard copies of the reading passage could also be created for re-reading by those students that are second language students or have reading difficulties.

Extensions:

The following are additional activities or resources teachers could use if needed:

- StudyJams Video on Skeletal System
- Possible Engage Video Clip of Mr. Parr Skeletal System
- Possible Elaboration lesson Video Clip of Advanced Skeletal System
- LIVING BONES, STRONG BONES - Hands-on Educational Activity from NASA Fit Explorer Series

Suggested Technology: Computer for Presenter, Internet Connection, LCD Projector

Special Materials Needed:

Chicken bones (see attached handout for directions)

Further Recommendations:

Preparing Chicken Bones for Class:

1. First, the teacher should eat some chicken wings and save the bones.
2. Put the bones in water and boil it until all the tendons, ligaments and excess meat has fallen off.
3. Since the bones have been boiled they should be soft enough to carefully slice at different angles for different views for the students.
4. Let the bones dry completely.

SOURCE AND ACCESS INFORMATION

Name of Author/Source: Anonymously Submitted
Is this Resource freely Available? Yes
Access Privileges: Public
License: CPALMS License - no distribution - non commercial

Related Standards

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
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<tbody>
<tr>
<td>SC.6.L.14.5:</td>
<td>Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.</td>
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<tr>
<td>LAFS.68.RST.1.2:</td>
<td>Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.</td>
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