

AverMedia AverVision Lesson Plan Contest Submission

Jennifer Borowicz
West Seneca East Senior High School
4670 Seneca St.
West Seneca, NY 14224
716-677-3300 x4169
jborowicz@westseneca.wnyric.org

Subject: Science
Grade level: 10
Topic of Lesson: Anatomy of the Heart

Lesson Plan

Topic: Anatomy of the Heart, designed for an 80 minute laboratory block

Overview: This lesson examines the connection between structure and function in the body to maintain homeostasis.

Student Objectives:

The learner will be able to describe the functions of the chambers of the heart.
The learner will be able to compare an actual heart to textbook diagrams.
The learner will be able to describe the role of the heart in maintaining homeostasis

Materials:

dissection equipment
gloves
safety goggles
fetal pigs
textbook diagram of the heart
document camera
LCD projector
computer
image editing software
fetal pig dissection lab handouts

Procedures:

Anticipatory set: Connect to background knowledge

Students will come to class with homework completed as follows: a journal writing activity comparing similarities and differences between pigs and humans where the students are encouraged to think not only about anatomy, but also about the life functions that keep both organisms alive. They will also have completed a Venn diagram comparing pigs and humans. Student volunteers will be chosen to share their Venn diagrams with the class using the document camera. A brief whole class discussion will follow regarding the similarities between humans and pigs, and therefore, the reason for performing the dissection – as a method to

observe an organism's anatomy that is closely related to the human since both are placental mammals.

Activity #1: Introduction to the lab

Students will be organized into groups of three or four. One student will be the dissector, one the reader, and one the recorder. As a whole group the background information of the lab will be read aloud by a student volunteer. After reading the background information students will be asked to determine important pieces of information from the background to highlight. As the students volunteer information, the teacher will highlight those sections on the lab handout that is projected using the document camera. A think aloud technique will also be used to help students see the importance of the highlighted information.

Activity #2: Dissection procedures

The lab groups will be organized so the reader will read the lab instructions for the dissector and the recorder will write answers to the questions in the lab after group discussion. The document camera will be used to project the lab diagrams showing the beginning dissection and a fetal pig secured to a dissection tray. The teacher will model for the whole class how to follow the dissection diagrams to begin the dissection of the fetal pig. This method will allow the students to visualize how to transfer the two dimensional dissection motions onto the three dimensional fetal pig.

Activity #3: Student dissection

Students will work collaboratively in their groups to dissect the pig following the lab instructions. After opening up the pig, students will investigate the chest cavity locating structures such as the thymus, heart and lungs. A student group will be asked to place their pig under the document camera as a model for a good dissection allowing good viewing of the chest cavity.

Activity #4: Heart anatomy

After student groups have removed the heart from their pigs and opened up the heart, whole group discussion of heart anatomy will follow. A student volunteer will place his/her pig's heart under the document camera next to a textbook diagram of the heart. Students will be asked to identify the chambers and major vessels of the heart. A whole group discussion will follow comparing and contrasting the real heart to the textbook diagram. Expected responses include the fact that the real heart is much more muscular than it appears in the diagram and that the atria are much smaller than the ventricles.

Activity #5: Documenting heart anatomy

The document camera will be connected to a computer and each group will take a turn placing their heart under the document camera and capturing a still image of the heart in the computer. Each group will work with image editing software to label the chambers and vessels of the heart. Student groups will brainstorm ideas for writing about the importance of the heart in maintaining homeostasis.

Closure: Connecting to maintaining homeostasis

A visual of an entire human body will be projected onto the board using the document camera. Each student group will write a short sticky note about how the heart maintains homeostasis. Each group will place their sticky note on the board so that the note is attached to the area of the body they wrote about on the note. The image that the document camera projects of the human body will be covered with sticky notes leaving the lasting impression of how the heart helps maintain homeostasis throughout the body.

Assessment

The students will be assessed throughout the dissection via questioning by the teacher.

The closing activity serves as a form of assessment to determine if the students can make the connection between the structure of the heart and its overall function in maintaining homeostasis.

The homework assignment will be an assessment tool to determine individual student understanding. The homework assignment will be to print out the labeled photograph of the heart that the students took in the lab class and to write a paragraph explaining how the heart helps maintain homeostasis.

How the Document Camera is Used

The document camera is used in every portion of the lesson. For each section of the lesson, the use of the document camera is explained below.

Anticipatory set: Connect to background knowledge

The document camera provides a method for students to share their work with their peers. The ability to place their Venn diagrams under the document camera allows the students to showcase their work and at the same time promotes discussion among students. The students can interact with each other making additions to the Venn diagram that is displayed.

Activity #1: Introduction to the lab

In this activity the document camera is used to strengthen the students' reading skills and to provide a means to differentiate instruction. Students with lower reading abilities see what to highlight, and at the same time, students with higher reading abilities have the opportunity to explain their choice. They can easily refer to the information since all students have a copy in front of them and that same copy is projected for all to view.

Activity #2: Dissection procedures

The teacher uses the document camera to model proper dissection techniques. This allows the students to be more successful in their dissection since they see and hear proper procedures.

Activity #3: Student dissection

In this activity the students use the document camera to showcase their work. A student group uses the document camera to show their dissection to the rest of the class. Once again this gives students an opportunity to share with each other, and it gives all groups a model of what to strive for during the dissection process.

Activity #4: Heart anatomy

Here the document camera is used to assist students in understanding the difference between a textbook diagram of a heart and an actual heart. By comparing the diagrams side by side with the actual heart under the document camera, the students are able to see that a real heart is much more muscular than portrayed in the diagrams. Additionally, viewing the real heart allows them to see that the atria are much smaller than the ventricles. This size difference is much more dramatic in the real heart than in the textbook diagrams. The students will be more capable of understanding the connection between the structure and function of the heart due to the visualization of these comparisons using the document camera.

Activity #5: Documenting heart anatomy

The document camera is connected to a computer so that each group can take a digital photo of the heart and use image editing software to label the structures of the heart. Not only does this help students understand the structure of the heart, it allows them to use the technology as it is used in a real world setting. Using technology to document their lab work models how scientists document their findings in a real laboratory. Using the image editing software also models how scientists prepare information to present to their peers and/or the public.

Closure: Connecting to maintaining homeostasis

In the closing activity the document camera will be used to help the students move beyond thinking about organs in isolation and move towards thinking about homeostasis and how the organs of the body work together to maintain life.