Dembones: A 5th grade Forensic Mystery

Dem Bones: a unit plan integrating the SOL's for 5th grade

Lesson Plan- Day One

Two weeks before Halloween, the weather had turned warm again. "Indian Summer", said Matthew. "Let's go fishing before the cold weather returns for good!" Jesse and Matthew headed down to the barn to find the fishing poles, tackle box and bucket. The two boys also grabbed a small shovel to use to dig up night crawlers.

They ran through the back pasture to a spot where they had dug up some really big night crawlers last summer. It was a cool spot by a creek. They threw down their fishing equipment and began to dig in the rich dirt. It wasn't long before they had dug up some huge worms to use as bait.

Just as they were about ready to leave and head for the pond, Matthew suddenly stopped digging and yelled, "Jesse, look at this!" Jesse ran over and peered down into the dirt to see what looked like a gray, smooth bone. "What do you think it is?", Jesse asked. "A bone, but from what?", Matthew answered. "Let's keep digging and see what else we find."

Matthew and Jesse carefully dug in the black earth. Soon, they uncovered another piece of bone, this one was bigger than the first. "Let's take these back to the house and clean them up.", Jesse said as he carefully packed the bones in the bucket.

Matthew and Jesse gathered the fishing equipment and ran back to Matthew's house. They hosed off the bones and took them inside. "What kind of bones are they?", both boys wanted to know. "I think we should take them to school and ask Mrs. Strong to help us.", Matthew thought out loud.
First thing Monday morning the two boys appeared at the Science Room door. "Mrs. Strong, look what we found!", they yelled. Their exciting story and questions gave Mrs. Strong an idea for a 5th grade Science Lab.

Lab One:

Objectives: TSW (the students will) discover the history of the word "skeleton". TSW be introduced to the vocabulary of the skeletal system: bone, calcium, blood, compact bone, spongy bone, marrow, joints, ligaments, fracture.

TSW be asked to tell about their experiences with bones. Expect to hear about broken bones, dead animal bones, etc. TTW (the Teacher will) read the story " The Skeleton Inside You" a Let's Read and Find Out Science book.

TSW examine various bones that are available in the lab. TSW compare and contrast these bones and produce a drawing of their favorite bone. The following is a list of bones we have in the Jouett lab: cow skull, human bones- a disarticulate skeleton, rat skeleton, cat skeleton, gorilla skull, bat skeleton.

Content: SOL science 5.1, science 5.5, English 5.7, English 5.8

Materials: various skeletons, paper, pens, crayons.

Assessment: review of class drawings

Lesson Plan- Day Two

By comparing the bones that were found to the bones of other animals and humans, the 5th grade determined that the bones that were found by Matthew and Jesse are pieces of a human femur. The class talked about calling the police to report that they had found some human remains. Some of the class thought they should wait to report the bones until they go back to the pasture to see if there are any more bones that can be dug up. Mrs. Strong offered to take some interested students to Matthew's pasture to continue digging to see if they can find any more bones. If more are found, the class must decide what legal action they must take.

The class and Mrs. Strong arrived at the spot by the creek and stretched out string to mark off a grid of the area. Two students were assigned to a section of the grid and the pairs carefully sifted through the layers of soil. Many more bones were uncovered, some of the bones had been cracked to expose the marrow inside.

Lab Two:
Objectives: TSW predict what they will find when they dissect a fresh cow femur. (This can be ordered from Carolina Biological Supply Company, or you can ask your local meat cutter to save you a good section of beef marrow bone.) TSW dissect a fresh cow femur and diagram what they have discovered. TSW create a slide of the marrow and draw what they see. TSW write an explanation of the job of the marrow.

Content: SOL science 5.1, 5.5, English 5.7

Materials: fresh cow femur, slides, microscopes, paper, pens, crayons.

Assessment: completed drawing of the bone marrow and the description of the job of marrow.

Homework: TSW define Leukemia and describe how this disease is related to the bone marrow.

Lesson Plans- Day Three

Lab Three:

Objectives: TSW examine the results of the Vinegar and Chicken Bone test to eventually conclude that bones are composed of calcium. This test is a classic and is sometimes called the "Rubber Bone" experiment. TSW write a formal lab report for this experiment.

Content: SOL science 5.1, 5.5, 5.4, English 5.7

Materials: Chicken bone, vinegar, beakers, paper, pens.
Assessment: Student produced formal lab write up.

Lesson Plans-Day Four

_The bones that were found were cleaned and taken back to the school, where they were carefully laid out on one of the Science room lab tables. Mrs. Strong and the children found books that contained pictures of the human skeleton. They were going to use these to help them put their discovery together._

Lab Four:

:Objectives TSW create and label a paper model of the human skeleton. The major bones will be identified- skull, sternum, ribs, carpals, metacarpals, phalanges, tarsals, metatarsals, humerus, radius, ulna, pelvic girdle, coccyx, femur, patella, tibia, fibula, spinal column. The model will be put together with gold brads so that it can move. TTW read from the Eyewitness book, "Skeleton".

Content: SOL science 5.1, 5.5.

Materials: paper, skeleton pattern, gold brads, scissors

Assessment: Student produced paper skeleton

[Here is a cool Anatomy Site:](#)

Lesson Plans-Day Five

_Mrs. Strong’s class worked very hard and were excited as their skeleton slowly came together. By studying the pelvis, the class was able to determine the sex of their specimen. The class was also able to determine how tall their specimen had been in real life._

Lab Five:

:Objectives TSW combine the bones of a disarticulated human skeleton . TSW predict the length of the major long bones of the body.TSW measure the length of the major long bones to determine the height of the deceased person. TSW create a table to show their findings. TSW determine if the skeleton is that of a male or female.

TTW read the story" Dem Bones" written by: Bob Barner.
Content: SOL science 5.1, 5.5, Math 5.3, 5.11, 5.17.

Materials: disarticulate skeleton, tape measurer, ruler, meter stick, paper, pen.

Assessment: student produced table

Homework: TSW write a paper to discuss how donating your body after your death is beneficial to students.

Lesson Plans-Day Six

"We still need to find the skull.", Jesse complained. "If we could find the skull, we might be able to tell how the skeleton died." Jesse grabbed Matthew at lunch and the two boys decided to go back to the pasture to continue digging.

That afternoon, the boys began to dig in the spot by the creek. They dug for what seemed like hours, when Matthew suddenly yelled, "A tooth, Jesse, I've found a tooth!". Jesse and Matthew began to dig with more excitement, as another tooth was found. Then a jaw bone was uncovered, and finally, the skull was exposed. The boys carefully lifted the skull out of the dirt and were shocked to see a hole in the left side of the skull. Quickly, they boxed their find and returned home.

The next morning, they carried the box to Mrs. Strong's Science Room. The skull was carefully placed at the top of the skeleton's spinal column.

Lab Six:

Objectives: TSW examine the ball-and-socket joint, a hinge joint, and an immovable joint on the articulated and disarticulate skeletons. TSW demonstrate how each joint works by exercising the join. (Arm rotations, knee jerks, leg swings, hip rotations, etc.). A human skull will be compared to the other joints- the immovable joints of the skull will be drawn. A baby's skull will be examined to show the fontanel. TSW produce a drawing of the baby skull with the fontanel labeled.

Content: SOL science 5.1, 5.5

Materials: disarticulate skeleton, human skull, fetal skull, paper, pen, crayons

Assessment: student produced drawings
Lesson Plans-Day Seven

_The 5th grade was excited with the discovery of the skull. Many ideas about the reason for the hole in the skull were discussed. The class also discovered that one of the skeleton's femurs had been fractured._

Lab Seven:

Objectives: TSW illustrate the various types of bone fractures after they examine x-rays showing examples of the most common injuries. TSW discuss safety practices in the most common sports that they participate in- shin guards in soccer, pads in football, pads in baseball, hard hats in horseback riding, etc. TSW discover how a fracture is repaired (what happens while the cast is on).

Content: SOL science 5.1, 5.5 English 5.7, 5.8, 5.3

Materials: x-rays, paper, pens

Assessment: student discussion

Lesson Plan: Day Eight

TTW direct the class to break up into Lab Partners. The Partner Teams will be instructed to examine the story that they have been hearing for the past seven days. The Partner Teams will define the Issues in the story. They will look at the story through the eyes of the people involved (Perspectives). It will be up to the Partners to gain Knowledge about the different problems in the story. The Partners will then write possible Actions that can be taken to solve the problems and the Consequences (good or bad) that might result from those actions. The Actions that are presented by the Partners will be based on how they choose to interpret the story.
Content: English 5.1, 5.2, 5.6, 5.7, 5.8. History SOLs can be introduced by suggesting that the skeleton might be from Colonial Virginia, a Revolutionary War soldier, a Civil War soldier, a slave that was trying to escape Virginia on the Underground Railroad. These SOLs would be History and Social Science 5.1, 5.3, 5.6, 5.7.

Materials: The Story can be printed and handed out to the Partners. Paper, Pens, Brains.

Assessment: A student produced paper. Oral presentations to the class.

Lesson Plan-Day Nine

Objectives: TSW construct a bat and diagram its wing bone structure using toothpicks. TSW contrast and compare the bat wing to the human arm and hand. TSW hang the bats in the science room to decorate for Halloween. TSW celebrate the end of the unit with a bag of Halloween gummy creatures!

Content: SOL science 5.1, 5.5. Math 5.11. English 5.7, 5.8

Materials: Bat template, toothpicks, glue, paper, crayons, pens, Gummy creatures

Assessment: Student produced bat, formal science writeup.
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