



Culturally Sensitive Approach To Science & Animal Research Skeleton Model

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Grade-Level:
High School-Junior College

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Introduction:

This activity is the last in a unit of Native American cultural sensitivity to animal research. This unit was developed to address the concerns of Native American students as they are introduced to animal research in their biological/scientific educational career. This unit can be incorporated into an introductory-level broad science course such as Survey of Science, introductory level biology course, or introductory level anatomy course. I feel this unit (including this activity) is very important and appropriate for schools having a high population of Native American students. (Due to the community/tribally-specific information discussed in this unit, I do not feel comfortable making the other activities of this unit available to the public.) Please feel free to contact me if you have specific questions regarding this activity/project.

Purpose:

The purpose of this activity is to incorporate *inquiry*, *cooperative learning*, *teamwork*, and *hands-on experience* into the cultural unit of which this activity is part. This will be accomplished by requiring students to first *identify* and *compare/contrast* bones of two culturally significant animals (deer, antelope, cattle, buffalo, dog, etc.) and then develop a plan amongst themselves to construct a life-size skeletal model of the animal(s) using a preserved skeleton provided to them. This activity is part of a unit developed for Junior College (13/14-grade level) students, but may easily be adapted for use in a high school classroom.

Objectives:

Students will be able to:

- work cooperatively with a partner or group of other students.
- use teamwork to accomplish an assigned task.
- be familiar with, on an introductory level, comparative anatomy.
- be familiar with major identifiable markings on bones of various animal species (deer, antelope, cattle, buffalo, dog, etc.).
- develop a plan, including scheduling, meeting arrangements, defined individual roles, and resources available/needed to accomplish an assigned task.
- construct a skeletal model of an animal having cultural significance to the local community.

Materials:

Student materials will be very minimal. The class will be presented with a **full skeleton (bones)** of two different animals. Specific species will depend upon cultural history and availability of skeletal animal remains (deer, antelope, cattle, buffalo, dog, etc.)

- 2 display stands (for the completed skeletal models)
- soft wire (1 small roll)
- fishing wire (2 small rolls)
- adhesive glue (2 large containers)

- clear lacquer (1 can)

Preparation and Procedure:

It is suggested that instructors obtain written permission to use professionally preserved skeletal remains (bones) of game animals in their classroom from their dean/principal before planning this activity. Depending upon resources available in your community, preparation time will vary. The major preparation for this project comes in preparing an animal skeleton (bones) of two animals to bring into the classroom. The class will be divided into two groups, with each group preparing a skeletal model of the bones brought into the classroom. I suggest that each group have a minimum of four students and no more than 9-10 students. If you have only a few students, have all students work together to construct only one skeletal model. I have been fortunate enough to obtain the assistance of two local professional taxidermists. They, together, have agreed to field-dress, skin, and de-bone the animals if I provide them with the needed supplies (skinning & boning knives, boiling apparatus, propane fuel, bleach, and clear lacquer). I suggest, for safety reasons, that you obtain the assistance of a professional to prepare the skeleton of bones for bringing into the classroom.

I have also obtained the commitment of a professional taxidermist to come into the classroom and present to the students major identifiable markings on bones of the different animals brought into the classroom. I have been searching for additional resources in this area (comparative anatomy of game animals) but currently have none for publication.

Altogether, this activity should take approximately four days of class time (four hours) including the introduction, developing the plan, seeing comparative identifiable markings, and actual construction of the model. Below is a sample time schedule for the activity:

Day 1: Introduction, students given assignment to develop plan for constructing model.

Day 2: Guest speaker (professional taxidermist) presents process of preserving bones, identifiable markings of bones, comparative anatomy.

Day 3: Students compare/contrast bones of 2 different animals and begin organizing bones for construction of model.

Day 4: Class time is used to prepare display stand and begin actual construction. Students must schedule the remaining time needed to assemble the model for time outside the class schedule. Approximately 5-6 additional hours will be needed by groups to completely assemble the models.

Safety:

The main safety concern for this activity is having the animal bones professionally prepared and preserved before being brought into the classroom.

Students will be working with heavy objects (bones) and must take caution not to drop the bones. Also when assembling the bones into a skeletal model, students must be taught proper handling of wire-cutting tools and adhesive glue.

Questions to Ask:

1. Why do you (students) think that the variation amongst skeletons exists between two animals? What can you assume/interpret from this information? These questions will lead students to examine the differing lifestyles, environment, and/or feeding/seasonal patterns of the animal and how they are physically adapted for their particular lifestyles.
2. What will you do if your group is unable to keep on schedule with the plan you have devised? This question will force students to plan for possible obstacles they may run into when carrying out their plan. This will help develop students' problem-solving skills.

Where to Go From Here:

As was stated in the introduction, this activity is part of a whole unit discussing issues of animal/scientific research from a Native American student's perspective. The other activities of this unit were developed specifically for the student population and their particular cultural background.

I would like to suggest that the skeletal models be displayed in a public place, possibly moving its location periodically. The local media would be a great source of advertisement for the students' accomplishments in this project. My students love the local recognition and schools will always accept positive media attention.

References and Resources:

I recommend that you talk to a local professional taxidermist and/or wildlife biologist in your area before attempting this activity. I have received great comments and suggestions from a local high school teacher who developed a similar activity for their classroom. Contact your local university's anatomy department chair for suggestions and information.

Also if your university has a wildlife biology department, faculty from that department would be great resources. Other suggestions for assistance include your local wildlife commissioner, game warden, and forestry service personnel.

Suggestions for Assessment:

1. To assess teamwork and cooperative learning, classroom observations by instructor and individual team/group evaluations by students would work well.
2. Assessment of a plan developed by students will be based on appropriateness, flexibility, and the group's ability to follow that plan.
3. Assessment of inquiry will be based on students' ability to assemble bones into appropriate organizational scheme for model and assembly of model.
4. Assessment of model will be based on proportionality measurements and appearance.

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Student Activity Sheet

This is the last activity in the Culturally Sensitive Approach to Science and Animal Research Unit. In this activity you, as a class, will construct a life-size skeletal model of two animals, _____ and _____. We have, in previous activities, talked about the cultural significance of this animal and some of the historical uses of body parts of this animal. We have a set of preserved skeletal bones of each of the above animals to use in this activity provided to us by

_____, a local professional taxidermist.

This activity will have three sections. Below is a description:

Section 1:

Identify distinctive identifiable markings of bones of the above animals and comparison of bones from the two animals. (Guest speaker will present class with this information.)

Section 2:

Students will divide into two groups and, as a group, will devise a plan to successfully assemble the skeletal model of one of the animals. Each group will assemble a model of one of the animals. This plan must include a timetable (including completion date), meeting arrangements (times and places/rooms, etc.), individual roles and responsibilities (for each member of the group), and a section addressing resources needed and their availability. You will be given part of one class period and another full class period to work on your model. It is suggested that you use this class time to organize your bones into appropriate skeletal shape and prepare the display stand.

Section 3:

Groups will work together, following their plan, to assemble the bones into a life-size model of the animal. You will be provided a space to work, a display stand for your model, and materials needed for assembly.

NOTE: This is only an introduction to this activity. You will be given additional information and guidance as needed.