HOMOLOGOUS STRUCTURES

INQUIRY ACTIVITY SHEET

INTRODUCTION

It's always exciting to find a shark tooth along the beach, but finding a bone is really exciting. Finding a bone is like finding a million dollars in cash, it prompts the question, "Where did it come from. " In the case of the bone, the next question is usually, "Is it human, and if not then to what animal does it belong." As human beings, we seem to have this instinctive curiosity for investigating animal remains; perhaps this curiosity benefited our hunter/gatherer ancestors. As Biologist, we are always compelled to step beyond the discovery stage and ask questions like, "How do these structures compare with similar structures in other organisms." Evolutionary Biologists often ask these kinds of questions when considering relationships between organisms.

In this exercise we'll be looking for homologous structures, a structure in one animal that is thought to have the same evolutionary origin as a structure in another animal (Ex. Wings of bats and arms of humans). In contrast, structures in one organism that share a similar function in other organisms but have developed independently are known as analogous structures (Ex. Wings of bats and butterflies).

STUDENT LEARNING OBJECTIVES

1. Students will be able to work cooperatively to explore homologous and analogous structures of various vertebrate skeletons and propose an identification of that vertebrate.

MATERIALS

1 black box
4 pencils
4 copies of Evolution of Vertebrates WS1 (Homologous Structure)

PROCEDURES

1) At each lab station in the back of the room you'll find 1 black box, 4 pencils, and 4 copies of WS1. Form groups of four around each box. Each group must have at least one male biologist and one female biologist. Obtain a single copy of WS1 and one pencil. At the bottom of the worksheet write your name and the names of the other biologist in your group.
2) **Complete Worksheet Part 1:** On the top of the box there is some information about the contents inside, copy that information to your worksheet.
3) **Walk to front of the classroom** and wait for everyone else to finish.

FIRST GROUP TO THE FRONT GETS MY SIGNATURE

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4) Return to your station. Choose one member of the group to be a curator. Only the curator may touch the box and the structures inside. The curator opens the box, removes the structures, and places them on the table

5) **Complete Worksheet Part 2:** Each structure has a numbered label, write the number in the upper right corner of the sketch box on your worksheet. Sketch three structures and list three characteristics that you think best describe the structure. When everyone in your group has completed WS: Part 2 the curator will place the structures back in the box and close the box.
6) **Walk to front of the classroom** and wait for everyone else to finish.

FIRST GROUP TO THE FRONT GETS MY SIGNATURE

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7) For each one of your structures you must find one homologous structure. Walk around the classroom and share your sketches and descriptions with other biologists. None of the structures from the same box are homologous so don't consult the other members of your group.
8) **Complete Worksheet Part 3:** When you find a potential homologous structure, ask the biologist if you may record the number assigned to their structure and copy the characteristics they recorded.
9) **Complete Worksheet Part 4:** When you have found three homologous structures locate the principle investigator (The Teacher) and ask for approval. For each homologous structure that is not approved, erase the information written in WS: Part 2 and repeat step 3. Continue until you have received approval for three homologous structures.
10) **Walk to front of the classroom** and wait for everyone else to finish.

FIRST GROUP TO THE FRONT GETS MY SIGNATURE

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COMPLETE SIX QUESTIONS

1) What part of the box information do you consider most important?

2) How did the curator hinder or improve the process?

3) How might this activity be relevant to the life of a “real” Biologist, explain?

4) Select one structure and explain how your description of that structure compares with that of the homologous structure.

5) What single component of this activity would you consider to be the most important, explain?

6) How would assess whether the structures are “really” homologous? In other words, what evidence would you need to be absolutely sure?

LAST GROUP TO FINISH GETS MY SIGNATURE

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