

ACTIVITY: Evidence for Evolution

BACKGROUND: Much evidence has been found to indicate that living things have evolved or changed gradually during their natural history. The study of fossils as well as work in embryology, biochemistry, and comparative anatomy provides evidence for evolution.

OBJECTIVES: In this lab you will learn about homologous, analogous, and vestigial structures and their significance in evolutionary theory.

MATERIALS: Colored pencils and worksheet.

PROCEDURES AND OBSERVATIONS:

PART I. HOMOLOGOUS STRUCTURES (definition): _____

1) Carefully examine the drawings of the bones shown in Figure 1 on the next page. Look for similarities among the various animals.

A) **Color** each part of the human arm a different color. (All bones of the wrist should be a single color; the bone groups of the hand should be a different single color, etc.) **Then color the corresponding bone in each of the other animals the same color as the human bone.**

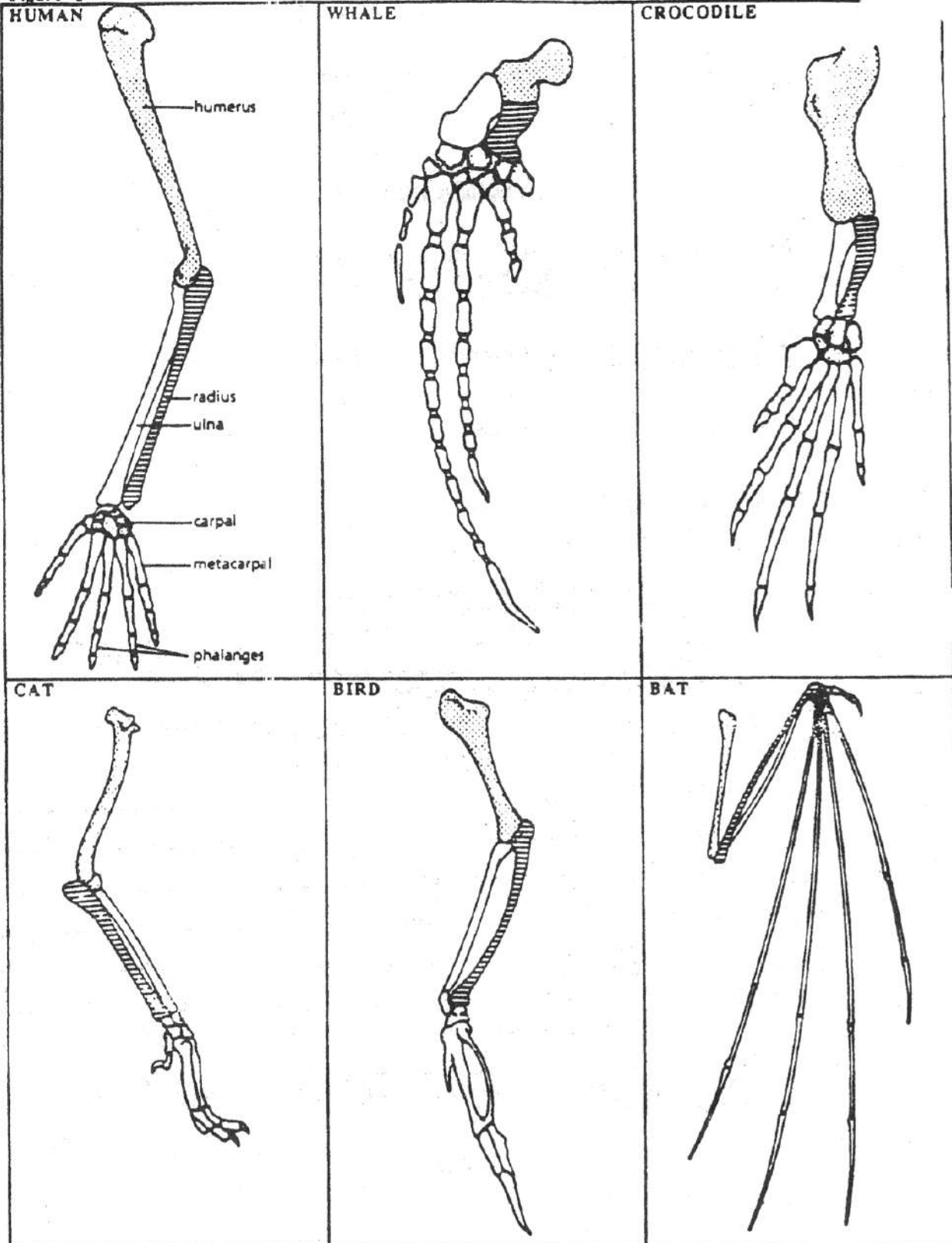
B) Describe the function of each set of bones below (***based on the arrangement of bones, for what purpose is the shown appendage best suited?***)

ANIMAL	FUNCTION
HUMAN	
WHALE	
CAT	
BAT	
BIRD	
CROCODILE	

C) Are the bones arranged in a similar way in each animal? _____

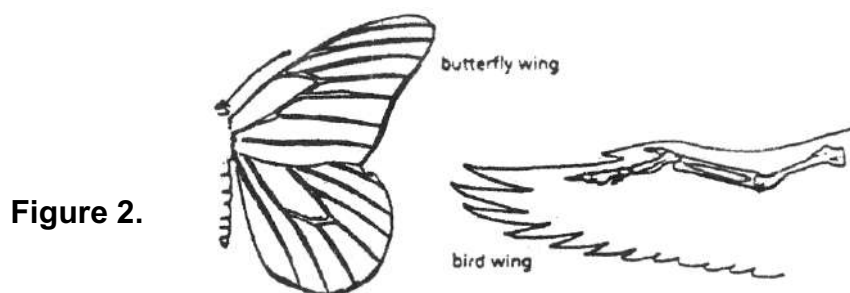
These structures are formed in similar ways during embryonic development and share like arrangements; however they have somewhat different forms and functions. They are called **homologous structures**.

Figure 1



PART II. ANALOGOUS STRUCTURES (definition): _____

1) Examine the butterfly wing and the bird wing shown in Figure 2.



A) What **FUNCTION** do these structures share? _____

B) How are these structures different? _____

C) Do birds and insects share any structural (inside the wing) similarities that would suggest they are closely related taxonomically? Explain.

Some apparently unrelated animals have organs with similar functions, yet are very different in structure and form. These structures are called **ANALOGOUS STRUCTURES**.

PART III. VESTIGIAL STRUCTURES (definition): _____

Gradual changes have occurred through time that have in some cases reduced or removed function of some body structures and organs. The penguin's wings and the leg bones of snakes are examples of this phenomenon.

1) The cavefish and minnow shown in Figure 3 are related, but the cavefish is blind.

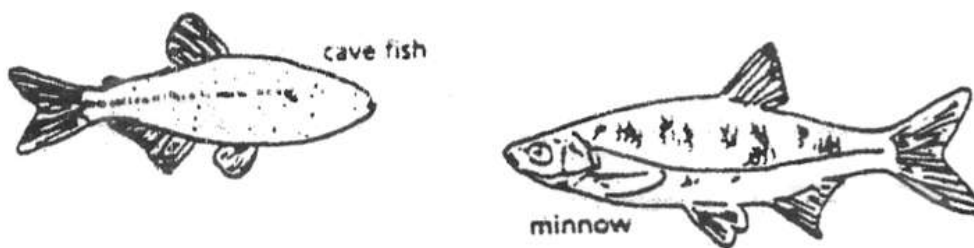


Figure 3.

A) Explain why eyesight is NOT an important adaptation to life in a cave. _____

B) What about the body plan or structure of the cavefish and minnow suggest common ancestry?

2) Read the list of human vestigial structures shown in Table 1.

C) Suggest a **possible function** for each structure and **explain why it became vestigial**. Record your answers in the table.

Table 1

STRUCTURE	POSSIBLE FUNCTION	WHY VESTIGIAL?
appendix (digests leaves in koala bears)		
coccyx (tail bones)		
muscles that move ears		
muscles that make hair stand up		
little toe		
wisdom teeth		

ANALYSIS AND INTERPRETATIONS

1) Explain why the homologous structures in Part I are evidence of evolutionary relationships.

2) Explain the evolutionary relationship between the fin of a fish and the flipper of a whale.

3) List one additional structure (not from Table 1) that you think are vestigial and explain why.

4) Explain the three different types of structures that you have studied in this lab. Give an example of each.

1. HOMOLOGOUS STRUCTURES - _____

2. ANALOGOUS STRUCTURES - _____

3. VESTIGIAL ORGANS - _____
