Name: _____ Period: _____ Date: _____

Evidence of Evolution Lab

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 in embryology, biochemistry, and comparative anatomy provides evidence for evolution.

Objective

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

Materials

Colored pencils

Part I Homologous structures

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

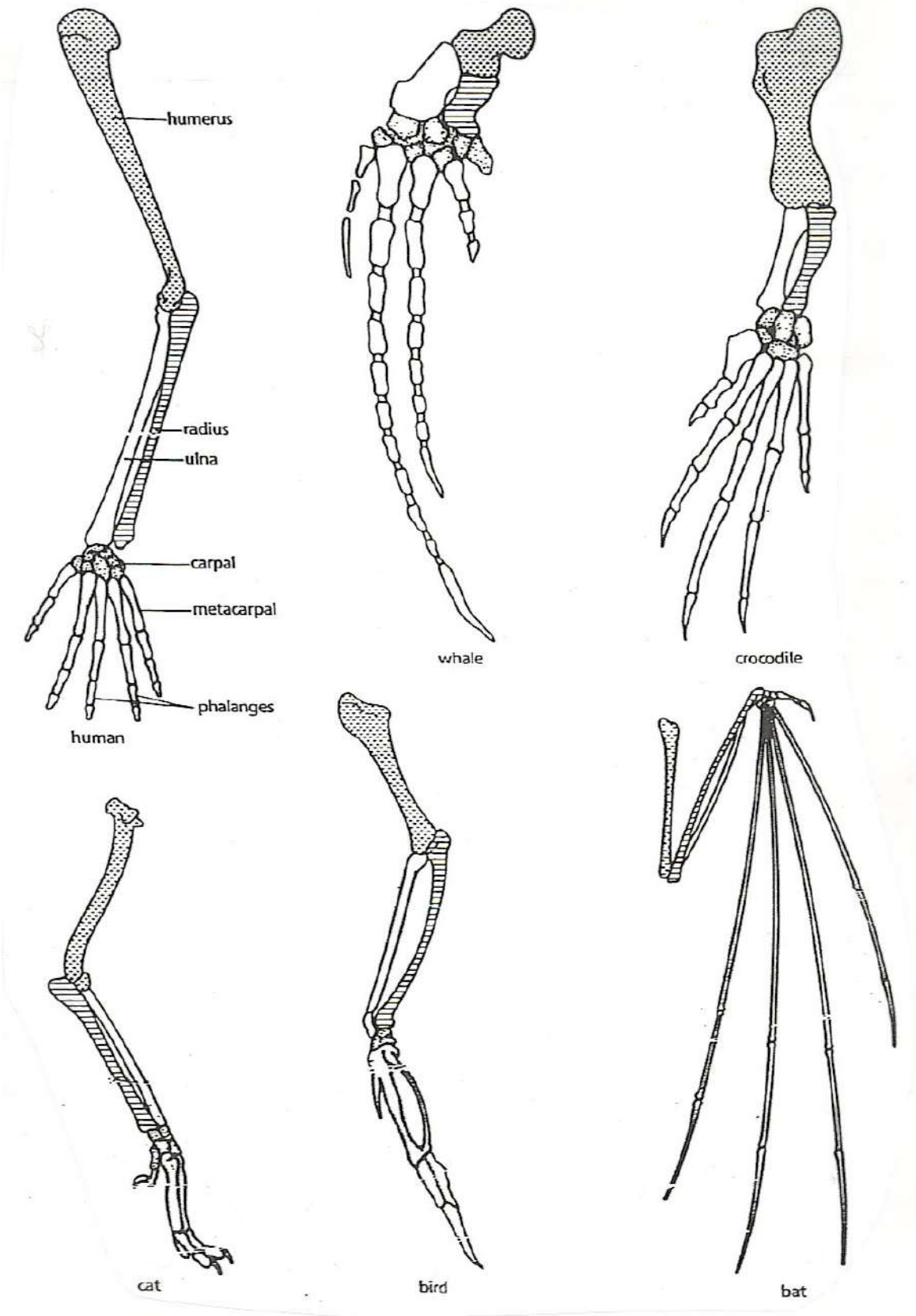
   a. Color each part of the human arm a different color. (All bones of the wrist should be a single color, the bone groups of the hand should be a different single color.) Then color the corresponding bone in each of the other animals the same color as the human bone.

   b. Describe the function of each set of bones below.

Animal	Function
Human	
Whale	
Cat	
Bat	
Bird	
Crocodile	

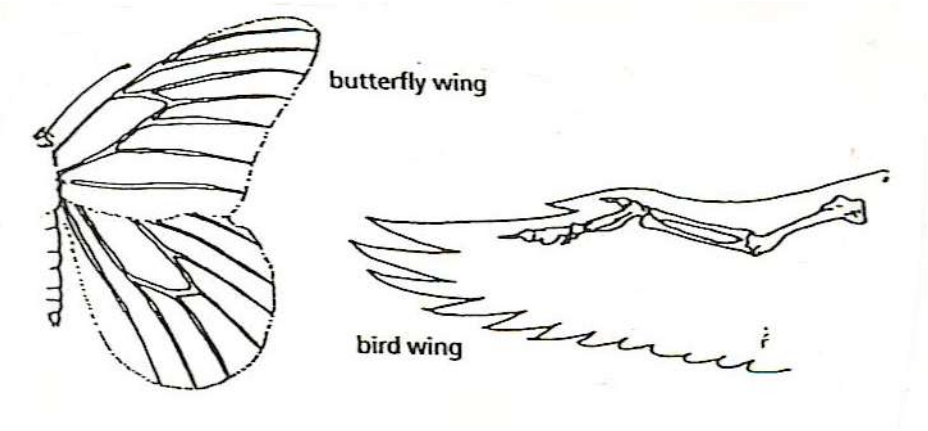
c. Are the bones arranged in a similar way in each animal?

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



Part II Analogous Structures

1. Examine the butterfly wing and the bird wing shown below.



a. What function do these structures share?

b. How do the structures differ?

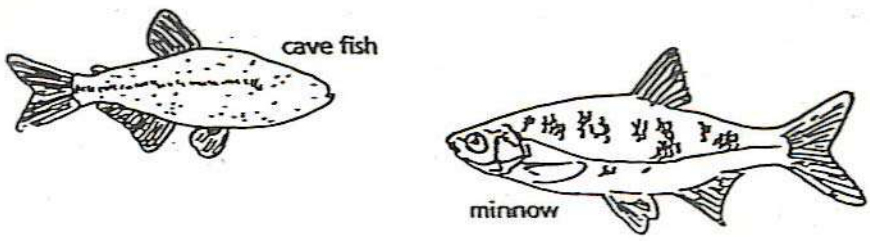
c. Do birds and insects share any structural similarities that would suggest they are closely related taxonomically?

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

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

1. The cave fish and minnow shown below are related, but the cave fish is blind.



a. Explain why eyesight is not an important adaptation to life in a cave.

b. Does the appearance of the cave fish and minnow suggest common ancestry? Why?

Organs or structures that have lost their function in the organism and become reduced in size (because of efficiency) are called vestigial structures. Human vestigial organs are well documented.

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

a. Suggest a possible function for each structure and explain why it became vestigial. Record your answer in the table.

Table 1

Structure	Probable Function	Why Vestigial?
Appendix		
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 the fish and the flipper of a whale.

3. List two structures (not from table 1) that you think are vestigial and explain why.