

## Evidence of Evolution

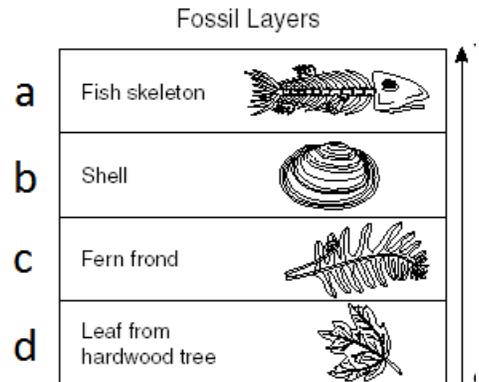
**Background:** Much evidence has been found to indicate that living things have evolved or changed gradually during their natural history. The study of fossils as well as work in embryology, biochemistry, and comparative morphology provides evidence for evolution.

**Objective:** To compare homologous, analogous, and vestigial structures and analyze their significance in evolutionary history.

**I. Fossils**

Study the figure at right.

1. Which rock layer is the oldest? \_\_\_\_\_
2. Which rock layer is the most modern? \_\_\_\_\_
3. How do you think the habitats changed over time?  
\_\_\_\_\_



**II. Homologous Structures**

1. Carefully examine the drawings of the bones in Figure 1 at the bottom. Look for similarities among the various animals.
  - i. Color each bone of the human arm a different color. All bones of the wrist (carpals) should be a single color. The metacarpals and phalanges should each be another color. Then color the corresponding bones (containing the same pattern) in each of the other animals the same color as the human bone (i.e. if you color the humerus blue in the human, it should be blue in all the other animals).
  - ii. Describe at least two functions (jobs) of each set of bones below:

**Table 1**

Animal	Functions	
Human		
Whale		
Crocodile		

- iii. Are the bones arranged in a similar way in each animal? \_\_\_\_\_

These structures on the following page 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. What does the prefix "homo" mean? \_\_\_\_\_

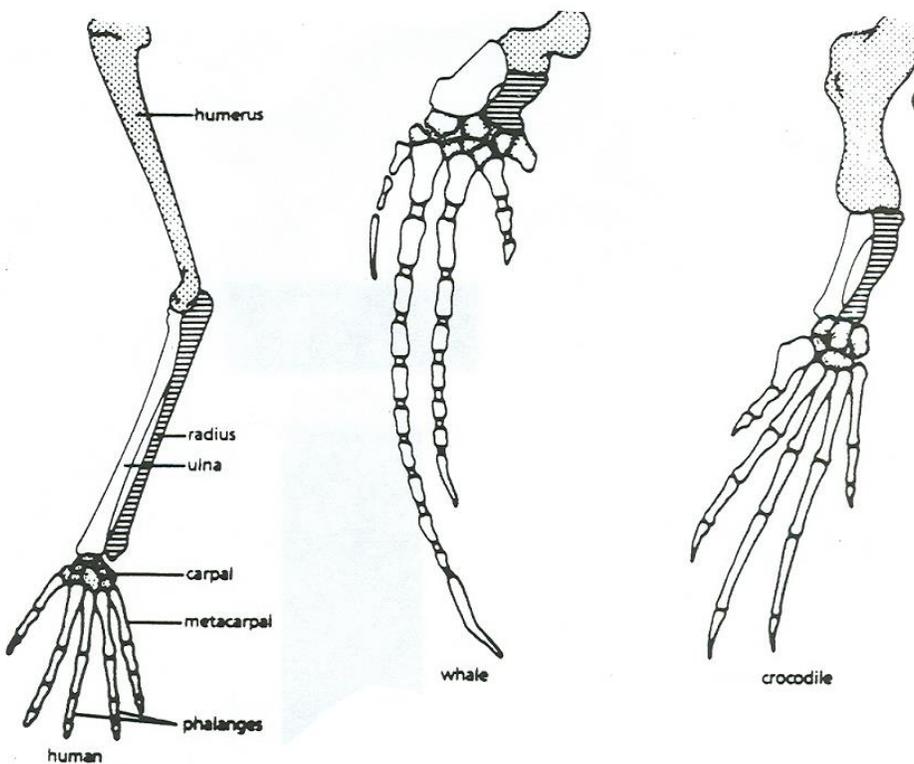
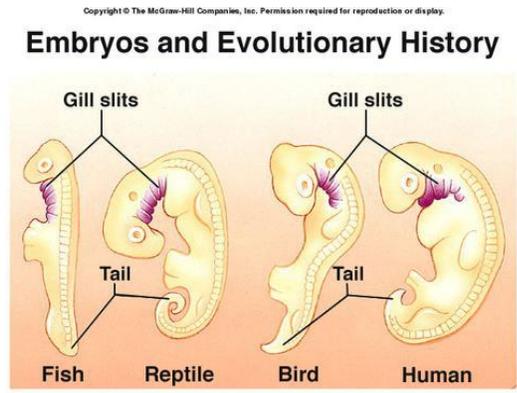


Figure 1

III. Embryology

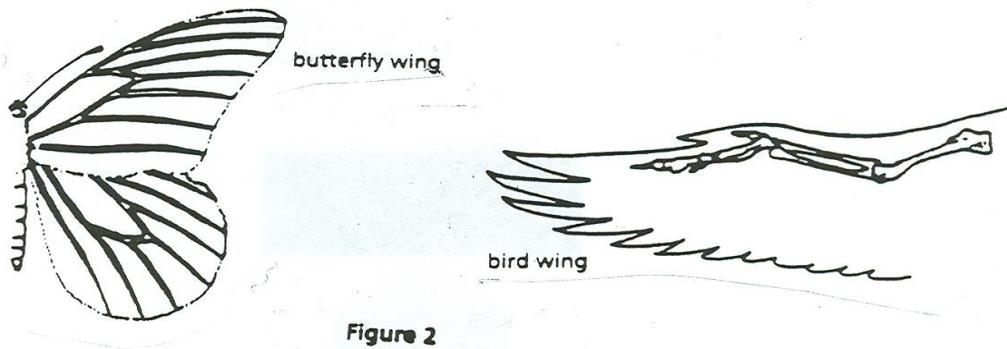
1) Why is embryology a good indicator of evolution?

- A. All embryos use the same genes at the exact same instant during development.
- B. The embryos of various groups of vertebrates all share the same features of early development, suggesting an evolutionary relationship.
- C. Embryological development occurs at the same pace in all organisms.
- D. The fact that any organisms undergo embryological development at all suggests evolution.



IV. Analogous structures: Some apparently unrelated animals have organs with similar functions, yet are very different in structure and form. These structures are called analogous structures.

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



a. What function (job) do these structures share? \_\_\_\_\_

b. How are these structures different? Look inside and outside!

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c. Do birds and insects share any structural similarities that would suggest they are closely related (have a common ancestor)? Explain.

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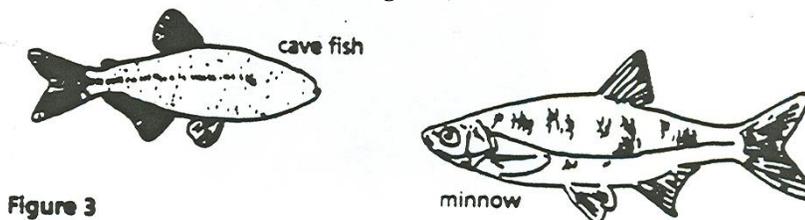


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V. Vestigial structures: Organs or structures that have lost their function in the organism and have become reduced in size (because of efficiency) are called **vestigial structures**.

Gradual changes have occurred through time that have, in some cases, reduced or removed the function of some body structures and organs.

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



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

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b. Do the appearance of the cave fish and minnow suggest common ancestry? Explain.

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