

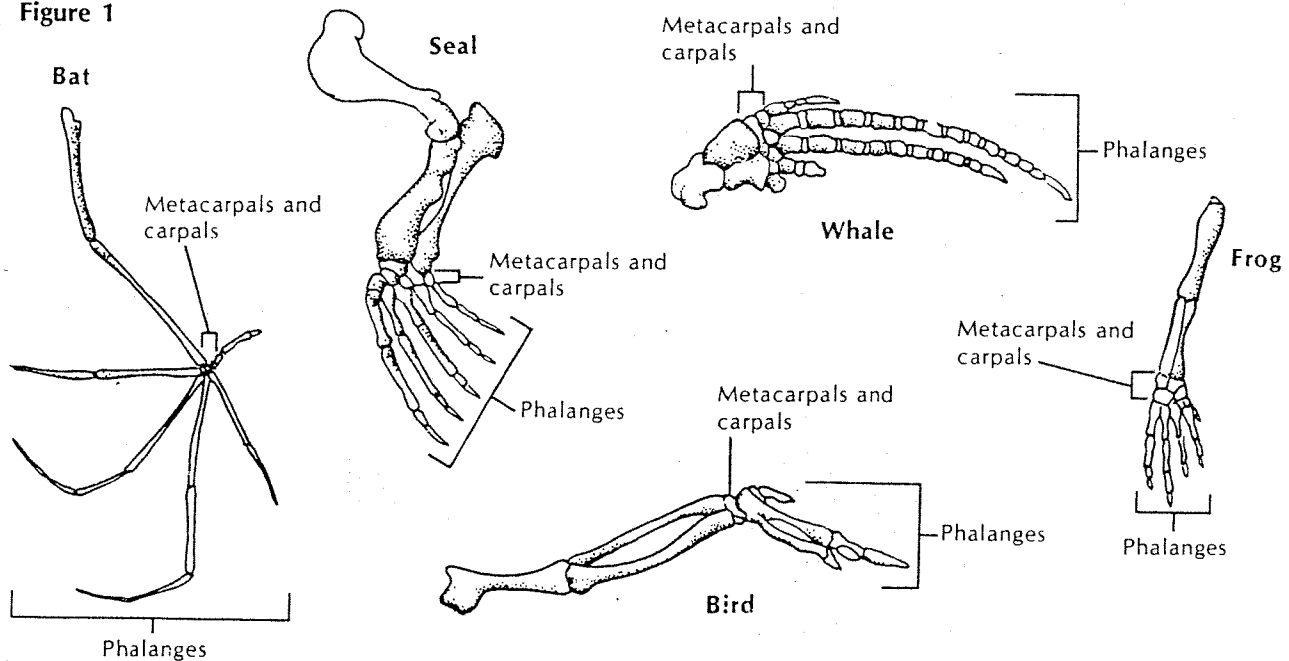
## Examining Homologous and Analogous Structures

### Making Comparisons

Comparing the structures of organisms is one of the ways in which biologists learn how different organisms are related. To make these comparisons, biologists must make careful observations and measurements and write clear descriptions. In this activity, you will observe and compare the structures of some organisms.

*Homologous* structures are either identical or very similar in form. They provide evidence that organisms might have evolved from a common ancestor. Structures must be studied in great detail to make sure that they are homologous. For example, the front limbs of bats, whales, frogs, seals, and birds look very different. The front limbs of both birds and bats are used for flying, but the limbs of birds have feathers and the limbs of bats do not. The front limbs of both the whale and the seal are flippers, but the seal uses its flippers to support its body on land and the whale does not. The flippers on both a whale and a seal might appear to have little in common with the front limbs of birds and of bats. The front legs of a frog also appear to have little in common with the front limbs of the other animals. These structures are not similar in function. However, an examination of the bones in each of these front limbs shows that the bones in them are very much alike. In fact, scientists say that the bones in these limbs are homologous.

Figure 1



The bones in the front limbs of a bird, a bat, a whale, a seal, and a frog are shown in Figure 1. Use Figure 1 to answer the following.

1. Compare the names of the bones in each limb.

2. Compare the positions of the bones in each limb.

3. Explain the differences between the bird wing and the bat wing.

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4. Which limb looks more flexible, the whale flipper or the seal flipper? Explain your answer.

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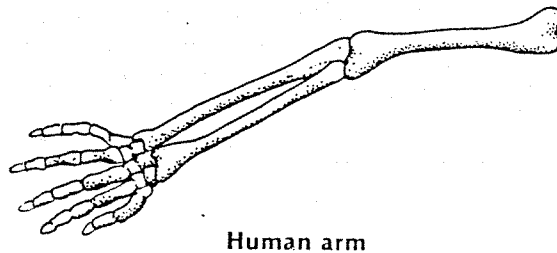
5. Suggest a reason for the flippers of a whale being less flexible than the flippers of a seal.

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Figure 2



Human arm

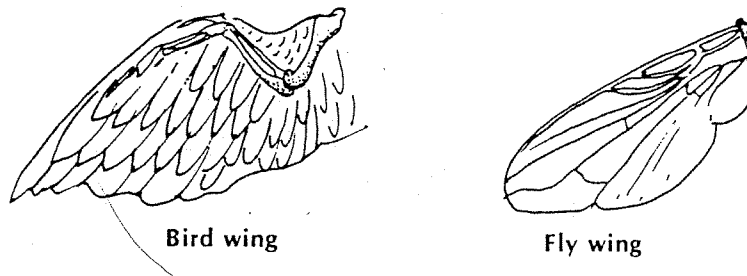
6. Study the bones in the human arm that are shown in Figure 2. Are these bones homologous to the bones that are shown in Figure 1? Explain your answer.

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Figure 3 shows two structures that perform the same function but that are not similar in structure. Scientists say that such structures are *analogous*.

Figure 3



7. Examine Figure 3. List at least two ways in which the wing of the bird and the wing of the fly are different.

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