

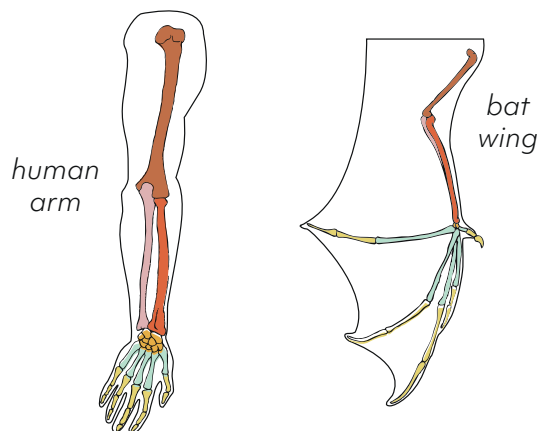
Analogous and Homologous Structures



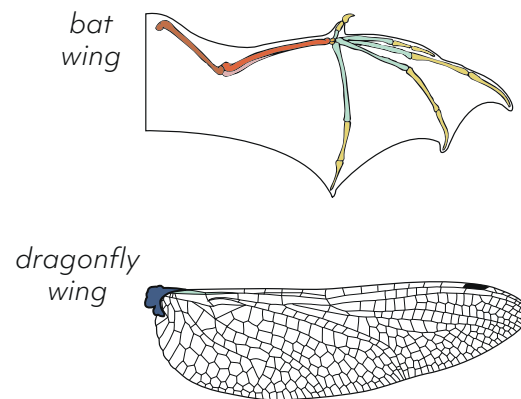
Evolution is the study of how organisms change over time. Evolutionary biologists gather evidence to determine how closely related organisms are. One particularly useful type of evidence is **anatomical evidence**. Anatomy is the study of the internal structure of an organism. So, anatomical evidence is gathered by comparing the internal structures of two organisms to determine how closely related they are.

There are two types of anatomical structures that are particularly helpful to evolutionary biologists:

Homologous structures look very similar between organisms, even if they serve different functions. For example, the human arm and hand and a bat wing serve two different functions. One is used for grasping and manipulating things, while the other is used for flying. Despite these functional differences, the bone structure between the human arm and hand and a bat wing is strikingly similar.

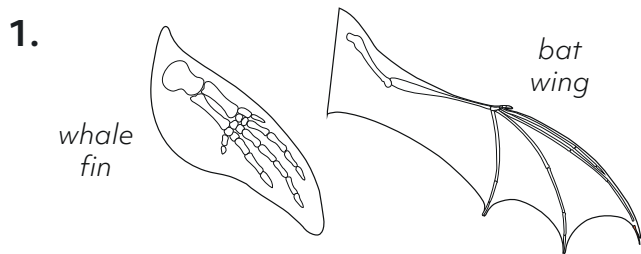


Analogous structures serve the same function between two organisms but look different. For example, a bat wing and a dragonfly wing are both used for flight, but structurally they are very different. The bat wing is made of bones while the dragonfly wing is made of a thin substance called chitin.

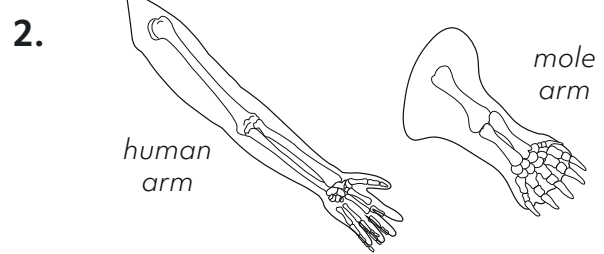


Because an organism's genes determine its physical structure, homologous structures provide evidence that two organisms are closely related. Analogous structures do not.

Time to practice! Circle the correct term to indicate whether each of the following pairs are homologous structures or analogous structures.



homologous or analogous



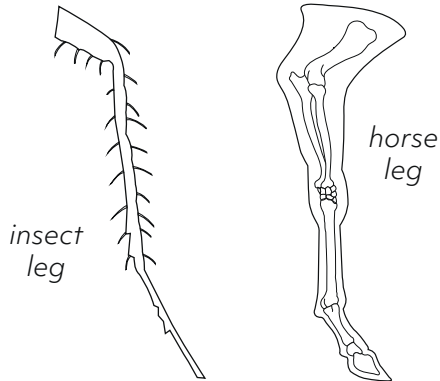
homologous or analogous

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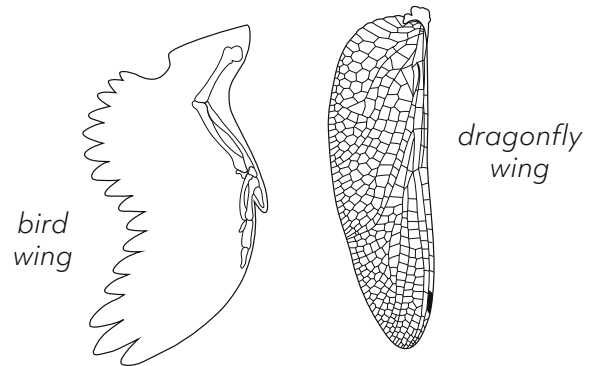
Keep going! Circle the correct term to indicate whether each of the following pairs are homologous structures or analogous structures.

3.



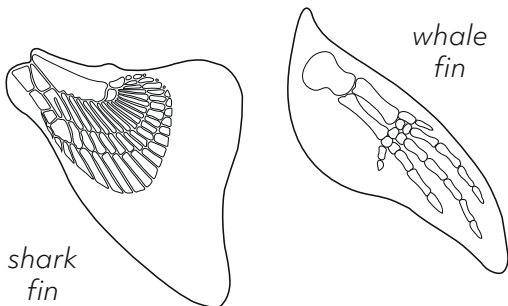
homologous or **analogous**

4.



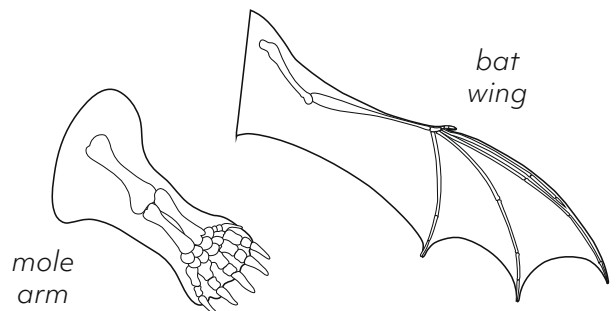
homologous or **analogous**

5.



homologous or **analogous**

6.



homologous or analogous

7. Which organisms are more closely related: the whale and the shark, or the whale and the bat? Explain how you know. Use what you learned in the problems above, and include the terms "homologous" and "analogous" in your response.

(Sample answer) Although whales and sharks both have fins, their fins are analogous structures. They are structurally different, so whales and sharks are not closely related.

The fins of whales and the wings of bats are homologous structures. They are structurally similar, so the whale and the bat are more closely related than the whale and the shark.