

Homologous Structures

LESSON PLAN Ref:		Course Ref:	
Subject / Course:	High School Biology		
Topic:	Evolution		
Lesson Title:	Homologous Structures		
Level:	High School	Lesson Duration:	45 minutes

Lesson Objectives:

1. Students will identify bone structures in multiple organisms (in models) that have evolved to fit the needs of the organism but are derived from common ancestry.
2. Students will explain how similar bone structures in multiple organisms perform different functions despite the organisms' common ancestry.

Summary of Tasks / Actions:

Considerations for teaching students with blindness or visual impairments:

While using the models, it may be necessary to guide students' hands over the various structures to help them identify each bone structure. Additionally, you will need to identify each model's individual species for the students or label the models using braille or large print as appropriate. Use hand-over-hand and hand-under-hand guiding to help the students focus on the specific bones of interest to the discussion as you teach.

Bell Ringer/Introductory Activity:

Have students identify the various bones inside their arms and hands. If a human skeleton model is present, have the students examine the bones that make up the arm.

Review Lesson Objectives

Discussion:

1. Introduce vocabulary: Homologous structures - similar physical features in organisms that share a common ancestor, but the features perform different functions.
2. Ask students if they have a dog or cat for a pet at home. Have the students describe the structure of the forelimbs of a dog or cat. How are they similar to human arms? How are they different? Do they perform the same function?

Activity:

3. Provide visual/tactile versions of the homologous bone structures of various organisms to the students. Have them discuss the similarities of the bones between organisms as well as the differences of similar bones between organisms.
4. Questions:
 - a. What does it mean for different species to have common ancestry?
 - b. Why do each of these organisms have essentially the same bones but in different shapes and sizes?
 - c. Are any of the bone structures performing the same function from one species to another in these examples?
 - d. What other examples of body parts or bone structures might we be able to observe in humans that would have corresponding homologous structures in other species?

Discussion 2:

Homologous Structures

5. Common ancestry refers to the idea that different species resulted from branching evolutionary paths away from a single species or type of organism in the past (discuss speciation if needed). Closely related species share a more recent common ancestor species, while less closely related species share an ancestor in the more distant past.
6. Species that share similar physical structures have these structures because of their shared common ancestry. Each example shown in the models contains related bone structures, indicating that in the past, the ancestors of these species evolved from one single type of organism that also had those organisms. Over time with changing environmental and genetic factors, the individual species branched away from one another at various points in the past. This is why homologous structures provide evidence for the theory of evolution.

Discussion 3:

7. Analogous structures are features of different species that are similar in function but not necessarily in structure and which do not derive from a common ancestral feature (compare to homologous structures) and which evolved in response to a similar environmental challenge.
8. Examples: Wings on a house fly compared to wings on a hummingbird, eyes of an octopus compared to eyes of mammals

Exit Slip:

1. What are homologous structures?
2. How do homologous structures provide evidence for evolution?

Materials / Equipment:

Homologous structures 3D printed models ([Link](#))

Homologous structures images

Human Skeleton model (if available)

NGSS Alignment:

HS-LS4-1: Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence. [Clarification Statement: Emphasis is on a conceptual understanding of the role each line of evidence has relating to common ancestry and biological evolution. Examples of evidence could include similarities in DNA sequences, anatomical structures, and order of appearance of structures in embryological development.]