

Comparative Anatomy

Shown below are images of the skeletal structure of the front limbs of 6 animals: human, crocodile, whale, cat, bird, and bat. Each animal has a similar set of bones. Color code each of the bones according to this key:

Humerus []

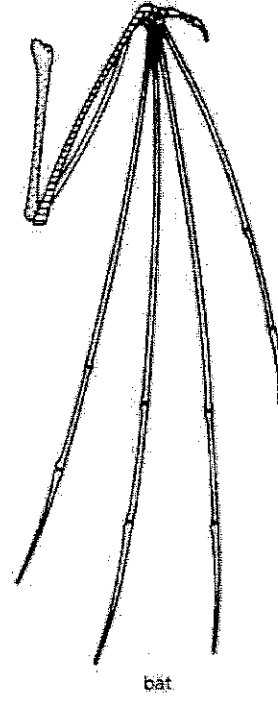
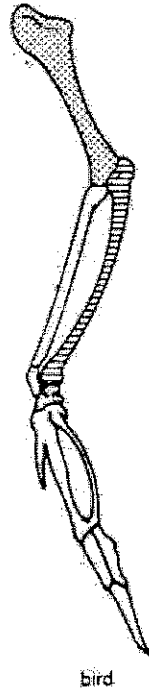
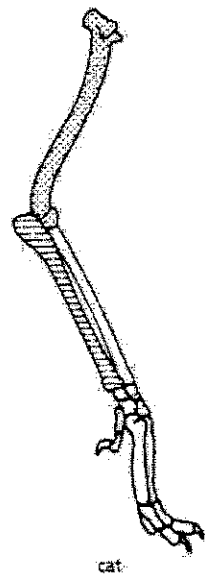
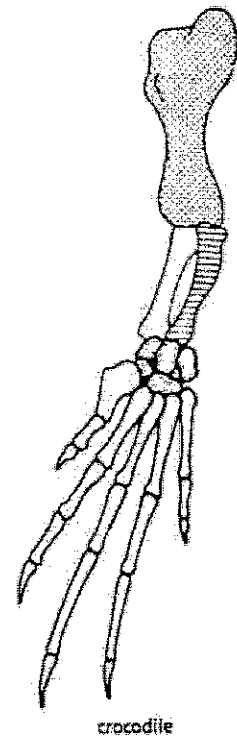
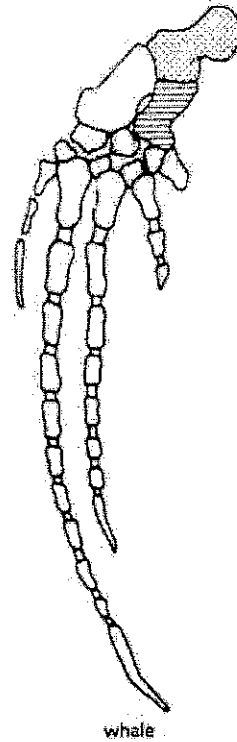
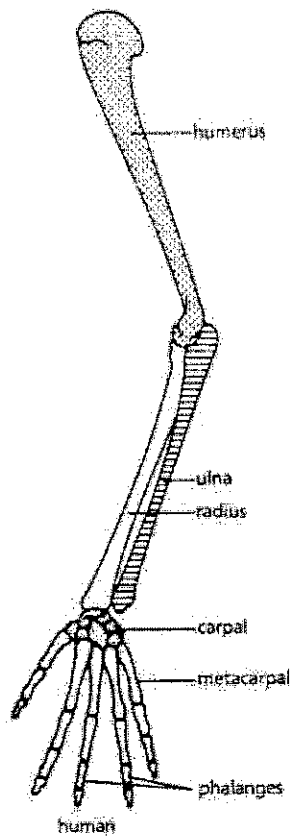
Carpals []

Ulna []

Metacarpals []

Radius []

Phalanges []



Name: _____

Date: _____

For each animal, indicate what type of movement each limb is responsible for.

| Animal | Primary Functions |
|-----------|---|
| Human | Using tools, picking up and holding objects |
| Whale | |
| Cat | |
| Bat | |
| Bird | |
| Crocodile | |

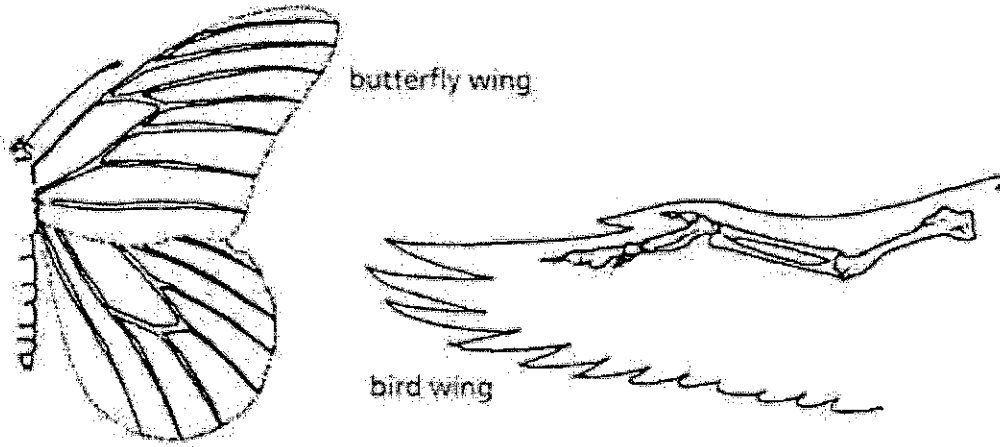
Compare the skeletal structure of each limb to the human arm. Relate the differences you see in *form* to the differences in *function*.

| Animal | Comparison to Human Arm in Form | Comparison to Human Arm in Function |
|-----------|--|---|
| Whale | Whale has a much shorter and thicker humerus, radius, and ulna. Much longer metacarpals. Thumb has been shortened to a stub. | The whale fin needs to be longer to help in movement through water. Thumbs are not necessary as the fins are not used for grasping. |
| Cat | | |
| Bat | | |
| Bird | | |
| Crocodile | | |

Name: _____

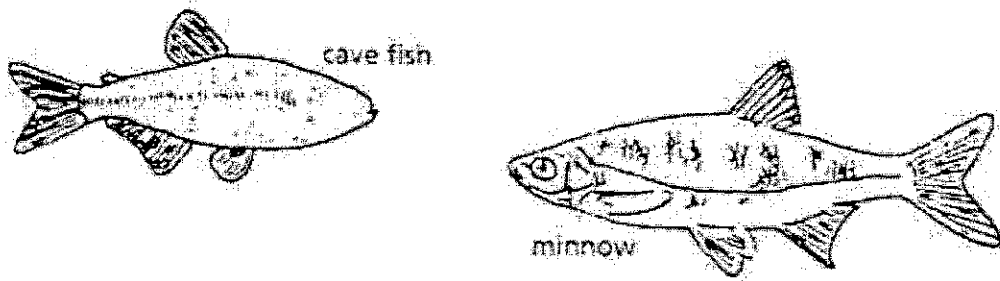
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Compare the anatomy of the butterfly and bird wing below.



1. What is the function of each of these structures?
2. How are they different in form? Give specific differences.

Compare the overall body structure of the cave fish and the minnow below.



1. What is the biggest, most obvious difference between the body structure of these two fish?
2. Assume the two fish came from the same original ancestor. Why might the cave fish have evolved without eyesight?
3. What kind of sensory adaptation would you hypothesize the cave fish has to allow it to navigate in a cave, including catching and eating food?

Name: _____

Date: _____

You have now studied three different types of anatomical structures:

- **Homologous structures** show individual variations on a common anatomical theme. These are seen in organisms that are closely related.

1. Give an example of a homologous structure from this activity: _____

- **Analogous structures** have very different anatomies but similar functions. These are seen in organisms that are not necessarily closely related, but live in similar environments and have similar adaptations.

2. Give an example of an analogous structure from this activity: _____

- **Vestigial structures** are anatomical remnants that were important in the organism's ancestors, but are no longer used in the same way.

3. Give an example of a vestigial structure from this activity: _____

4. Below are some vestigial structures found in humans. For each, hypothesize what its function may have been.

| Structure | Possible function? |
|----------------------------|--------------------|
| Wisdom teeth | |
| Appendix | |
| Muscles for moving the ear | |
| Body hair | |
| Little toe | |
| Tailbone | |

5. How are vestigial structures an example of evidence of evolution?

Name: _____

Date: _____

Conclusion

1. Charles Darwin published his book *On the Origin of Species* in 1859. Of the different types of evidence that you have examined, which do you think he relied upon the most, and why?

2. Given the amount of research and evidence available on evolution, why is it classified as a theory?