Chicken Wing Comparative Anatomy Lab

Experimental Question:
What evidence of common descent can anatomy provide? Which forelimb structure is most similar to the chicken wing? **(DON'T PICK THE BIRD)**

Introduction:
Define each of the following terms

1. Comparative Anatomy
2. Common descent
3. Analogous structure
4. Homologous structure

What is comparative anatomy?

On the attached forelimb diagrams, color each of the bones pictured according to the following key then glue it into your lab book

Humerous	Red
Ulna	Orange
Radius	Yellow
Carpals	Green
Metacarpals	Blue
Phalanges	Purple

Hypothesis: Write a prediction to the experimental question with a reason. If your hypothesis does NOT have a reason it will earn a score of 0.

Materials:
Dissection tray and pins
Scissors
Sharp knife or dissection Scalpel
Chicken wing
Safety goggles

Safety:
CAUTION: Salmonella may contaminate raw chicken. Keep your hands away from your face and mouth throughout this investigation.

Procedure:
1. Rinse the chicken wing under cool, running water. Dry it thoroughly with a paper towel.
2. Using the scissors, cut down the middle of the skin, starting at the top end of the upper wing. Try not to cut through the muscles below the skin. Do this by piercing the skin and then slipping the scissors between the skin layer and the muscle. Cut until you reach the shoulder joint.
3. Cut down the sides of the skin to make a T-shaped cut. Start at the first cut and cut away from it in both directions. Peel the skin and cut to loosen it. (Note: the chicken skin can be very difficult to remove)

Fat
4. Look for yellowish tissue clumped together beneath the skin. This is fat tissue, made of fat cells.

Muscles
5. Observe the muscles in the wing. They look like bundles of pale pink tissue.
6. Find two muscles in the wing that bend and straighten the elbow joint. Each muscle pulls on the lower wing bones in one direction (the flexor bends the joint). Since the flexor cannot lengthen by itself to push the bone back to straighten the joint, another muscle pulls the bone in the opposite direction (extensor).

Tendons
7. Tendons are shiny white tissues at the ends of the muscles that attach muscles to bones.

Joints and Ligaments
8. Two bones come together at a joint. Bend and straighten the elbow joint and observe how the bones fit together.
9. Ligaments connect bones to other bones at joints. They look like a shiny white covering of the joint surfaces.

Cartilage
10. Between the bones is another shiny white material that is slippery. This is cartilage, which helps the bones move without grinding against one another, or without causing trauma.

Skeleton
11. Carefully remove all of the skin and muscle tissue from the bones. Be careful not to cut the ligaments connecting the bones to one another.

12. Neatly sketch the arrangement of the bones of the chicken wing being sure to accurately represent their relative sizes and shapes the best you can.

13. When you have finished observing the wing and writing your notes, throw the chicken remains away. Wash all equipment and the counter tops with hot, soapy water.
14. Remove your PPE and wash your hands with hot water and soap.

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Analysis:

1. Carefully identify and label each of the bones in your chicken wing sketch. You may use your forelimb diagram if needed.
2. Color your chicken wing sketch according to the same key as directed in the introduction.
3. Copy the following table in your lab notebook to compare and contrast the different forelimbs.

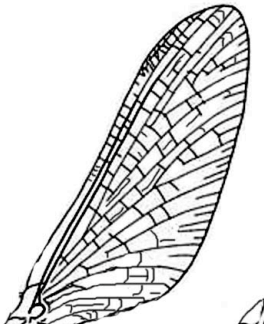
Forelimb	Function	# of bones	Similarity to the chicken wing	Different from the chicken wing
Chicken Wing			N/A	N/A
Frog				
Lizard				
Human				
Cow				
Whale				
Bat				

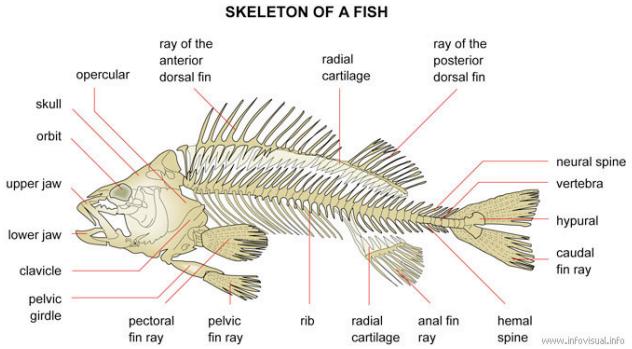
4. Which forelimb is most similar to the chicken? Explain your reasoning.
5. Do you think this wing is from the left side or right side of the chicken's body? Explain how you know.
6. Which joint in the human body is similar to the joint you studied?
7. How does the Theory of Evolution explain the similarities between the chicken wing's structure and other forelimbs?

8. If you wanted further evidence of how closely related the chicken is to the species that you listed in Question #4, what additional research or experimentation would you do?
9. Give an example of a structure that is homologous to a chicken wing and an example of a structure that is analogous to a chicken wing.
10. How do you explain the fact that there are more structural similarities between a bird's wing and a seal's flipper than there are between a bird's wing and an insect's wing even though both wings are used to for the same function?

Conclusion:

1. The external form of a whale looks similar to that of a fish, however a whale's skeleton is more similar to that of mammals. How does comparative anatomy explain these observations?





2. Using what you know about the anatomy of each of the following animals, group them into at least 3 groups based on comparative anatomy. Describe who is in the group and what anatomical characteristics caused you to put them together.

   Cat Coyote Dog Frog Horse Lion Tiger Toad Wolf Zebra Giraffe Salamander

3. Write a Conclusion Paragraph that
   a. Restates and answers the experimental question
   b. Gives data from this lab to support your answer
   c. Tells how the data support your answer
   d. Restates your hypothesis and states if it was supported by this experiment