Name _____ Date_____

Activity 8: Investigating Biomechanics

Guiding Question: How does the structure of an arm or wing affect its function?

Key Words: ***biomimicry***, *function, structure,* ***tendons***

Get Started:

1. What do you think inspires people to create new things?

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2. Brainstorm a list of motivations for engineers trying to create a new design.

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3. How might you go about coming up with new ideas to solve a problem?

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4. Read the introduction and Guiding Question to Activity 8, "Investigating Biomechanics," in your Student Book.

Do the Activity:

Part A: Comparing the Chicken Wing to the Human Arm

1. Read Procedure Steps 1-3 in your Student Book.

2. *Watch the LABsent video (found here:* LABsent Biomedical Engineering 8 Part A*), and record your data.* Each time the video says to record, you may want to pause the video to give you ample time to complete your observations.

3. Read Procedure Steps 4-15 in your Student Book.

4. *Watch the LABsent video (found here:* LABsent Biomedical Engineering 8 Part B*), and record your data.* Each time the video says to record, you may want to pause the video to give you ample time to complete your observations.

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Procedure Step 13: Draw a labeled diagram of the chicken wing. Include the tendons and the structures you located in Step 6.

Procedure Step 14: Describe what you saw being done to make the wing move in opposite directions. Record your observations of the inside of the chicken bone.

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5. Compare the range of motion of the parts of the chicken wing to those of your own arms.

Build Understanding:
1. This biomechanical way of moving—with opposing muscles attached to bones by tendons—is the same in humans and all vertebrates. What is an example of this found in a human or other vertebrate?

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Analysis:
1. How are human arms and chicken wings similar? How are they different?

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2. What evidence did you find that would help to explain how birds move parts of their wings back and forth? Draw a diagram showing muscles and tendons to help explain your answer.

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Diagram:

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3. Describe how the structure of bird bones allows them to be both lightweight and strong.

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4. Now that you know the internal structures of bird bones, would you change your bone prototype from the "Artificial Bone Model" activity? If so, describe how and why. If not, explain why not.

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