The Bicycle as a System
Student Sheet

Name:_____ Date:_____

Review the information from the **The Science of Cycling** http://www.exploratorium.edu/cycling/, on The Exploratorium website. Apply your knowledge of systems to answer the questions below and then be prepared to present your answers to the class.

Also, use this worksheet to take notes as the other groups present their answers.

1. Describe the subsystem that your group researched. What is its function within the bicycle system?

2. Complete the table to indicate how the subsystem affects the bicycle's speed, safety, comfort, and durability.

	Speed	Safety	Comfort	Durability
The Wheel				
Drivers and Gears				
Frames & Materials				
Brakes & Steering				
Aerodynamics				
Human Power				

3. Complete the table below to identify the following:
    - Name the parts of the bicycle's subsystem. If you don't know the name of a part, make up a name.
    - Tell what function each part has and how it contributes to the subsystem.
    - For the bicycle subsystem to work, what input must it receive?
    - What, if any output does the subsystem produce?

	Parts	Function	Input	Output
The Wheel				
Drivers and Gears				
Frames & Materials				
Brakes & Steering				
Aerodynamics				
Human Power				

4. Could any part of this bicycle be made of a different material and still help the bicycle carry out its function?

5. Can any one part of the bicycle carry out the job of the whole bicycle? Explain your answer.

6. Can you take a part from another bicycle and use it to replace a part in this bicycle and still have the bicycle carry out its function?

7. Could some parts of the bicycle be arranged differently so that the system will still carry out its function? Explain your answer.

8. Does the bicycle require symmetry among any of its parts? If so, describe the symmetry.

9. What will happen to the bicycle if one part, such as a spoke, breaks? What if all the spokes on a wheel break?

10. Is it useful to think of a bicycle as a system? Justify your answer.