

Name _____

Date _____

Human Accelerated Environmental Change

In your expert group, discuss change globally and locally. Then, using the information provided, answer the questions. Finally, meet with your jigsaw group again to learn about other changes that have taken place.

Part 1: FOR ALL GROUPS: Guiding questions

1. What are the major changes that have taken place globally?

2. How are humans involved in these changes?

3. What types of change do you think have taken place locally?

Part 2: Expert Groups

Group 1: Lyme Disease

1. What does the diagram tell you about Lyme disease in our area?

2. What does the first graph tell you about the relationship between infected nymph density and land use size?

3. What does the second graph tell you about how much fragmented land is in our area?

4. Based on this information, what recommendations would you make to land owners in order to reduce the incidence of Lyme disease? How confident are you about your answer? What more would you like to know?

Group 2: Hudson River & Temperature

1. What has happened to the temperature of the river over the last 60 years?

2. What has happened to the numbers of Atlantic tomcod and Rainbow smelt in the Hudson? Do you think these two graphs are related? Why?

3. Do you think the temperature graph and the fish graphs are related? Why? What else would you need to know before deciding if they are related?

4. Based on this information, what is the potential impact of this trend on the river's ecosystem? How confident are you about your answer? What more would you like to know?

Group 3: Hudson River & Zebra Mussels

1. What happened to the population of pearly mussels (unionids) in the Hudson River?

2. What happened to the filtration rate, chlorophyll a and rotifer levels after the arrival of the zebra mussels?

3. What is the relationship between the graphs?

4. What are the potential impacts of these changes on the river's ecosystem? How confident are you about your answer? What more would you like to know?

Group 4: Common Reed & Marsh Birds

1. Based on the maps, what happened to the types of vegetation from 1991-2005? What vegetation type increased, and what decreased?

2. Looking at the data of marsh birds, what are the major differences between the bird diversity at the other three marshes (Constitution, Tivoli, and Stockport) and Iona marsh?

3. What does this data tell you about the relationship between *Phragmites australis* and birds?

4. If *Phragmites australis* invades the other marshes, what do you think will happen to the bird population? How confident are you about your answer? What more would you like to know?

Group 5: Acid Rain & Fish

1. Based on the drawing of the streams and the fish living in them, describe how the fish community was different in the 1960s when compared with today.

2. Look at the second set of graphs. Explain how the pH, sulfate, and nitrate levels have changed over time.

3. Using the third set of graphs, explain how the change in pH levels affected the aquatic ecosystem at the Hubbard Brook research streams in the first drawing.

4. What else would you like to know in order to be confident about your answer that connects the change in pH to the change in fish?

Part 3: Jigsaw Group

Take notes on the major changes that the other groups are describing.

Group	Changes

Which of the six major environmental changes are responsible for each group's topic? Then, decide if these changes are permanent or temporary. How can you tell the difference? Discuss with your class what other types of information you would like to have to be certain about your decisions.

	Climate Change	Loss of biodiversity	Land Use Change	Pollution	Infectious disease	Exotic Species	Permanent (P) or Temporary (T) change?
Lyme Disease							
Hudson River & Temperature							
Hudson River & Zebra Mussels							
Common Reed & Marsh Plants							
Acid Rain & Fish							

Part 4: Reading

Read the short article titled “Human Accelerated Environmental Change” and answer the following questions.

1. What are the major changes outlined by the author?

2. Why does he believe that HAEC is more important than climate change?

3. How do you feel about this statement?

4. What do you think should be done?
