**Modeling module for Biology Standard 4**

**Modeling Unit Engaging Scenario Teacher Notes**

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**Standard 4: Interdependence**

Describe the relationship between living and nonliving components of ecosystems and describe how that relationship is in flux due to natural changes and human actions.

Explain that the amount of life environments can support is limited by the available energy, water, oxygen and minerals and by the ability of ecosystems to recycle the remains of dead organisms.

Describe how human activities and natural phenomena can change the flow and of matter and energy in an ecosystem and how those changes impact other species.

Describe the consequences of introducing non-native species into an ecosystem and identify the impact it may have on that ecosystem.

Describe how climate, the pattern of matter and energy flow, the birth and death of new organisms, and the interaction between those organisms contribute to the long-term stability of an ecosystem.

Scenario:

Why are there so many ladybugs in the fall and why do they bite! (can use any invasive species common to area such Asian carp, kudzu, zebra mussels, honeysuckle, and emerald ash borer)

Imagine that you are working in the wildlife management department of a national forest in Indiana. You and coworkers have been noticing plants and animals that you have not seen in the park before. They appear to be taking over the ecosystem of the other plants and animals, filling in their niches. Where did these plants and animals come from? How can you prevent them from taking over the park?

Modeling questions

1. How do these organisms affect the Indiana ecosystem?
2. To what area are these organisms native?

WebQuest: <http://zunal.com/webquest.php?w=104556> How an Invasive Species can Effect the Ecosystem of the Great Lakes

Potential resources:

<http://www.in.gov/dnr/3123.htm> - Indiana DNR Invasive species

<http://www.youtube.com/watch?v=qfG4vsJ5_xI> - Asian Carp

<http://www.defenders.org/programs_and_policy/science_and_economics/invasives/invasives_by_state/indiana_invasive_species.php> - Defenders of Wildlife