Lab-wide Learning Outcomes for Fire, Succession, and Diversity

Knowledge-Based Outcomes

Upon completion of *Fire, Succession, and Diversity*, students should be able to:

1. Describe the role of disturbance and its general effects on ecological communities.
2. Describe how successional processes alter community structure over time.
3. Explain the intermediate disturbance hypothesis, which posits that ecological communities subjected to disturbances of intermediate scale have higher levels of species diversity compared with similar communities that are undisturbed or overly disturbed.
4. Explain why models are useful for investigating ecological processes.

Skills-Based Outcomes

Upon completion of *Fire, Succession, and Diversity*, students should be able to:

1. Draw a graph representing the intermediate disturbance hypothesis by plotting diversity versus some metric of disturbance (roughly bell shaped).
2. Design an experiment to test the intermediate disturbance hypothesis using a simulated forest.

Fire, Succession, and Diversity, Part 1: Succession and Disturbance

Knowledge-Based Outcomes

Upon completion of *Part 1: Succession and Disturbance*, students should be able to:

1. Describe how a forest community's composition can change during succession.
2. Define Simpson's Diversity Index and indicate how it differs from species richness.
3. Explain that, according to the intermediate disturbance hypothesis, "intermediate" relates to size, frequency, and/or intensity of a particular type of disturbance.

Skills-Based Outcomes

Upon completion of *Part 1: Succession and Disturbance*, students should be able to:

1. Given two communities with different species distributions, identify which is considered more diverse according to a diversity index like Simpson's.
2. Describe a technique for reducing sampling bias (i.e., by collecting samples after pre-determined interval).
3. Describe a technique for reducing the effect of unusual observations and/or errors in measurement (i.e., replicating measurements and/or experiments).

Fire, Succession, and Diversity, Part 2: Playing With Fire

Knowledge-Based Outcomes

Upon completion of *Part 2: Playing With Fire*, students should be able to:

1. Explain why it could be useful to examine and change a model's simplifying assumptions.
2. For an ecological community that is subjected to regular disturbances, describe how community dynamics can be altered if some species are less susceptible to the disturbance than others.

3. For an ecological community that is subjected to regular disturbances, describe how community dynamics are affected if only good dispersers colonize bare patches and succession is driven primarily by facilitation, versus if most species can colonize bare patches and succession is driven primarily by differences in life span.
4. Explain why researchers conclude that widespread suppression of fire in deciduous forests in the eastern U.S. has caused oak abundance to decline and sugar maple abundance to increase.

Skills-Based Outcomes

Upon completion of *Part 2: Playing With Fire*, students should be able to:

1. Generate a research question relating to succession, diversity, disturbance, and/or ecological modeling, and use a simulation model to explore the question.
2. Interpret a shift in the location of the peak of a curve in a graph of species diversity (e.g., Simpson's Diversity Index) versus scale of disturbance.