Teaching Notes

By ***John H. Starnes, Ph.D.***

Somerset Community College

808 Monticello Street

Somerset, Kentucky 42501

P: (606) 451-6817

[john.starnes@kctcs.edu](mailto:john.starnes@kctcs.edu)

# Course Information

Department: Biology

Level: Lower

Course type: Lecture

Students:Non-majors Ecology

Number of Students: 16 students

# Module Information

Original Module Name: Terrestrial Trophic Cascades & Population Structure

Link to Original: <https://qubeshub.org/publications/430/1>

Adapted Module Name: Adaptation of Terrestrial Trophic Cascades & Population Structure to a Non-Major’s Ecology Course.

Files associated:

* Terrestrial Trophic Cascades & Population Stucture.pptx
* TeachingNotesStarnes18.docx
* Outdoor Environmental Observation Assignment.docx

## Modification of Learning Goals:

* At the end of the module students should understand the topics of energy transformation, food chains, food webs, trophic cascades, predator/prey dynamics, age structure, and nutrient cycling.
* Students should gain skills in system exploration, data visualization, data interpretation and extrapolation, graph interpretation, and the scientific method.

# Teaching Notes

Students were introduced to the topics of energy, food chains, and food webs. At the end of the first lecture students were given an Outdoor Environmental Observation Assignment to do at home (attached with this adaptation on QUBES).

In the following class, the students presented their observations and discussed the food chains that they had developed. Since, many of the observations were from a similar environment the class worked to develop a larger food web of their observed ecosystem. The concept of trophic cascades was introduced using the video **Some Animals Are More Equal than Others: Keystone Species and Trophic Cascades** from the HHMI Biointeractive website <https://www.hhmi.org/biointeractive/some-animals-are-more-equal-others-keystone-species-and-trophic-cascades> . After the video, the original module, Terrestrial Trophic Cascades & Population Structure PowerPoint file <https://qubeshub.org/publications/430/1>, was used to discuss tropic cascades in terrestrial ecosystems to slide 43 (this discussion continued into lecture day 3). The first time the students had to predict what a graph would look like (slide 22), from the data presented, they seemed to struggle. To help scaffold this skill, a more simplified example was used. Students, in groups of two, developed a simple bar graph of older and younger trees using a completely made up data set. After visualizing these bar graphs, the class discussed the first example again. As the students went through more of the module, they became engaged in the class discussion, became more confident in data extrapolation, and started describing other examples. These discussions were much richer than in previous courses.

During the third lecture period, students were introduced to nutrient cycling through ecosystems (lecture files not included with adaption).

In the next class, the second half of the module was used starting at the slide introducing the topic of Trophic Cascades & the Physical Environment. Students were very active in discussing the different hypothesis and predicting how nutrients would cycle in this system. However, they had a much harder time visualizing the nutrient cycling portion of the module, but this may be remedied by a changing the introduction given on nutrient cycling during the third lecture period.

Prior to any of the discussion points or predictions within the module, students were given time to think about the topic, then they discussed the topic in groups, and finally the class tried to come to a consensus. Allowing students to have time to digest the information and then to think about the possible outcomes is important for student engagement.

This module was very easy to adapt to use in the non-major’s ecology course. The module was broken down in 2 sections to allow for a broader range of concepts to be discussed around this common theme. Overall the students were much more engaged in the conversation during class as they became more familiar with the topic. The performance on the midterm exams were higher than in previous courses taught that did not use this module.

Building a culture where students feel it is okay to answer incorrectly is very important in using this module. Some of the best discussions came from a student having an incorrect answer initially. One oversight when utilizing the module was that the students had not been introduced to the topic of age structure and some of the initial misunderstandings in the content could have been cleared up by covering that material. Another possible avenue would be to continue with the module through the population structure of the various trees and then led into a more advanced discussion of age structure. In the future, it may be helpful to break the module down further to use the parts as a case study example to cap the end of discussions on specific topics within the course.