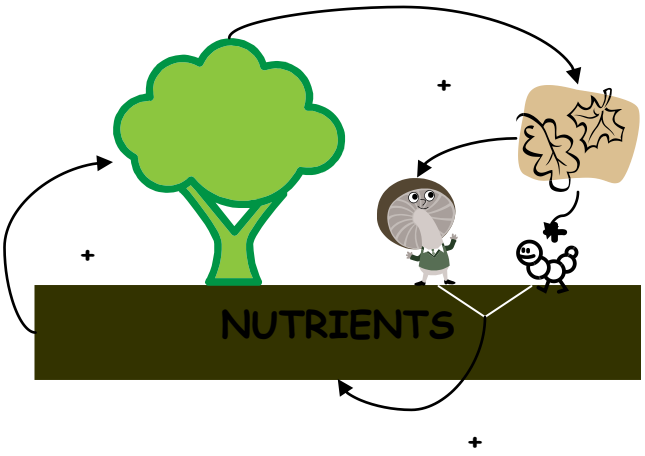
Forest Age & Arthropod Species

Ecoplexity Data Explorations

Author: Ecology Explorers Team, adapted from Ecoplexity data (http://ecoplexity.org)
Time: 15-30 minutes
Grade Level: 9-12

Background:
Forest age, in this case old- versus young-growth, is an important consideration in terms of the type of ecological interactions predicted because age can be (though not always) associated with changes in numbers and types of organisms. For example, old-growth forests may have greater or fewer numbers of plants than a young-growth forest, contributing to an increased organic layer build-up in the soil. This could lead to increased complexity of the detritivore community feeding on the organic matter. In turn this could lead to increased nutrient availability to both plant and soil community members leading to increased plant productivity and resources to herbivores and omnivores.



Functional groups are ubiquitous components of all habitat types, at all scales and useful categorical tools. They are often employed to help develop hypotheses about complex ecological phenomena such as nutrient/mineral movement between the abiotic and biotic community.

Functional groups are created for every type of organism including bacteria, plants, and mammals. This lesson uses arthropod functional groups to explore and brainstorm potential causes leading to different functional group abundances (numbers) in different forest ages.

Objective:
Students will analyze patterns in arthropod distribution and forest age.

Standards:
Science

Advanced Preparation:
Students should have been introduced to basic information about population and community ecology.

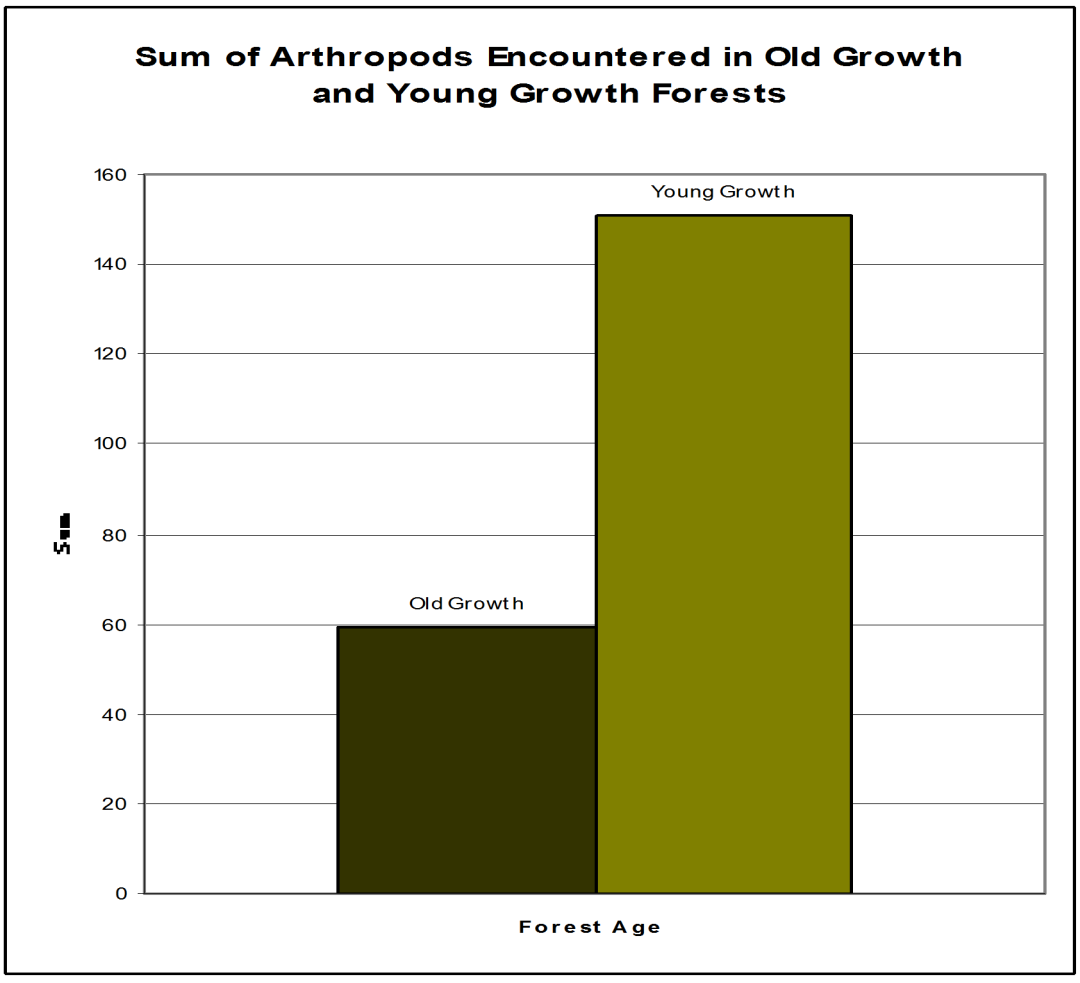
Materials:
Student Worksheets
Pictures of old growth and young growth forests would help students unfamiliar with these ecosystems

Evaluation:
Observation during the activity and participation in discussion.
Student responses to reflection questions.

Extensions:
Have students view models of ecosystems and design experiments based on protocols at http://ecoplexity.org

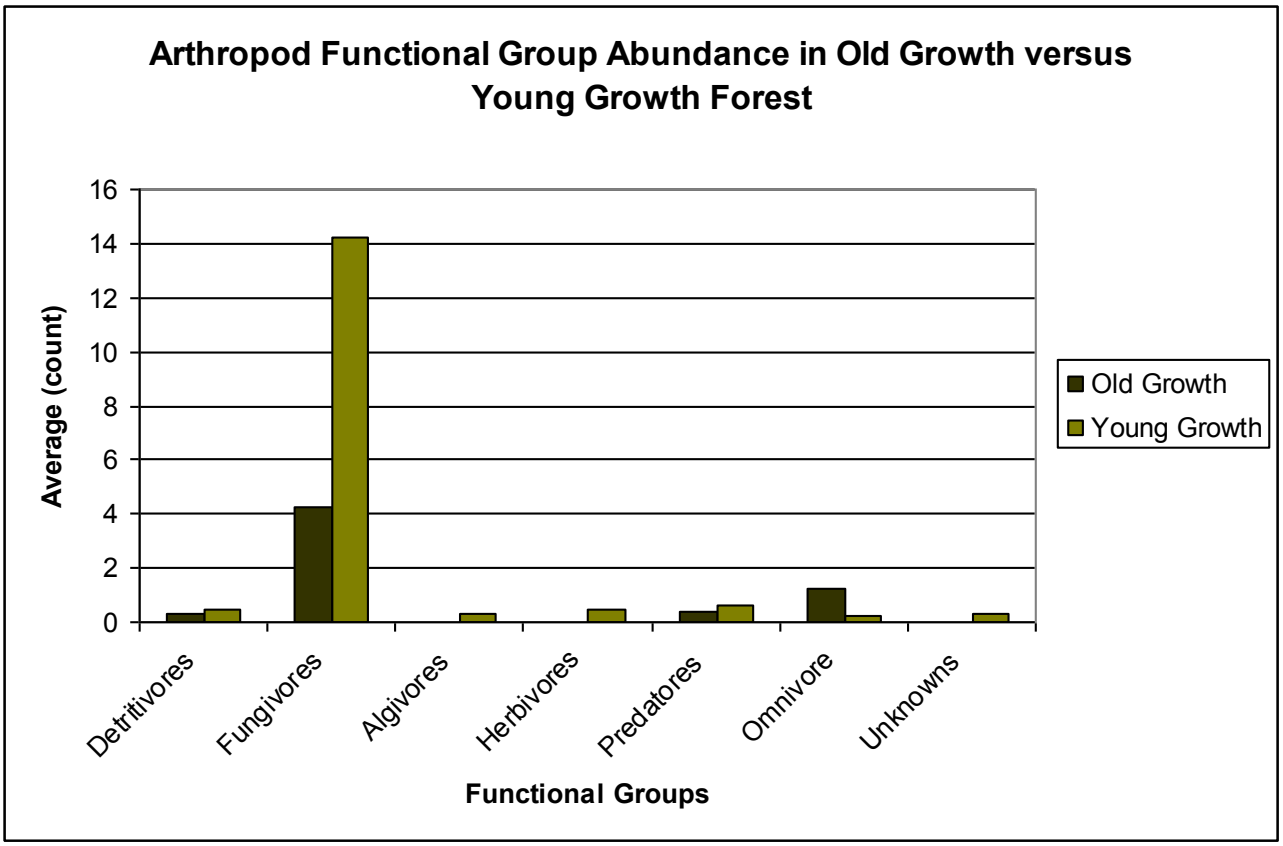
Forest age, in this case old- versus young-growth, is an important consideration in terms of the type of ecological interactions predicted because age can be (though not always) associated with changes in numbers and types of organisms. For example, old-growth forests may have greater or fewer numbers of plants than a young-growth forest, contributing to an increased organic layer build-up in the soil. This could lead to increased complexity of the detritivore community feeding on the organic matter. In turn this could lead to increased nutrient availability to both plant and soil community members leading to increased plant productivity and resources to herbivores and omnivores.

Graph 1. Total number of arthropods (abundance) caught in pitfall traps in old- and young-growth forests.



Arthropod functional groups are based primarily on feeding habits. The groups used here are:

1. Detritivores: feed on detritus or decaying/dead matter such as dead leaves and insects
2. Fungivores: feed on fungus
3. Algivores: feed on algae
4. Herbivores: feed on plants (herbs)
5. Predators: feed on other arthropods or animals
6. Omnivores: feed on just about everything



Graph 2. Average number of arthropod functional groups found in old- versus young-growth forests.

1. First, look at Graph 1: which forest age has the greatest number of arthropods?

2. Then look at Graph 2: which forest age has more functional groups?

3. How does the number of functional groups (Graph 2) compare with the number of arthropods (Graph 1) between the two forest types?

4. List one characteristic of an old-growth as compared to a new-growth forest that might explain the pattern you found in question 3.