

The Ecosystem Lab

Ecosystems are a complex and delicate balancing game. The addition or removal of one species affects many other species with which it might compete for, or provide food. In this lab you will get a chance to "build your own" ecosystem, and explore the effects of these interrelationships. In this lab, you will:

Part 1. Explore how 2 plant species interact in an ecosystem

Part 2. Introducing herbivores, you will try to create a scenario where both species can coexist in the same ecosystem.

Part 3. Create a food web that allows a community to thrive.

Go to the link below or click on the link found on our "LABS" page.

<http://www.learner.org/courses/envsci/interactives/ecology/>

Procedure:

1. Click on LESSON 1: THE PRODUCERS. Read "Challenge"
2. In the upper right you'll see "OPEN SIMULATOR." Click and open the simulator.
3. Plant A and Plant B will be on. Click on Plant B and chose the check to remove Plant B from the simulation.
4. Click "Run" on the simulator for Plant A alone. Record your data below on the mini-graph. Give a possible explanation for your graphed results.

5. Hit Reset. Now uncheck Plant A and check Plant B to run the simulation for Plant B alone. Graph your results.

6. Make a hypothesis. What do you suppose will occur if Plant A and Plant B are run in the same ecosystem?

State your hypothesis:

7. Turn on both Plant A and Plant B and run the simulation. Graph your results.

Do you find one producer to be dominant? Why might one producer be dominant over another in an ecosystem?

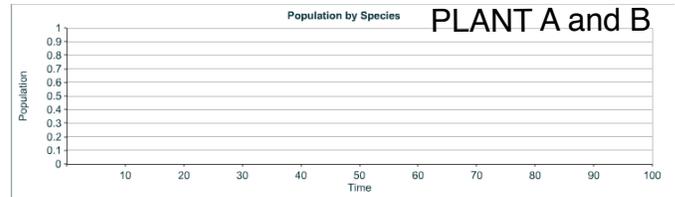
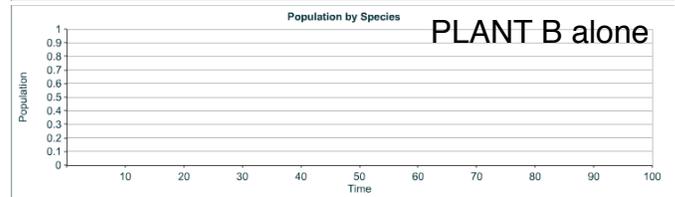
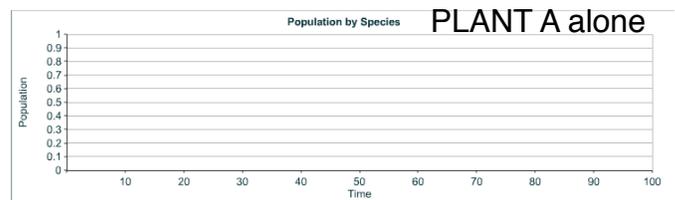
Part 2: Now you'll introduce an herbivore into the environment with Plant A and Plant B. In theory, an herbivore native to the ecosystem should feed primarily on the dominant species. In this system, the herbivore may consume enough of the dominant species to give the non-dominant species a chance for proliferation and survival.

Click on herbivore A (the rabbit) and choose "eats plant A." Using your knowledge from part 1, predict and record what will happen to the population of Plant A. Then, run the simulator and record your results.

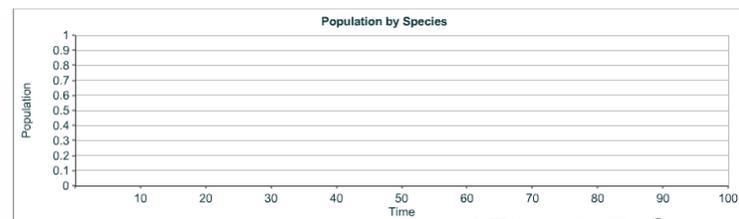
Prediction:

Results:

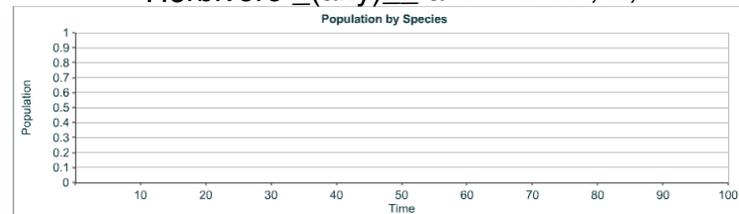
1. Does adding the herbivore establish a more equal field? Is one producer still dominant over the other? Why might one producer be
2. dominant over another?
3. If the simulation included decomposers, how would your current results change?
4. How do producer population numbers with the presence of an herbivore compare to the producer populations from Part 1?



Herbivore A and Plant A only



Herbivore (any) and Plant A, B, C



When the ecosystem contains plants only, one species of plant out-competes the other(s) and takes over. This illustrates the "competitive exclusion principle," which theorizes that no two species can occupy the same niche at the same time in a particular locale if resources are limited. The presence of a consumer is needed to keep that plant in check and allow the other species to survive.

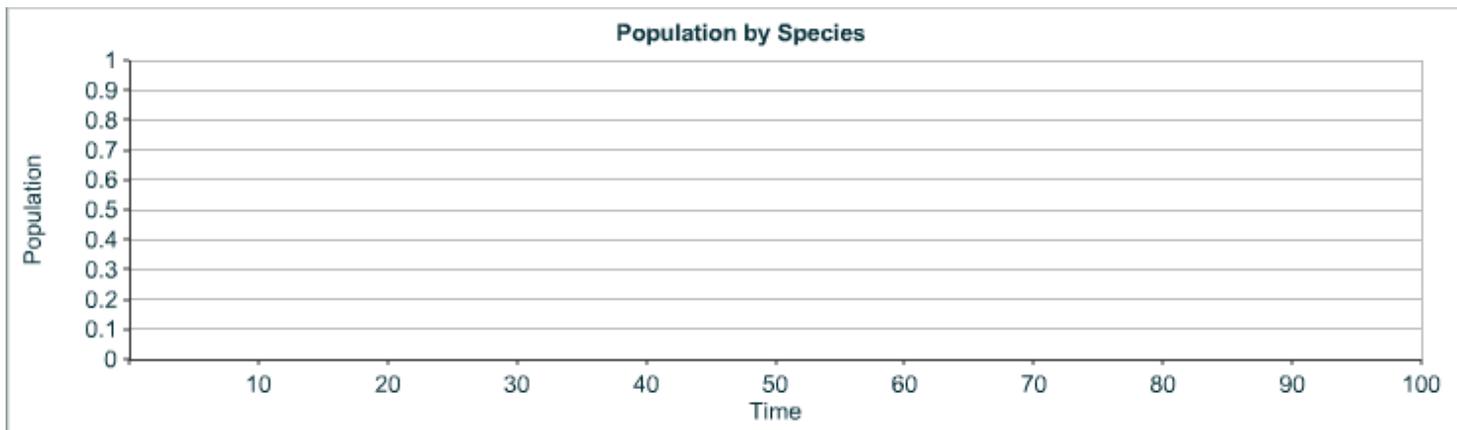
The primary colonizers of an ecosystem, the producers, are also the forerunners of primary succession. As these pioneer plants die and decay, they add organic material to the soil, which, over time, will allow for secondary succession—generally larger and more delicate producers such as trees.

Part 3: A Food Web

Now that you have a sense for the interrelationships between the trophic levels, see how big you can make your food web and still have all of the species you add survive through the end of the simulation run. Keeping the ideas of succession and the competitive exclusion principle in mind, think of the many factors that may go into sustaining an ecosystem. Is there any way we can all get along and live side by side?

Procedure

Run as many simulations and scenarios as possible in order to find the best balance in your ecosystem.



Species	Feeds on:				
Herbivore A					
Herbivore B					
Herbivore C					
Omnivore A					
Omnivore B					
Top Predator					

Summarize what each species feeds on in the data table and graph your results

- What would happen to this imaginary ecosystem if the producers were to die out?
- Did any of the species increase in number? What could account for this increase? Which species decreased in number and what might account for this decrease?
- Were you able to modify the parameters so that each species survived? Explain how you decided what changes to make.