Teacher Guide Sheet

Classroom Demonstration

You can do a classroom demonstration if there are not enough computers for small groups. Work at your computer with the students sitting so they can all see the screen. Click the Setup button, then the Go button to run either simulation. Begin with Simulation #1.

Simulation #1: Rabbits and Grass

Task 1: Tell the students that they are going watch a simulation and discuss what they see. Run the simulation as described in the student guide. Then discuss the patterns they saw and why the graph looks the way it does.

Task 2: Tell the students that they are going to predict what will happen when one variable at a time is changed. Tell them they need to think about how they think an ecosystem will react to these changes.

Steps:

1. Have the students predict what will happen if you increase the number of rabbits. Agree on how many rabbits to add with your students, but make sure to write down what the new number is so you can reproduce your results.
2. Once you have observed the results discuss what really happened and whether it was the same as the students' prediction.
3. If the number was increased dramatically, try increasing it only slightly (from the starting number) to see if similar results occur. Discuss with your students why they think this happened.
4. Repeat steps 1-3, but this time, make the number of rabbits smaller than the original number.

Task 3: Tell the students that this time you are going to change the birth rate of the rabbits (so instead of directly changing the number of rabbits, you are changing how quickly they reproduce.) You want them to predict what will happen when birth rate is changed. Ask them to think about how an ecosystem will react to these changes.

Steps:

1. Return the number value to its original amount and change the birth rate of the rabbits using the hatch-threshold slider. You and your students can choose to increase it or decrease it. Make sure you write down the new number and discuss the student's predictions.
2. Once they have finished observing the changes have them discuss what happened, and if this matched as their expectations.

Task 4: Now that the students have played around with this simulated environment, they have a sense of how it works and how changes can affect the system. Try to create a balanced environment. Decide with your students what to change and by how much. You can try more than one idea out to see what happens. Before beginning this experiment, discuss what a balanced ecosystem would look like. Ask them if a balanced ecosystem would be in flux if it would have very little flux, or if it would be stable. Ask them, "Do you think that a balanced ecosystem was created in the last 2 experiments?"

After you finish, discuss what happened as in Step #6 in the directions in the lesson plan.

Simulation #2: Rabbits and Foxes

Task 1: Tell the students that they are going watch the simulation and discuss what they see. Run the simulation, then discuss the patterns they saw and why the graph looks the way it does.

Task 2: Tell the students that they are going to predict what will happen when one variable at a time is changed. Tell them they need to think about how an ecosystem might react to these changes.

Steps:

1. Have the students predict what will happen if you increase the number of rabbits. Agree with your students on how much to increase the rabbits by, but make sure to write down what the new number is so you can reproduce your results.
2. Once you have observed the results, discuss what happened and if this matched their expectations.
3. Have the students predict what will happen if you increase the number of foxes. Agree with your students on how much to increase the foxes by, but make sure to write down what the new number is so you can reproduce your results.
4. Once you have observed the results, discuss what really happened and if this matched their expectations.

Task 3: Tell the students that this time you are going to change the birth rate of the rabbits (so instead of directly changing the number of rabbits, you are changing how quickly they reproduce.) You want them to predict what will happen when the birth rate is changed. Ask them to think about how an ecosystem will react to these changes.

Steps:

1. Return the number value to its original amount and change the birth rate of the rabbits using the hatch-threshold slider. You and your students can choose to increase it or decrease it. Make

sure you write down the new number and discuss the student's predictions.

2. Once the students have finished observing the changes, have them discuss what happened and if this matched their expectations.

***Task 4:** Now that the students have played around with this simulated environment, they have a sense of how it works and how changes can affect the system. Try to create a balanced environment. Decide with your students what to change and by how much. You can try more than one idea out to see what happens. Before beginning this experiment, discuss what a balanced ecosystem would look like. Ask them if a balanced ecosystem would be in flux, if it would have very little flux, or if it would be stable. Ask them, "Do you think that a balanced ecosystem was created in the last 2 experiments?"

After you finish, discuss what happened as in Step #8 in the directions of this lesson plan.

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*StarLogo v1.2.2 Developed by Mitchel Resnick, Andrew Begel, Vanessa Colella, Eric Klopfer, Molly Jones, Bill Thies, Brian Silverman, Matthew Notowidigdo, Adam Eames, Max Planck, and Sumita Kumar at the Media Laboratory, MIT, Cambridge, Massachusetts, with support from the National Science Foundation and the LEGO Group.Prior development by Monica Linden, Alice Yang, and Ankur Mehta.For use by members of the StarLogo Users Group. For information about joining the StarLogo Users Group, send email to starlogo-request@media.mit.edu. For more information, see http://www.media.mit.edu/starlogo. This distribution is approved by Walter Bender, Executive Director of the Media Laboratory at the Massachusetts Institute of Technology.