

# StarLogo Simulations: General Instructions

## What is StarLogo?

StarLogo is a computer program designed to create models of systems. It simulates what happens at a population level when individual organisms interact in certain ways.

In the two simulations provided, you and your students will be manipulating the rules and interactions between individuals and observing ecosystem relationships. These explorations can be done as a whole class demonstration or in small groups.

Simulation #1 focuses on rabbits and grass. In this simulation, the rabbits eat grass and reproduce. The grass decreases where it is eaten, but grows in new areas. Simulation #2 focuses on foxes and rabbits. In this simulation, the foxes eat the rabbits and reproduce. You can change certain aspects of these relationships and observe what happens. The aim of these simulations (and the step-by-step instructions on the guide sheets that follow) is to show students what happens in an ecosystem when things are changing or balanced.

The Student Guide sheet is designed for students working in small groups. It guides students to explore specific aspects of the simulations, step-by-step. It asks them to manipulate different variables and to try to predict what will occur. Students experiment with the first simulation and discuss it as a class before moving on to the second simulation. The Teacher Guide sheet explains how to walk through the simulations as a demonstration.

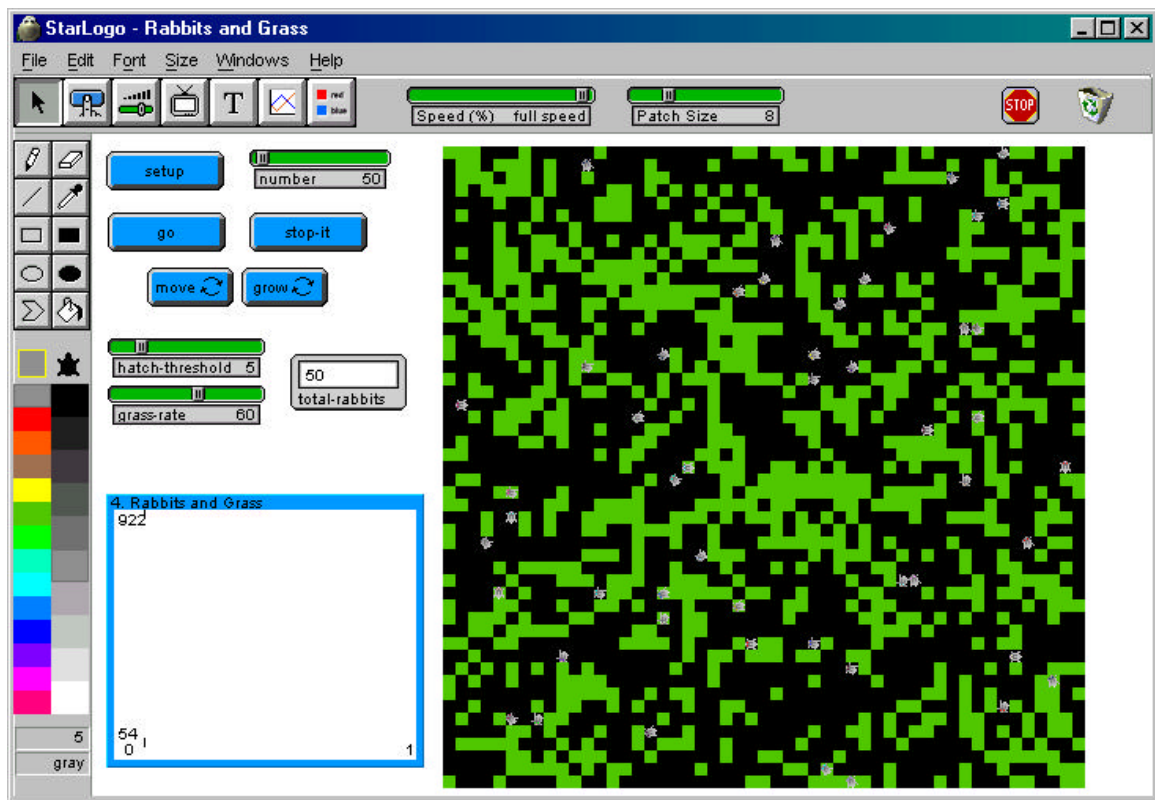
Download Star Logo from the following website, <http://www.media.mit.edu/starlogo/>, and follow the instructions for installing it. You will also find more detailed information about the program there (such as, how to program it yourself).

*\*The simulations in this section were created by Rebekah Gould using Starlogo.*

## Using the Simulations on Your Computer

To open the programs, click on the **Simulation #1 (Rabbits and Grass )** icon or the **Simulation #2 (Rabbits and Foxes )** icon. Be sure you have downloaded and installed StarLogo first. You can have only one simulation open at a time. It may take over a minute for the program to load so be patient. When the program opens, you will first see the **Control Center** (this is explained further below). Do not close it, minimize it. Click on the Setup button to refresh the screen. Every time you want to run the simulation you must click Setup first. This resets the program to its original state. Then click the Go button. The program will run and a graph will be created.

## What you see when you open the program

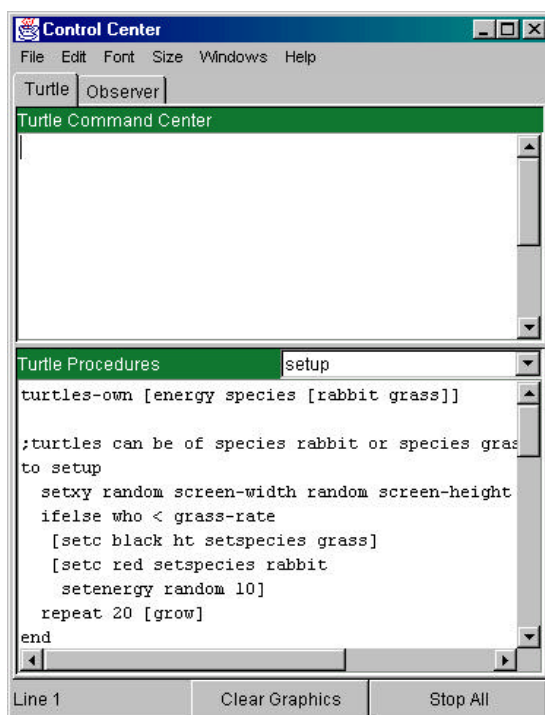


This is the StarLogo window. The main screen with the black and green squares (which are called "turtles" in StarLogo language) is where the simulation occurs. When a rabbit or fox goes off one side of the screen, it comes right back on the opposite side. It "wraps" around so it is always

on the screen. The icon buttons above the screen and the drawing and coloring tools to the left-hand side are used to create buttons, sliders, monitors and turtles in StarLogo. You do not need to create anything to use the simulations, so you do not have to learn how to use these. In both simulations, we used rabbit icons for the rabbit "turtles." They look gray in the above image. In Simulation #1, the green squares are the grass and in Simulation #2, the blue squares are the foxes.

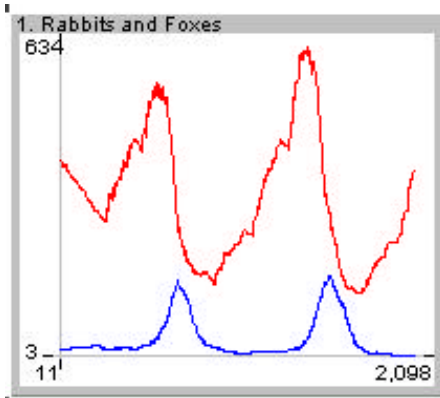
The buttons to the left of the main screen control the simulation. You will see several sliders. The number slider controls how many rabbits or foxes you have. The hatch-threshold slider lets you control the birth rate of the rabbits or foxes and the grass-rate controls how fast the grass grows. You will also see monitors. The total-rabbits and total-foxes monitors tell you the number of rabbits and foxes currently interacting on the main screen. You can watch the numbers decrease or increase. The blue buttons are used to begin, reset or stop the program. The two buttons called move and grow or move and graph-it (depending on the simulation you choose) automatically depress when the go button is clicked. The move button makes the rabbits begin eating the grass and the grow button makes the grass grow. There is a small graph below the buttons that will display the population's interactions.

When you open the program, the Control Center also opens. This is where



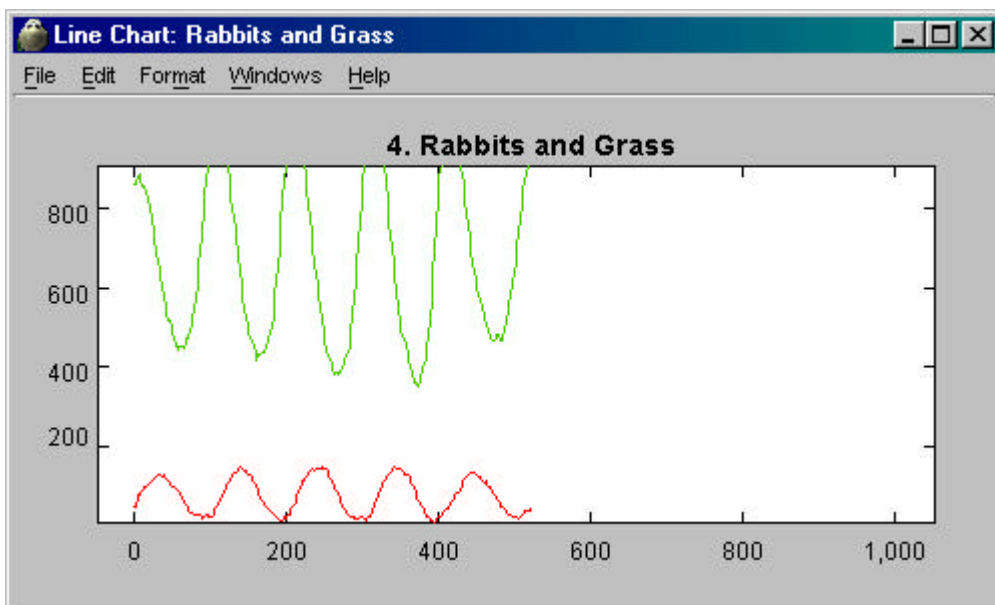
you can see the language used to program StarLogo. Notice that there are two tabs, one for the "turtles" (the grass, foxes, and rabbits) and one for the observer. The Turtle Command Center is where the code is written that moves the turtles, and the Observer Command Center is where the code is written for the things that you and your students will be able to interact with. You do not need to add or remove anything. You DO need to leave the command center open. If you close it, the whole program will close.

There is a graph that is created automatically next to the main screen. You can use just this graph, or if you'd like a larger representation you can open a bigger graph. To open the bigger graph, go to the control



center screen and click on the Windows menu. Select Plot Window or double click on the smaller graph in the main window. A second, larger graph will automatically appear. If the Go button has already been clicked you will see the data being plotted in real time, that is, as it is happening. The graph will not show anything until the Go button has been clicked. The graph is already set up for the students to use.

They do not have to do anything to the graph but observe and note what occurs.



**Notes to the teacher:** The version of StarLogo that you will be working with is the newest and it still has a few bugs. There have been some problems with the larger graph so you may just want to stick with the one on the main screen. StarLogo has been known to freeze if a project is left running and your screensaver comes on. If you want to leave this simulation running for an extended period of time, it would be best to turn your screensaver off first.