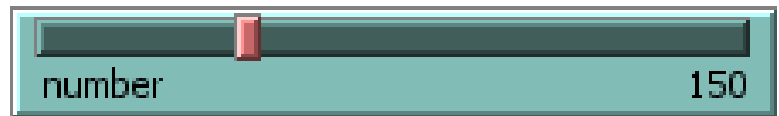


Start up NetLOGO and try out the Rabbits Grass Weeds model.

File menu > Models Library > Biology > Rabbits Grass Weeds

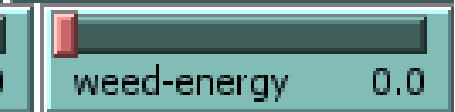
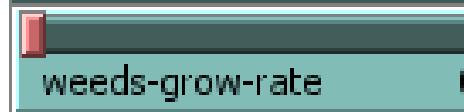
Here is what the default settings for the Rabbits Grass Weeds model are when you install NetLOGO and do not save the changes when you exit the model to explore another model or create your own NetLOGO turtles model or application.

Number 150
Birth-Threshold 15
Grass-Grow-Rate 15
Grass-Energy 5.0
Weeds-Grow-Rate 0.0
Weed-Energy 0.0



setup

go



These 6 sliders can be reset back to these default values, if you need to start over with the experiment.

What is the x-axis in the Populations graph?

What is the y-axis in the Population graph?

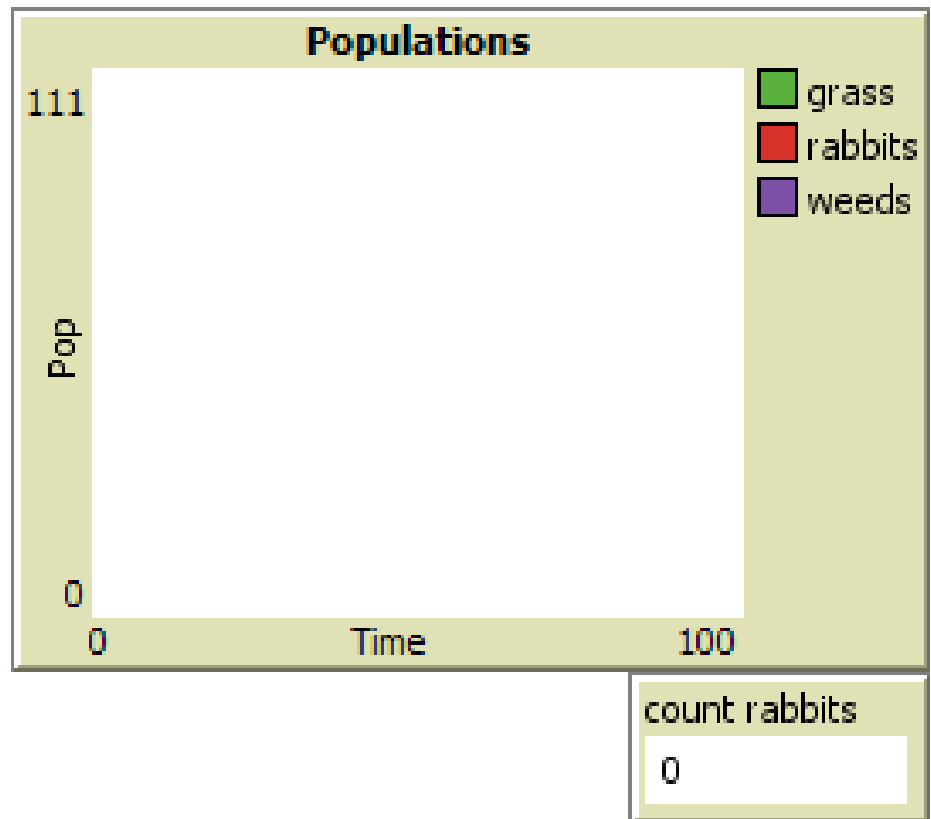
Run the model several times to get used to it. You can start and stop the model with the GO button.

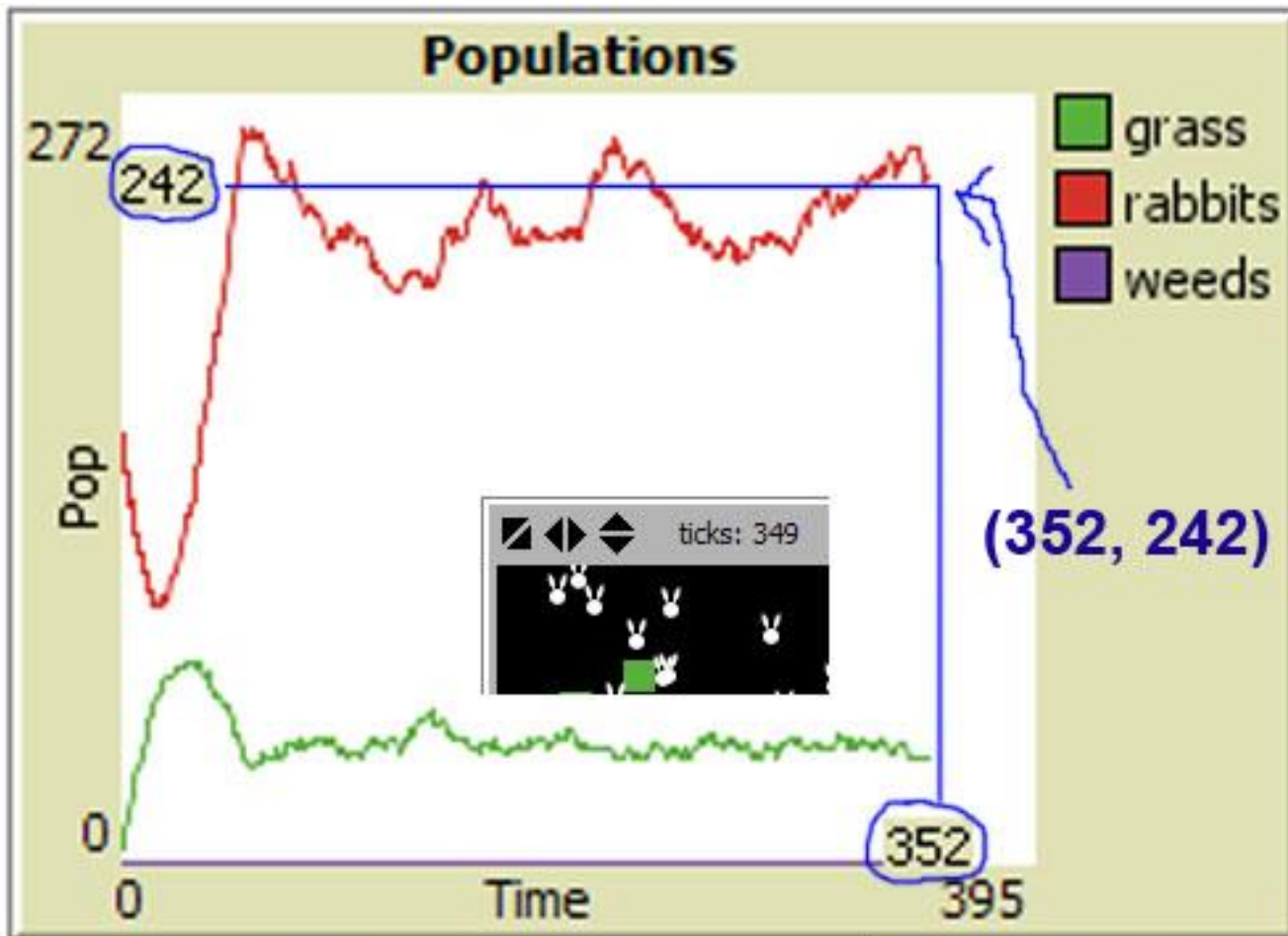
Run the model with the default settings and from a brand new SETUP. Stop the model at about 100 TICKS. Look carefully at the graph. Using your mouse, you can determine the x and the y values at various points on the graph.

Determine the MAXIMUM value that the RABBITS population reached. At about what TICK did this PEAK or MAXIMUM occur? This is an (x, y) value where X is TIME and where Y is the RABBITS count.

Determine the MINIMUM value you see on the RABBITS population. This will be the deepest valley or low point on the graph. At about what point in TIME or what TICK did this occur?

Here is what the GRAPH looks like or the 2D Plot of the model when it was stopped after exactly 349 TICKS:





Note: The model is stopped at 349 ticks. You see that at the upper left corner of the NetLOGO world. Rabbits are white, Grass is green.

count rabbits
244

The mouse pointer is paused right at about the end of the RED Rabbits line. It indicates that my mouse was at 352 on the X-axis and at 242 on the Y-axis. If I moved the mouse pointer down to the GREEN Grass line at about the same location in time (the X-axis is time or ticks), then you would have an indication of how much GRASS existed at that time when there were about 242 Rabbits.

The Grass was about 44 on the Graph where it is stopped. So that would be (349, 44) for the amount of GRASS at the point where there were 244 rabbits: (349, 244) is the exact value for the Rabbits, as we have displayed the actual count for the rabbits where the Model is stopped (paused).

Read over the following four sections of the information in the INFO tab of NetLOGO. Use it, notice things, try things.

- WHAT IS IT
- HOW TO USE IT
- THINGS TO NOTICE
- THINGS TO TRY

Note that you can read and study these online if you do not have NetLOGO installed at home.

<http://ccl.northwestern.edu/netlogo/models/RabbitsGrassWeeds>

Change the Grass Grow Rate from its default value of 15 to the slow grow rate of 3. Leave all the other model settings at their defaults. See the above page one screen snapshot if you need to get all settings back to the defaults, if needed. Only the Grass Grow Rate slider will be adjusted to 3 instead of 15.

Run the model again after clicking SETUP. Let it run until about 500 ticks and stop it there.

Describe what is different about this PLOT or GRAPH when it comes to the UPS and DOWNS of Grass and Rabbits?

What is the highest PEAK on the Y-axis for the number or count of RABBITS that you can estimate. When does this occur (about what TICK in TIME on the X-axis)?

Watch the following YouTube video after reading and taking some notes on the THINGS TO TRY section where it talks about Oscillations. Here is an excerpt from THINGS TO TRY where it talks about three kinds of oscillations.

“With the current settings, the rabbit population goes through a **damped oscillation**.

By changing the parameters, can you create an **undamped oscillation**?

Or an **unstable oscillation**?”

You Tube Video: [Underdamped, Undamped and Unstable Oscillation - 60 second video](#)

Read the following PDF but only read section **1 NetLogo Models** which is pages 1, 2 and 3 of the PDF. You can ignore and skip the first half of page 1. You do NOT need to read section 2, which is 2 Building a Simple Predator-Prey Model

[Individual \(Agent\) - Based Modeling with NetLogo - A Predator-Prey Example](#)

Section 1 NetLogo Models explains in much more detail the concepts in the Rabbits Grass Weeds model.

Section 2 Building a Simple Predator-Prey Model we will get to work on in early November. It actually builds a model that simulates the relationship between Panthers and Rabbits, or actually Lynx and Hares.

Here is a quote from the beginning of Section 2:

Let’s suppose we would like to model the Canadian lynx and snowshoe hare predator-prey dynamics with NetLogo. Note we are making the simplifying assumption that the snowshoe hare is the only food source for the Canadian lynx to simplify the predator-prey system dynamics. Before starting our model, we must identify the “rules” that determine the behavior of the lynx and hares...

Watch the following video and read the accompanying text to see what effects 14 Wolves had on Yellowstone National Park. It is amazing. <http://weloveanimals.me/released-14-wolves-park-no-one-prepared-unbelievable-nature11/>

[How Wolves Change Rivers](#) – YouTube video is 4 minutes 33 seconds long and has 27,064,387 views

To preview the discussion of another NetLogo model, try out the following model. It is also part of the Models Library under the Biology category. **File menu > Models Library > Biology > Wolf Sheep Predation**

<http://ccl.northwestern.edu/netlogo/models/WolfSheepPredation>