**Background**

Get into your lab groups and visit the web page listed below. You will find on that website that there is a simulation the shows the population fluctuations between a producer, primary consumer and a secondary consumer.

<http://ccl.northwestern.edu/netlogo/models/run.cgi?WolfSheepPredation.845.540>

**Hypothesis**

What do you think will happen when a population of primary consumers and secondary consumers interact over a time period?

Directions for Part 1:

1. When you get to the website, wait for everything to load.
2. When everything is ready you should see a black box on the right with controls on the left.
3. Select the button “Setup” and the black box should fill with grass sheep and wolves
   1. Make sure the “Grass On – Off” Switch is on the **off** position
   2. Move the “Ticks “ slider until it says **Slower** and the bar is about 1/3 blue
   3. DO NOT CHANGE ANY OTHER SETTINGS YET
4. Click go and record what happens below in trial 1.
5. Repeat the experiment and observe what happens again in trial 2
6. Repeat a third time and observe what happens a final time in trial 3

**Data Table 1:**

|  |  |  |
| --- | --- | --- |
| Trial 1 | Trial 2 | Trial 3 |
|  |  |  |

Directions for Part 2:

1. Play with the number of starting sheep and starting wolves to come up with a solution that shows a fairly stable environment
   1. Move the “Ticks “ slider until it says **Normal Speed** and the bar is about 1/2 blue
   2. Be very careful with the numbers of “Sheep Gain from Food” and “Wolf Gain from Food”.
   3. Any time you want to get back to the original settings just refresh the web page
2. Draw me a graph of the graph that you have made. Be sure to include the data on the data table that is relevant to the graph

**Data Table 2:**

|  |  |  |  |
| --- | --- | --- | --- |
| Title | Amount | Title | Amount |
| Initial Number of Sheep |  | Initial Number of Wolves |  |
| Sheep Reproduce |  | Wolves Reproduce |  |
| Sheep Gain From Food |  | Wolf Gain from Food |  |

**Graph**:

**Directions for Step 3:**

1. Switch the “Grass? On – Off” Switch to **ON**
2. This adds a producer to the environment
   1. Areas of uneaten grass will be colored green
   2. Areas of eaten grass will be colored brown
3. Find a good combination of grass, sheep and wolves that will create a stable environment. Record the numbers down on the data table below
   1. Be careful when playing with the numbers of “Sheep Gain from Food”, “Wolf Gain from Food” and “Grass Regrowth Time”
   2. Any time you want to get back to the original settings just refresh the web page
4. Copy the graph for all three organisms on the graph below.

**Data Table 3:**

|  |  |  |  |
| --- | --- | --- | --- |
| Title | Amount | Title | Amount |
| Initial Number of Sheep |  | Initial Number of Wolves |  |
| Sheep Reproduce |  | Wolves Reproduce |  |
| Sheep Gain From Food |  | Wolf Gain from Food |  |

**Graph**:

**Conclusion**

How did your hypothesis relate to your findings on primary consumer and secondary consumer populations over time?

**Analysis Questions:**

1. What happened in the following situations?
   1. The population of sheep dipped low.
   2. The population of wolves dipped low
   3. The population of wolves went highs.
   4. The population of sheep went high.
2. What happens when one group of organisms went too high? Was the environment stable?