Lab
#32
Wolves and Rabbits Predator-Prey Simulation

Introduction

In a stable ecosystem, a delicate balance exists between predators and prey. Predators refer to those organisms that need to hunt for food. A prey is an organism that is food for predators. The populations size of both organisms are depended on the size of the other population. This means a change in the size of one population will affect the size of the other population. In this lab you will simulate a predator-prey relationship, using wolves as the predator and rabbits as the prey. Over many generations you should be able to see the relationship between the number of predators and the number of prey.

Directions:

Data was collected on the populations for wolves and rabbits in a certain area. The data was taken over 20 generations and is shown in the table below.

<table>
<thead>
<tr>
<th>Generation</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
<th>12</th>
<th>13</th>
<th>14</th>
<th>15</th>
<th>16</th>
<th>17</th>
<th>18</th>
<th>19</th>
<th>20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prey (Rabbit)</td>
<td>60</td>
<td>56</td>
<td>50</td>
<td>31</td>
<td>25</td>
<td>26</td>
<td>33</td>
<td>44</td>
<td>56</td>
<td>61</td>
<td>58</td>
<td>51</td>
<td>26</td>
<td>22</td>
<td>24</td>
<td>31</td>
<td>43</td>
<td>52</td>
<td>56</td>
<td>63</td>
</tr>
<tr>
<td>Predator (Wolf)</td>
<td>8</td>
<td>11</td>
<td>15</td>
<td>18</td>
<td>21</td>
<td>24</td>
<td>28</td>
<td>25</td>
<td>14</td>
<td>7</td>
<td>10</td>
<td>13</td>
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<td>23</td>
<td>20</td>
<td>19</td>
<td>16</td>
<td>11</td>
<td>10</td>
</tr>
</tbody>
</table>

Use this data to construct a double lined graph. One line will represent the rabbit (prey) population and the other line will represent the wolf (predator) population.

Plot and connect the data from the above table onto the graph paper on the following page as follows:

- Plot the prey using ◆ and connect them using a solid line. Use the left side of the graph to plot the rabbit population.
- Plot the predators using △ and connect them using a dashed line. Use the right side of the graph to plot the wolf population.
Questions:

1. Study your graph lines for the two populations. How are the wolf and rabbit populations related to each other? Explain how the lines look next to each other.

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2. How do the sizes of each population affect each other?

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_____________________________________________________________________________________

3. What do you think would happen to the wolf population if you introduced an additional predator, such as a coyote, which kill more rabbits and reproduces faster than the wolf?

_____________________________________________________________________________________

4. What would happen to the original rabbit population if you introduced another type of rabbit, one that could run faster and escape its predators?

_____________________________________________________________________________________

_____________________________________________________________________________________

5. Explain why a predator / prey relationship can lead to an evolution of a new population?

_____________________________________________________________________________________

_____________________________________________________________________________________

_____________________________________________________________________________________

Change in Predator & Prey Populations Over Time

Generations

Rabbit Population

Wolf Population