Unit II: Ecosystems: Interactions, Energy and Dynamics Task 1   Name: _____

Suggested Phenomena: There are factors that limit the growth of biological populations.

Engage: What would happen to an ecosystem if the rabbit population did not have any predators?

Explore:

  1. Navigate to http://phet.colorado.edu/en/simulation/natural-selection

  2. Click on the "RUN NOW" button

  3. Once you have the simulation window active, click the "PAUSE" button at the bottom to stop the simulation. NOTE: you can always start over by pressing the "RESET ALL" button

  4. The simulation starts you off with only one bunny. When you "add a friend", the two bunnies will start to reproduce. Without changing any of the parameters within the simulation, write a prediction of what you think will happen to the bunny population when you "add a friend" in Table 1.

  5. Press "Play" and then "Add a friend". Let the simulation run for several generations. Record what actually happened to the bunny population (You may write "matches prediction" if you were right). Finally, write an explanation for what you observed.

  6. Repeat steps 4-5 for each of the scenarios in Table 1. Be sure to write your prediction BEFORE pressing play! Also, allow the simulation to run long enough for you to actually see what will happen to the population.

Explain: Use the data, internet or other provided resources to answer the following questions.

7. Based on what you observed, what are some factors that you believe to be essential to keeping the size of a population in check? _____

_____

8. Compare scenarios #2 and #4 and #3 and #5. What happened when the bunnies were all the same compared to when there were two different types of bunnies? _____

_____

_____

9. Based on your response to #2, would you consider variation, or differences, within a population to be beneficial or harmful? Explain. _____

_____

_____

10. In a real world situation, what would actually happen to the sample ecosystem if the rabbit population exceeded the carrying capacity? Would rabbits take over the world?_____

_____

_____

Evaluate: On **an attached sheet**, develop a plan for the Australian government on how to combat the overpopulation of the rabbit species. Your plan should Use evidence from the activity & Include and explanation for your reasoning

Performance Task 1 In Detail

Table 1: Predictions and Results			
Scenario	**What do you think will happen?**	**What actually happened?**	**Why did this happen?**
#1: No selection factors or mutations			
#2: Introduce wolves after the population gets above 50, no mutations			
#3: Introduce food after the population gets above 50, no mutations			
#4: Introduce brown fur mutation, Introduce wolves after the total population gets above 50			
#5: Introduce long teeth mutation, Introduce food after the total population gets above 50			

Extend: Using the PhET Natural Selection simulation, plan and carry out an investigation to select a scenario that will end with the population remaining within its carrying capacity. Include your scenario variables and complete the questions in Table 2. You must examine at least 3 scenarios.

	Scenario #1	**Scenario #2**	**Scenario #3**
Independent Variable			
Dependent Variable			
Controlled Variables			
Hypothesis (what do you think will happen?)			
Results (what actually happened **and** why?)			