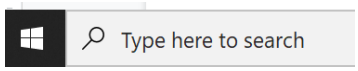
Lesson 9 - Bug Hunt Computer Model - Survival and Reproduction

Purpose - Run an experiment and show results of how survival allows increased chance for reproduction.

Warm Up - What is coevolution? In biology, coevolution occurs when two or more species reciprocally affect each other's evolution.

Start Here - Computer Model - Bug Hunt

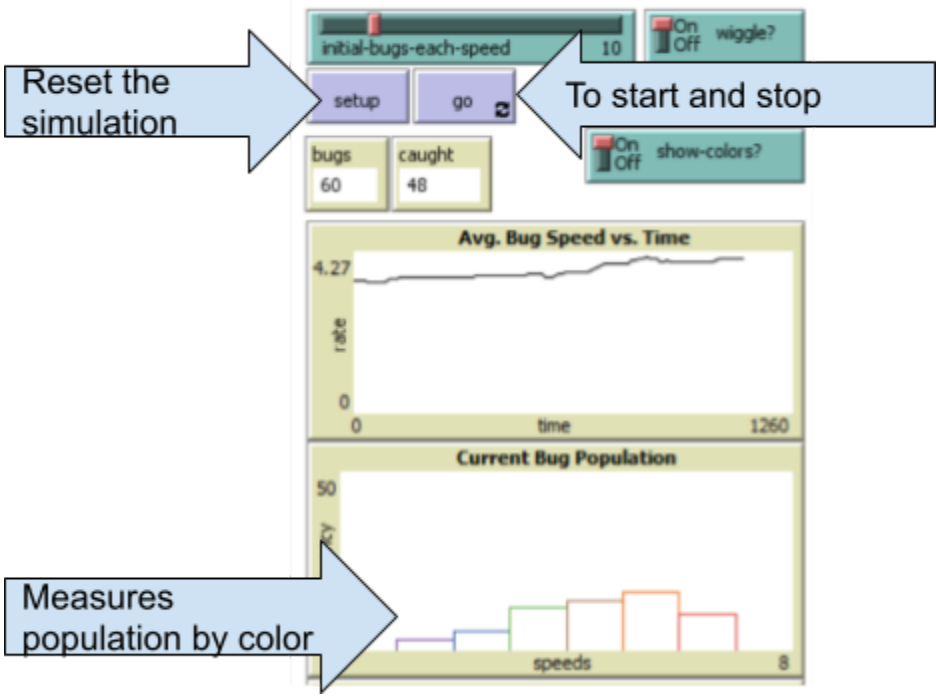
Use this computer model to design a simple experiment.



Instructions.

- Search your hard drive for Netlogo.
- If you do NOT have it, “install” it from the “software center. In Netlogo - open “file” - “models library” - “biology folder” - “evolution folder” - “bug hunt speeds”

- Try out the computer model. Click “Setup” and “Go.”
- “Click” on a bug to “eat” it.



Write in your answers.

1. Write - What does this computer model show? Run the model to see how it functions to answer this, and then plan your experiment.

2. Write a research question that you could test with a partner using this computer model. Example - How are the populations of different bugs affected when _____? (pick - wiggle, flee, or show colors)

3. Write - Hypothesis - Predict what results you think you will get.

4. Record data - create a data table for **at least 4 trials** (of populations based on your input variable). Select “Insert” and “Table” from the menu above to add a data table of your design. Be sure to include proper labels in the table.

5. Conclusion -

- Claim - Which types of bugs seemed to have bigger populations during your experiment?

- Evidence - How does your data support your claim?

- Reason - How do you think the phenotypes (physical characteristics) of your bugs affected the results? (hint - which bugs were easier to catch?)

- What do you think this computer model would show for the evolution of future generations of the bugs AND the bird? (mention “speed” in your answer)

6. Comparison - Write complete answers. This is a summary of how different types of experiments have pros and cons. If you “missed” the paper circle moth experiment, then think of another hands-on experiment that we did this year.

A. What are the advantages and disadvantages for each option

	Advantages (Pros)	Disadvantages (Cons)
A real experiment - like our capture of “paper circles” 	- - -	- -
Computer Model Experiment 	- - -	- -

B. Look up and write a sentence (definition) for each term. Or draw and explain a picture.

- Accurate -
- Reliable -

C. Explain how each type of experiment shows accuracy and reliability.

- The computer model (is/is not) accurate because _____.

- The computer model (is/is not) reliable because _____.

- The real model (is/is not) accurate because _____.

- The real model (is/is not) reliable because _____.

D. How could a computer model be used to solve a future problem that might happen? Use an example in your answer.

Assignment __Using Computer Models_ Criteria D - Applying Science Concepts

Advanced 100%	**Advanced** 90%	**Understands** 80%	**Got the basics – Working on it** 70%-60%	**No Attempt**	*Skill*
I can **discuss and evaluate** the implications of using science and its application to solve a specific problem or issue, interacting with a factor	I can **discuss** the implications of using science and its application to solve a specific problem or issue, interacting with a factor	I can **describe** the implications of using science and its application to solve a specific problem or issue, interacting with a factor	I can **outline** the implications of using science to solve a specific problem or issue, interacting with a factor		***Discuss and evaluate the various implications of using science and its application to solve a specific problem or issue*** 2
I can **consistently** apply scientific language to communicate understanding **clearly and precisely**	I can **usually** apply scientific language to communicate understanding **clearly and precisely**	I can **sometimes** apply scientific language to communicate understanding	I can **apply** scientific language to communicate understanding **but does so with limited success**.		***Apply scientific language effectively*** 3

Continue below if you finished 1-6.

7. Review - What type of selection is represented in this computer model?

8. Revisit - Taxonomy - Connects to kingdoms of living things, biodiversity through evolution, and then again in the disease unit.
a. Fill out your answers. We will go over them in class afterward.
b. Give an example of putting things into different groups or categories.

c. Why does agreeing on a name for an item help humans communicate?

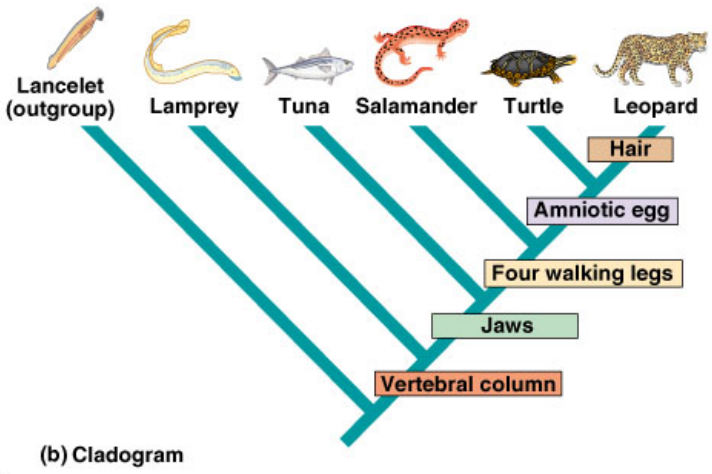
d. Why do you think Carl Linnaeus, a Swedish doctor, decided to change the commonly used naming system? Here is an example:

Plant	Before Linnaeus	The name given by Linnaeus
Tomato	Solanum caule inerme herbaceo, foliis pinnatis incisis, racemis simplicibu	*Solanum lycopersicum*

Use this diagram to answer the following questions:

9. What is the closest relative of the leopard on this cladogram?

10. What makes a lamprey different from a tuna?



(b) Cladogram

11. Which organism appeared first in this diagram, according to evolution?

12. How could looking at the DNA of each of these species change the placement of some groups?