



Science Objectives

- Students will analyze a predator prey graph that represents the population cycling of the lynx and the snowshoe hare.
- Students will hypothesize what is actually occurring at different points of the predator prey graph.
- Students will predict future trends that will occur in a predator prey population.

Vocabulary

- population cycling
- predator
- prey

About the Lesson

- This lesson *Lynx_and_Snowshoe_Hare_Cycle.tns* involves investigating population cycling patterns that exist between a predator and its prey.
- As a result, students will:
 - Interact with a given situation to make predictions in an unknown situation.
 - Draw conclusions from graphs.
 - Predict future trends that will occur in a predator prey population.

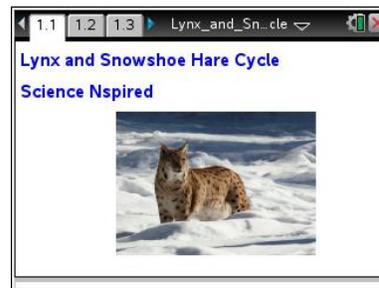


TI-Nspire™ Navigator™

- Send out the *Lynx_and_Snowshoe_Hare_Cycle.tns* file.
- Monitor student progress using Class Capture.
- Use Live Presenter to spotlight student answers.

Activity Materials

- Compatible TI Technologies:  TI-Nspire™ CX Handhelds,  TI-Nspire™ Apps for iPad®,  TI-Nspire™ Software



Tech Tips:

- This activity includes screen captures taken from the TI-Nspire CX handheld. It is also appropriate for use with the TI-Nspire family of products including TI-Nspire software and TI-Nspire App. Slight variations to these directions may be required if using other technologies besides the handheld.
- Watch for additional Tech Tips throughout the activity for the specific technology you are using.
- Access free tutorials at <http://education.ti.com/calculators/pd/US/Online-Learning/Tutorials>

Lesson Files:

Student Activity

- *Lynx_and_Snowshoe_Hare_Cycle_Student.doc*
- *Lynx_and_Snowshoe_Hare_Cycle_Student.pdf*
- *Lynx_and_Snowshoe_Hare_Cycle.tns*

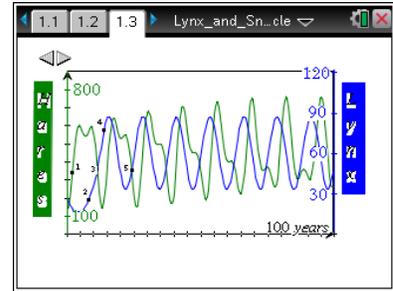


Discussion Points and Possible Answers

Have students read the background information stated on their activity sheet.

Move to pages 1.2–1.4.

1. Have students use the graph on page 1.3 to answer Questions 1 and 2 in the .tns file, on the activity sheet, or both places. Be sure students answer Questions 3–5 on the activity sheet. (Questions 3–5 are not in the .tns file).



- Q1. What is happening at Point 1 on the graph?

Answer: B. The prey population is growing fast.



TI-Nspire Navigator Opportunity

It may be helpful to display the graph for the class to see the individual points being discussed.

- Q2. What is happening at Point 2 on the graph?

Answer: B. The predator population is growing slowly.

- Q3. Describe what is happening at Point 3 on the graph.

Possible Answer: The predator population is increasing because of the availability of prey (food). The prey population is decreasing because of the increased predation by the predator population.

- Q4. Observe the pattern of the rest of the graph. What happens to the predator population when the prey population increases? Decreases?

Possible Answer: There is a repeating pattern. Whenever the prey population peaks, the predator population increases and peaks. The same pattern occurs when the prey population decreases.

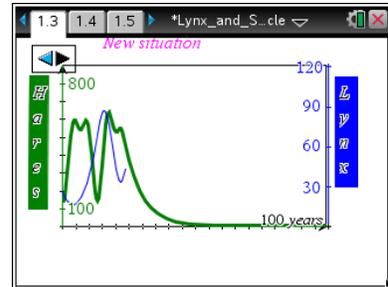


Q5. What other characteristics do you notice about the pattern of the graph?

Possible Answer: The prey population peaks and then the predator population peaks. The two graphs are not mirror images of each other.

Move to page 1.5.

2. Students select the right arrow ► on the Hare & Lynx graph on page 1.3 to get a “New situation.” Have students use the graph to answer Question 6 in the .tns file, on the activity sheet, or both places. Be sure students answer questions 7–9 on the activity sheet. (Questions 7–9 are not in the .tns file).



Tech Tip: Students select the right or left arrows (► or ◀) to move between situations.

Q6. In the new situation, what could have caused the change in the hare population?

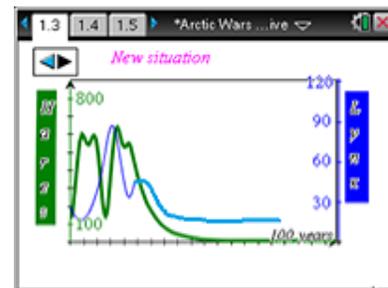
Answer: B. disease that affected the hares

Q7. For each answer choice that you did not choose in Question 6, explain why it could not have caused the hare population to decrease.

Sample Answer: Both choices A and D would result in an increase in the hare population. Choice C would result in a decline, but not to zero.

Q8. On the graph at the right, draw a line that shows what the population of the lynx might be in the future.

Sample Answer:





Q9. Explain the reason for where you placed your line on the graph in Question 8.

Sample Answer: Since there is prey other than the snowshoe hare, the predator population will not decrease to zero. It will decrease sooner and to a lower point than in the previous situation. Your students might also hypothesize that another rabbit population will move in. They might also say that, because of increased habitat space, other prey populations will increase. Each scenario would depend upon the time of the year the disease outbreak occurred. Accept any answer that correctly explains the graph.

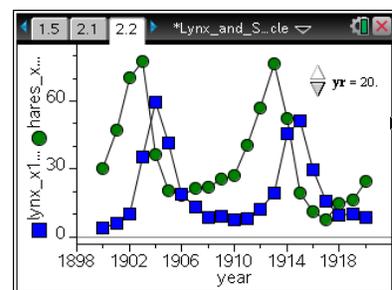
Move to pages 2.1 and 2.2.

3. Have students follow the directions on page 2.1 to create the hare graph on page 2.2.

Move to page 2.3.

4. Have students return to page 2.2 and add the lynx data on by selecting **Menu > Plot Properties > Add Y Variable > lynx_x1000**. Students should use the graph to answer Question 10 on the activity sheet, in the .tns file, or both.

Sample Answer:



Tech Tip: To add data for the lynx, select  **> Plot Properties > Add Y Variable > lynx_x1000**. You may need  to back-out to the main Tools Menu  to see the desired menu option.

Q10. How did your prediction of the lynx population match the actual data? Explain.

Answer: Answers will vary.



TI-Nspire Navigator Opportunities

Send out actual data from a predator prey relationship for your students to graph. Capture the graphs for class analysis. Have your students change the data and watch the changes that occur on the graph.



Wrap Up

When students are finished with the activity, pull back the .tns file using TI-Nspire Navigator. Save grades to Portfolio. Discuss activity questions using Slide Show.

Discuss with your students the variety of dynamics at work in a population. Have your students form hypotheses that include additional factors that were not included in this activity. Also discuss other predator prey relationships besides the lynx and the snowshoe hare

Assessment

- Formative assessment will consist of questions embedded in the .tns file. The questions will be graded when the .tns file is retrieved. The Slide Show will be utilized to give students immediate feedback on their assessment.
- Summative assessment will consist of questions/problems on the chapter test.