

## Activity Title:

Investigating Logistic Functions and Applications

Time Required: 45 minutes for problem 1

45 minutes for problem 2-4

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## Activity Overview:

In this exercise, students will investigate the graphs of logistic functions, function characteristics and solving logistic equations in Problem 1. Application problems that are modeled by logistic functions are completed in Problem 2-4. This activity is appropriate for Algebra II or Precalculus.

## Concepts:

- Logistic function graphs and characteristics
- Logistic equations
- Applications involving real-life model of growth whose growth levels off because the rate of growth changes from increasing to a decreasing growth rate.

## Teacher Preparation:

This investigation usually follows the study of exponential and power functions. The logistic function is characterized by an “elongated s” curve, where we start with an increasing growth rate and after the point of maximum growth we view a decreasing rate. The activity also includes solving logarithmic equations and application problems.

**The teacher should review basic equation solving process and also solving logarithmic equations, that is, taking the log of each side and solving for x.**

- This activity could be used in Algebra II either as an introductory to student discovery of logistic functions or as an activity following teacher presentation of the logistic functions.
- This activity could be used as student discovery/recall of logistic functions in Precalculus.
- Students should be familiar with using the different applications available on the TI-nspire, how to insert pages, change page layouts, and basic shortcut keystrokes.
- A worksheet accompanies this activities which students can complete as a hard copy for a written assignment. The worksheet may be completed at the discretion of the teacher. All answers to questions should be submitted in **sentence form** and the teacher should indicate to students the algebraic manipulation work required on the worksheet.

## **Classroom Management:**

- This activity is designed to be student-centered. The teacher may act as a facilitator while students work independently or cooperatively. The teacher will inform students in which manner they are to work.
- The ready-to-use worksheet will provide a written assignment which can be used for daily credit points.
- The file titled *logistic function SOL* shows the expected results of working through the activity and the screenshots are included in the step-by-step instructions.

## **TI-Nspire Applications:**

*Calculator, Graphs & Geometry, Lists & Spreadsheets, Notes*

## **Activity Extensions:**

- Students may select logistic problem examples from internet sites and bring them in and post them for other students to complete for extra credit/ present the problem to the class.
- Students could complete a science/math project growing some seedling over a few week period, recording growth, use non-growing lamps vs. growth lamps conditions, fertilizer vs. no fertilizer or different kinds, etc.