Modeling Data
ID: 12317

Activity Overview
In this activity, students will graph data modeling exponential and logarithmic growth and find equations representing the data.

Topic: Modeling Growth
- *Exponential Growth and Decay*
- *Compound Interest*
- *Logarithmic Growth*

Teacher Preparation and Notes
- *Students should be aware of the compound interest formula in order to be able to find the growth of the exponential data given in Problem 1.*
- *Students should be aware of basic logarithms in order to determine the base of the log function for Problem 2.*
- **To download the student and solution TI-Nspire documents (.tns files) and student worksheet, go to education.ti.com/exchange and enter "12317" in the quick search box.**

Associated Materials
- *ModelData_Student.doc*
- *ModelData.tns*
- *ModelData_Soln.tns*

Suggested Related Activities
To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.
- *Exponential Growth (TI-Nspire technology) — 8254*
- *Orders of Magnitude and Logarithmic Models – earthquake magnitudes (TI-Nspire technology) — 9706*
- *Properties of Logarithms (TI-Nspire technology) — 9607*

Problem 1 – Exponential Growth

In this problem, students will graph data given on page 1.3 using the data and statistics application. Students should select years on the horizontal axis and value on the vertical axis. Move the cursor over the **Click to add variable** box at the bottom and left of the page and press enter, then select the correct variable from the list. Students should determine an equation for the data using their knowledge of compound interest equations.
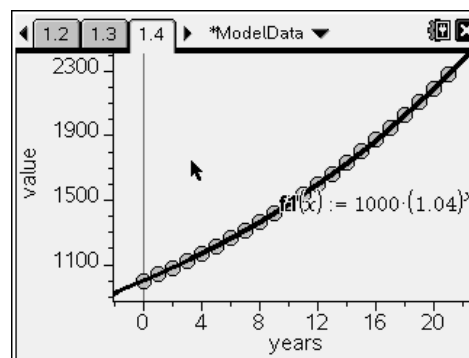

Students can plot the function to determine if it goes through the graphed points by selecting **MENU > Analyze > Plot Function** and entering the function.

Discussion Questions

- *What variable should be on the horizontal axis? Vertical axis?*

- *How can you determine the interest rate for this growth?*

Problem 2 – Logarithmic Growth

In this problem, students will graph data given on page 2.2. Students should determine an equation for the data using their knowledge of logarithmic functions. Students should try different bases to see if the equation fits the data. *Note: Do not use the logarithmic regression because that will give a natural log equation.* Suggest students use the whole number values in the data table to help determine the correct base.
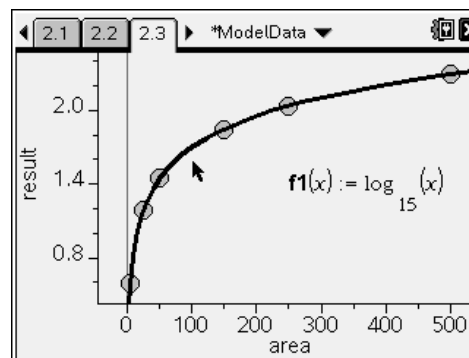
Discussion Questions

- *What variable should be on the horizontal axis? Vertical axis?*

- *How can we use the whole number results in the table to determine the base of the logarithmic function?*

Extension Problem – Exponential Decay

In this problem, students will continue with the process in the first two problems. The given data represents exponential decay.

Discussion Questions

- *What is the number of acres the farmer started with in year zero?*

- *By what percent does the amount of acres available decrease every year?*