

TI-Nspire Activity: *Linear and Exponential Models*
Connecting Algebra 2 to Statistics
By: Judy Stewart

Activity Overview

In this activity, students will see how they can linearize data and use their knowledge of linear regression to analyze the data to determine if an exponential function is a suitable model. Students will find an exponential model both algebraically and using their handheld for verification.

Tennessee Mathematics Standards - Algebra 2

SPI 3101.1.3 Use calculators to identify regression equations for nonlinear data.

SPI 3101.5.3 Analyze patterns in a scatter-plot and describe relationships in both linear and non-linear data.

SPI 3103.5.6 Find the regression curve that best fits both linear and non-linear (using technology such as a graphing calculator) and use it to make predictions.

SPI 3103.5.7 Determine/recognize when the correlation coefficient measures goodness of fit.

Concepts

Scatter Plot

Line of Best Fit/Least Squares Regression Line

Regression Equation

Correlation (r value)

Logarithm

Exponential Regression

Teacher Preparation

This activity is designed to be used in an Algebra 2 classroom as an extension of Exponential and Logarithmic Equations. It can also be used in an introductory Statistics course. Problem three could lead into a discussion of the residuals and power function models in a Statistics course but for an Algebra 2 class, we will simply note that an exponential model is not appropriate.

- *This activity assumes previous knowledge of a scatter plot, line of best fit, and correlation. The intention of the activity is not to learn the meaning of these terms, but to extend the students knowledge and make connections to the recently learned concepts of exponential and logarithmic equations.*
- *This activity assumes some previous experience using the TI-Nspire to create lists and spreadsheet pages and scatter plots from the data and statistics page.*
- *The Linear and Exponential.tns document will be sent to the students through the connect to class software upon the students entering the classroom. However, it could be downloaded by the teacher onto all student handhelds.*

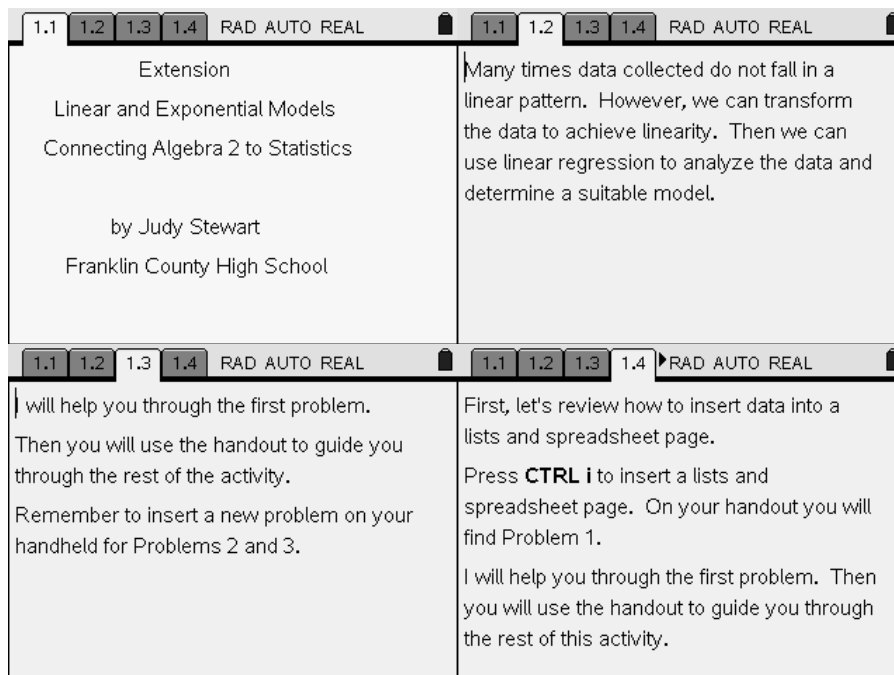
The Classroom.

- *This activity is intended to be mainly teacher-led through Problem 1, with breaks for individual student work. Use the following pages and Linear and Exponential Models Handout to present the material to the class and encourage discussion. Students will follow along using their handhelds. Once students have completed Problem 1, they may continue with Problems 2 and 3. Problems 2 and 3 are intended to be completed at students own pace.*
- *The student worksheet helps guide students through the activity and provides a place for students to record their answers.*

- There are two student worksheets. One hand out contains Problem 1 which is teacher led and can be used as instructional notes. Students should keep this in their notebooks for future reference. A second worksheet contains Problems 2 and 3 which are intended to be class work or homework and may be taken as a grade.
- The Linear and Exponential Models Solution.tns document shows the expected results of working through the activity.

The Document

These are the pages which appear in the original document. Students will be inserting additional pages.



This is how the document should look when students have completed problems 1-3.

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

Extension

Linear and Exponential Models

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Franklin County High School

Many times data collected do not fall in a linear pattern. However, we can transform the data to achieve linearity. Then we can use linear regression to analyze the data and determine a suitable model.

1.1 1.2 1.3 1.4 ▶ RAD AUTO REAL

I will help you through the first problem. Then you will use the handout to guide you through the rest of the activity.

Remember to insert a new problem on your handheld for Problems 2 and 3.

First, let's review how to insert data into a lists and spreadsheet page.

Press **CTRL I** to insert a lists and spreadsheet page. On your handout you will find Problem 1.

I will help you through the first problem. Then you will use the handout to guide you through the rest of this activity.

1.2 1.3 1.4 1.5 ▶ RAD AUTO REAL

A	xv	B	yv	C	ly
					=log(yv,10)
1	0	3.	0.477121		
2	2	5.1	0.70757		
3	4	8.6	0.934498		
4	6	14.5	1.16137		
5	8	24.5	1.38917		

1

1.3 1.4 1.5 1.6 ▶ RAD AUTO REAL

1.4 1.5 1.6 1.7 ▶ RAD AUTO REAL

1.5 1.6 1.7 1.8 ▶ RAD AUTO REAL

"Title"	"Linear Regression (a+b*x)"
"RegEqn"	"a+b*x"
"a"	0.478426
"b"	0.113872
"r²"	0.999995
"r"	0.999998
"Resid"	"(...)"

1/99

