Name: Brian DiNitto
Grade level(s):9th and10 th grade Math
Objectives: *I will use the scatter plot abilities of the graphing calculator to visualize correlations, and how they can be modeled with a linear equation.*

This lesson involves the following from the New York State Mathematics Standards: Modeling/ Multiple Representations Measurement Patterns and Functions.

Material: Activity worksheets, TI Graphing calculators and software modeling.

Procedure:

I plan on having my students to utilize the TI 83/84 Graphing calculators and software / modeling package(s) to solve problems after they have gathered data on their heights and corresponding arm spans to see the concept of a correlation. Students will be introduced with height and arm span data about famous boxers, basketball players, swimmers, and runners. Can their sport be predicted from the data? What are some of your reasons for your choices? Students will work in small groups of four students and try to agree and support some of their predictions. They will share their choices and predictions with the class.

Next, the teacher will model how to measure their own height and arm span using measuring tape. Student groups will measure their members and write their values on a data sheet each group has. Averages will be found for each group and recorded on the sheet. All the student data will be graphed on poster paper using a different color for each group. The values will also be entered into the overhead graphing calculator in two lists.

Students will work on questions in their group. Some of the questions are:
Can you predict which group is represented by which color on the poster chart?
Is there a relationship between height and arm span? Is it a direct, inverse, no relation, non-linear?
Is there a different relationship between height and arm span for girls and boys? How is it shown in the data?
How would this graph look different for an elementary school class? A class of high school seniors? A class of senior citizens?

The concept of a correlation is shown with the graphical model. Also the concept of an outlier is shown, a data point that varies significantly from the correlation pattern.

Using the overhead calculator display, we can look at the scatter plot and try to model the correlation with a piece of linguini placed along the data points. How can we best place this line to show the pattern or correlation? Have students in their groups best place their line among a print out of the data and give an explanation how they did it. Select a few groups to present their line and method to the class. Demonstrate how the calculator can be used to find the equation modeling this line through the linear regression function. The resulting equation is a mathematical model of the relationship between height and arm span. By selecting one value, another corresponding value is found. Elaborate how this equation has a limit on its domain and thus its range for people on earth (Domain: about 2 feet to about 8 feet).

Target	Acceptable	Unacceptable
Students can add data to two calculator lists accurately.	Students will need two corrections in their groups to accurately add data to two lists on the calculator.	The students do not complete adding data to the lists and have to just watch the demonstration.
Students can identify the independent and dependent variable in the graph display.	Students can identify which axis represents the height and arm span, but are incorrect about the independent variable.	Students incorrectly identify the axes and do not know about independent variable being on x-axis.
Students can model a line of best fit with a piece of linguini on their graphs with an explanation of why this line fits best.	Students place a line of best fit that generally shows the correlation, but cannot explain a rational on how to measure its accuracy.	Student's line of best fit does not fit. The correlation is not shown with their line.
A linear regression can be performed on the calculator and the found values can be incorporated in a line over the scatter plot.	The student can perform the linear regression, but does not know what to do with the resulting slope and Y-intercept to produce a line over the scatter plot.	Student cannot perform the linear regression, and does not understand how it will model an equation of line of best fit.
The domain and range for this equation can be accurately predicted.	With prompts, the student can give an accurate limit on the domain and range for this relationship.	The student does not connect the equation to real life to see the limitations that people would have for height and arm span.