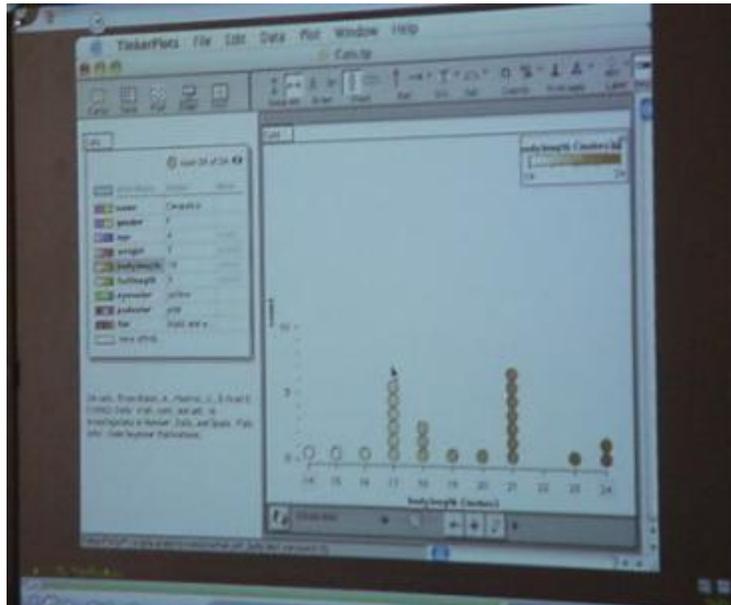


## Tech Talk

### Charting New Territories with *TinkerPlots*

Kristen Hernandez and Kay McInnis

We would like to introduce effective data software that is being used in the classroom to facilitate learning and promote higher order thinking. *TinkerPlots* (available from Key Curriculum <http://www.keypress.com/x5715.xml>) is an inquiry-based data analysis package designed for children in grades 4 through 8. The software helps the students learn that words and numbers can have an impact in their everyday lives. *TinkerPlots* takes the concept of statistics to the next level by allowing students to analyze data graphically and numerically which helps to develop a stronger understanding of what their numbers mean. The association of technology to data is livened up by the use of *TinkerPlots*.



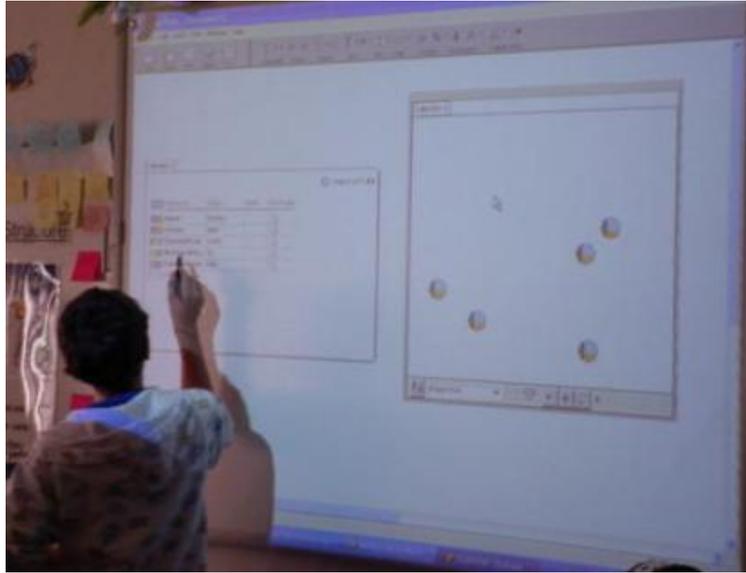
The standard interface for *TinkerPlots* showing a line graph and data cards

*TinkerPlots* allows students to collect data and quickly and efficiently design their own plots through the use of pie charts, histograms, scatter plots, and other graphs that help them analyze their data. The students are able to find the mean, median, mode, and range of their set of data and they truly love what they can accomplish and achieve. Another feature of the software is that the students can construct their own questions from their graphs and share these questions with their classmates. In this way, the software helps to address the Louisiana Grade Level Expectations for data analysis by allowing students to formulate their own understanding of trends in data and the interpretation of what a set of data might mean.

One major design component of *TinkerPlots* is to help students feel comfortable and confident in the areas of data analysis and statistics. We have seen that increased student motivation and increased academic achievement since we began using this software in 2006. One student at Carolyn Park Middle School in Slidell, LA said that she “*loved doing this kind of schoolwork*” while another said that her “*grades have gone up since using TinkerPlots.*” Because of software allows many students to be creative and successful in their mathematics our students asked if they could make a video about their use of *TinkerPlots*. You can view the video that they created by visiting the site: <http://pangea.tec.selu.edu/~khernandez/TinkerPlots.wmv> (note the video file is approximately 20 MB in size).

The *TinkerPlots* software helps us introduce some of the more complex elements of Bloom’s Taxonomy and increases the level of higher order thinking occurring in our classrooms. We also use *TinkerPlots* to build solid conceptual understandings of what statistics are and how the students can use them. We have the students apply technology

strategies into the math classroom to collect and analyze data so that they can explore their own thoughts and ideas about the real world—not data artificially taken from a textbook.



Students working with *TinkerPlots* using a Smartboard

Technology is a key component in engaging students and helping them to see important connections among different types of graphical displays of data. *TinkerPlots* creates a dynamic learning environment and can be used to differentiate your math and science lessons in a way to reach all of your learners and create a positive learning environment. The software can analyze both categorical and numerical data allowing you a lot of flexibility as a teacher.



Students working with *TinkerPlots* at individual computers

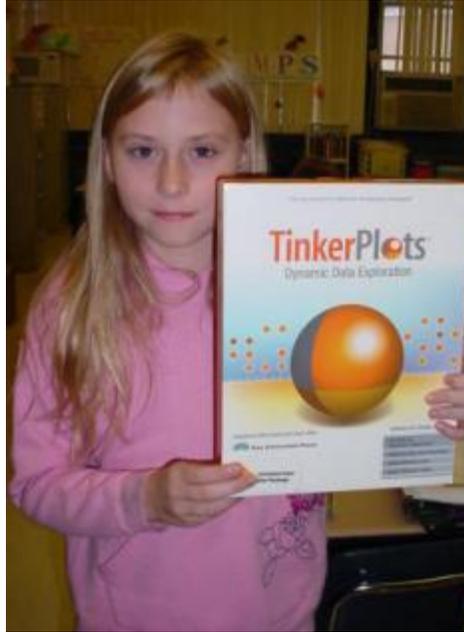
We have used *TinkerPlots* for many aspects of teaching important math concepts. When getting pumped and ready for the BCS National Championship in January of 2008 our 6<sup>th</sup> grade students participated in a Math and Literacy Tailgate party. The students took part in math stations with a football flair! One of the stations was called **Tinkering with Football**. The students worked through a *TinkerPlots* activity that included data collected about the 2008 football season high school verbal commitments. The students compared data and even created their own questions that they could share with their classmates. The excitement of using the software was amazing. Students were eager to make it to the Tinkering with Football station.



Ms. Hernandez helps a student with a question

*TinkerPlots* allows us to provide for our students' individual differences and at the same time helps us to produce lifelong learners. The students can use the information gathered through the use of *TinkerPlots* and apply it for many years to come. There is no better way than to help a child to see the benefits and enjoy the experience of what technology can do for them.

The hands-on approach allows the students' to become teachers themselves when it comes to showing their work to other students and their parents. After our students have been trained in the use of *TinkerPlots*, they too can be used as a resource to branch out and teach other students and teachers. Through the use of this interactive software, a student might find their future career and discover a love and appreciation for math. *TinkerPlots* is not only for use in math, but can be used across the curriculum to relate the connections between one subject matter to another.

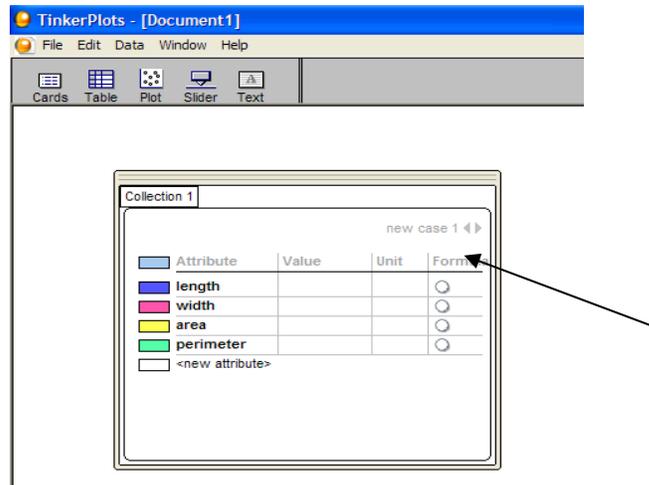


A future statistician?

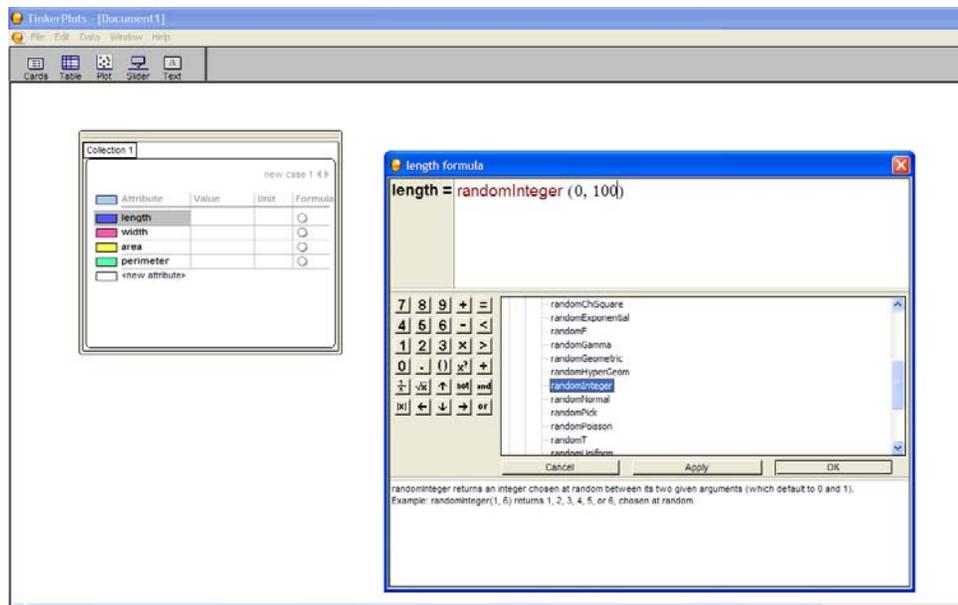
A major benefit of *TinkerPlots* is that it provides the students with a strong foundation for high school data analysis and statistics. Teachers will have to spend less time re-teaching those who have benefited from this inquiry-based program. We evaluate the effectiveness of this project by monitoring for changes in mood and behavior as well as using a rubric to assess the student's visual printouts of their graphs and questions. We also evaluate the electronic files (data and graphs) created by our students. Allowing students to differentiate their learning allows for increased testing scores and an overall attitude change towards math. This software benefits both the low and high students because of its friendly and engaging interface.

We have included a short introduction (along with some screenshots) of the basic *TinkerPlots* interface so that you can get a sense for this important software package designed specifically for middle school students. The example below illustrates the versatility of the software.

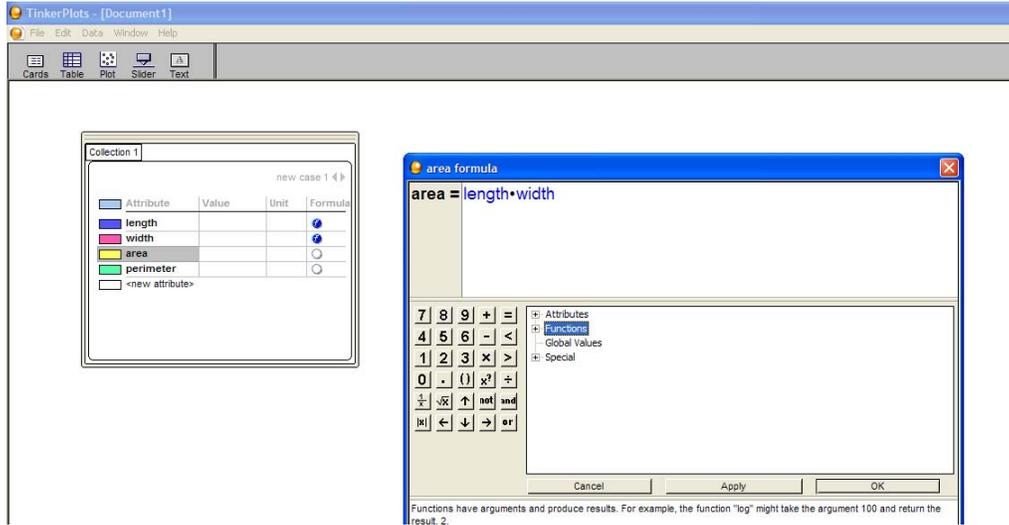
*TinkerPlots* software allows for quick and easy ways to have the students explore the relationship between area and perimeter. To begin with we create the “data” by creating a new set of data cards and entering the following attributes: length, width, area, and perimeter.



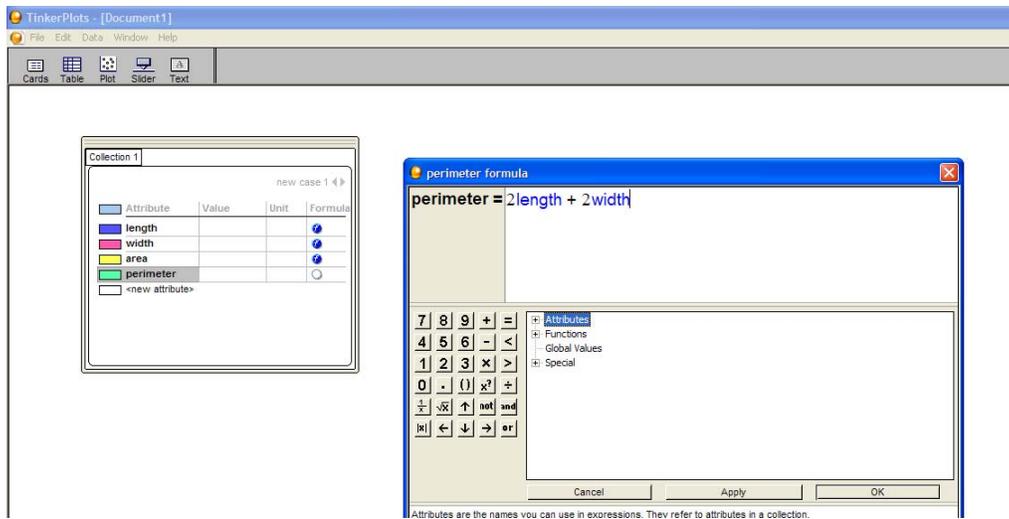
Click on the circle in the formula column for length and width and then select Functions, Random Numbers and Random Integer. Enter 0, 100 between the parenthesis. Follow a similar procedure for the width.



Click on the formula circle for area and enter length times width.

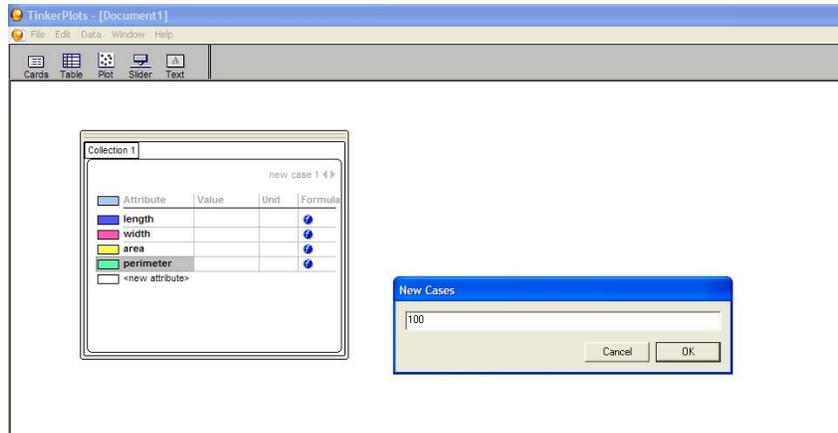


Click on the formula circle for perimeter and enter  $2 \cdot length + 2 \cdot width$ .

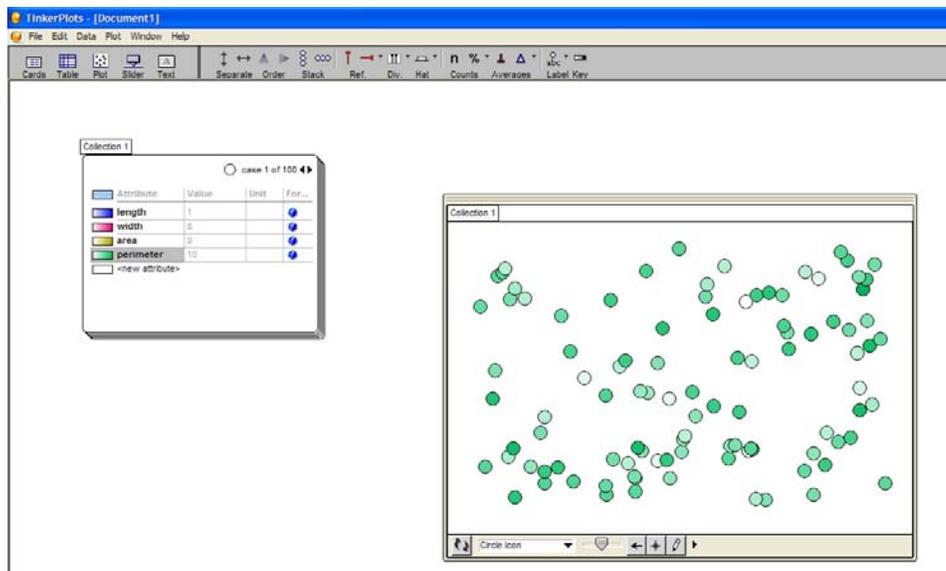


To see one hundred randomly generated lengths and widths (and their associated perimeters and areas) go to **Data** pull-down menu and select **New Cases**. Enter the number of cards you want to randomly generate. Let's select 100. Click ok and you will have 100 cards in your collection.

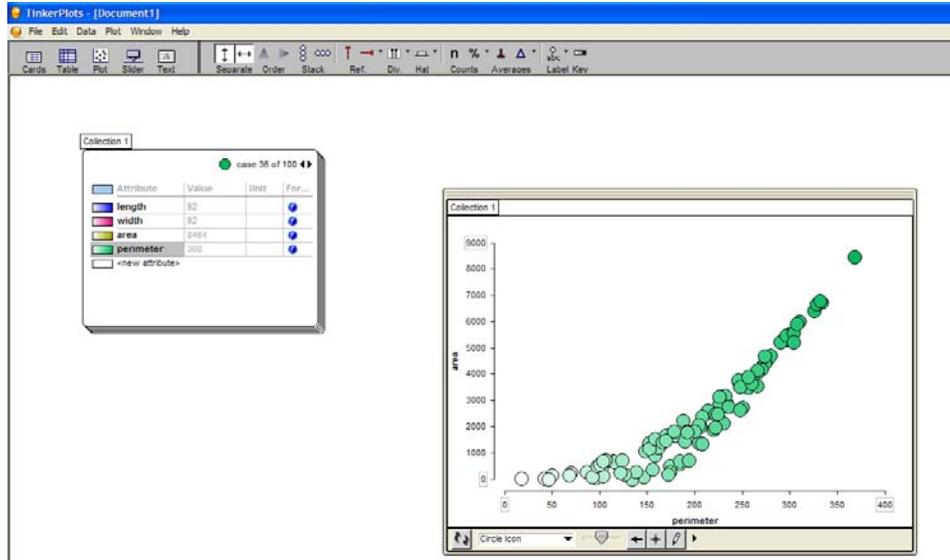
## Charting New Territories with *TinkerPlots*



Next pull down a plot into your work space.



Select the attributes you want to compare and explore the relationships!



Once the cards are created students can compare the relationship between the area and perimeter. They can also compare length and area to calculate the width of a specific case. This is just one of the many ways this program lets you explore area and perimeter.



*Kristen Hernandez has taught 6th grade math for Carolyn Park Middle School (Slidell, LA) for the last 5 years. She received the 2007-2008 Region II LACUE Elementary Teacher of the Year and was named Carolyn Park Middle School Teacher of the Year for 2007-2008.*



*Kay McInnis currently teaches 7th grade math for Monteleone Junior High School (Mandeville, LA). She has taught for 13 years.*