Developing an Understanding for a Direct Variation

In this investigation you will look at data about the length of large lakes to draw a graph and write an equation that states the relationship between miles and kilometers. You'll see several ways of finding the information that is missing from the table.

Lengths of Large Lakes of the World		
	Length in Miles	Length in Km.
Caspian Sea (Russia)	745	1199
Lake Superior (US)	383	616
Lake Victoria (Uganda)	200	322
Lake Michigan (US)	321	517
Lake Huron (US)	247	397
Lake Eyre (Australia)	130	209
Lake Winnipegosis (Canada)	152	245
Great Salt Lake (US)	75	121
Nicaragua (Nicaragua)	110	
Baikai (Russia)		636

- Draw a hand graph of the data in the chart. Let x represent the length in miles and y represent the length in kilometers.
- What pattern or shape do you see in your graph? Connect the points to illustrate this pattern. Explain how you could use your graph to approximate the length in kilometers of the Nicaragua Lake and the length in miles of the Baikai Lake.
- Make a scatter plot of the data in your calculator. Place the length in miles in L1 and the length in kilometers in L2.

- Use L3 to create a set of values for the ratio L1/L2. Explain what the values in L3 represent. If you round each value in L3 to the nearest tenth, what do you get?
- Use the rounded value you got in the last step to find the length in kilometers of the Nicaragua Lake. Could you also use your result to find the length in miles of the Baikai Lake?
- How can you change x miles to y kilometers? Using variables, write an equation to show how miles and kilometers are related.
- Use the equation you wrote in the last step to find the length in kilometers of the Nicaragua Lake and the length in miles of the Baikai Lake. How is using this equation like using a rate?
- Graph the equation on your calculator. Compare this graph to your hand-drawn graph. Why does the graph go through the origin?
- Trace the graph of your equation. Approximate the length in kilometers of the Suez Canal by finding when x is approximately 101 miles. Trace the graph to approximate the length in miles of the Baikai Lake. How do these answers compare to the one you got from your hand-drawn graph?
- Use the calculator's table to find the missing lengths for the Nicaragua Lake and the Baikai Lake.
- In this investigation you used several ways to find missing information: Approximating with a graph, calculating with a rate, solving an equation, and searching a table. Write several sentences explaining which of these methods you prefer and why.
- Since the ratio was the same for every pair of points, we say that kilometers and miles are directly proportional.
- The relationship between kilometers and miles is called a direct variation.
- It follows the form $y = kx$ where k is a constant of variation.