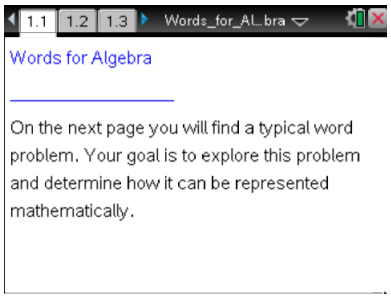
Words for Algebra
Student Activity

Name _____

Class _____

Open the TI-Nspire document *Words_for_Algebra.tns.*



In this investigation, you will explore the relationship between a real-life situation (a word problem) and the equations or expressions that model it. In addition, you will examine the types of numbers that can be used for the variables as dictated by the context of the problem. You will also represent the problem graphically, numerically, and analytically.

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Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

1. Consider this problem. Discuss with your table and the class how you could represent the relationship between the variables, **fruit**, **pencil**, and **cost**. Talk about how one purchases fruit and how this is different from how pencils are purchased.
   Give one set of values for the situation.

   Fruit = _____ Pencils = _____ Cost = _____

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2. a. This spreadsheet shows some possible scenarios related to the problem. In the first row, we see that Sally buys exactly one newton of fruit and two pencils for a total cost of $3.25. What is the meaning of the second row of values?

   b. Examine the rest of the rows, and determine several other possible situations. Fill these in on the spreadsheet in the TI-Nspire Document.
3. Could the value in the fruit column ever be a decimal (rational number)? Could the number of pencils ever be a decimal? Explain.

4. Could Sally ever spend the same amount of money for different quantities of fruit and pencils? Give a specific example of this.

5. What would happen if Sally bought the same number of pencils as she had newtons of fruit? Can this happen more than once. What pattern do you notice?

6. If Sally buys a set number of pencils, say five, and just increases the number of newtons of fruit she buys, what pattern do you see in the cost?

7. What if she buys 4.7 newtons of fruit and then increases the number of pencils that she gets, what pattern do you see in the cost? Write an equation to represent this situation.

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This is an expression that you could have used to determine the cost of your purchases: \$0.25*fruit + \$1.50*pencil. So if Sally has \$15 to spend, the equation becomes \$0.25*fruit + \$1.50*pencil = \$15.00.

8. Since Sally can only buy whole pencils, we could ask how much fruit she could get if she buys "x" number of pencils, with her \$15. Highlight the slider; and using the ▲ and ▼ keys, explore the patterns in the numbers where the ordered pair (6, 24) indicates 6 pencils and 24 newtons of fruit will cost \$15.

Note: The rule that is being graphed. **f1**(x) = 60 – 6*x. How is this the same as the equation: \$0.25*fruit + \$1.50*pencil = \$15.00? What is x? What is **f1**(x)? Where is the \$15.00?

9. What is the meaning of the point where the line appears to cross the x-axis (Pencil)? What about the point that the line crosses the y-axis (Fruit)?

10. What do all of the points on the graph represent, as they form the line?

11. Considering the limitations of the problem, give the Domain and Range of the function used to model the word problem.

12. Are there points on the line that are not solutions to the equation **f1**(x) = 60 – 6*x in the context of the problem [\$0.25*fruit + \$1.50*pencil = \$15.00]? Explain.

13. Develop an equation that would relate the number of newtons of fruit and the number of pencils Sally could buy for \$21.75.