



Overview

Students will write word problems based on whole numbers generated by the TI-15. The problems will use context clues to indicate which operation to use to solve each word problem. Students will analyze problems they create to determine the problem characteristics when using operations on whole numbers.

Grade Levels: 4–6




Concepts

- Computation
- Problem solving



Materials

-  TI-15 Explorer™ calculators
- *Math Curse*
Scieszka, Jon; Smith, Lane (New York, NY: Viking, 1995)
- Poster paper
- Markers
- 1-inch color tiles or paper squares
- Student activity sheet
- Using the TI-15 (page included in Teacher Notes)



Assessment

Throughout the activities, questions are included for formative assessment. Student work samples should be used as a check for understanding. Have the students use the TI-15 to show their calculations.



Introduction

Read the book *Math Curse* to the students. Have students describe the types of problems faced by the main character of the book.

Display the number 16. Tell students that this number is the answer to a problem. Have them determine problems that could have 16 as an answer. Record the problems as students give them.









Select one of the problems given, such as 4×4 . Give students a context for the problem such as, “*Timothy was making a drink coaster out of 1-inch tiles. The coaster was a 4-inch square. How many 1-inch tiles did Timothy need to make one coaster?*” Discuss with students how the operation of multiplication is reflected in the word problem. (This is an area problem. There are 4 groups of tiles each. Each group represents one row of tiles on the coaster.)

First Things First

For students not ready for open-ended problems, start with the *First Things First* activity page.

Presenting the Problem

1. Set the TI-15 to Problem Solving manual mode and enter the problem, $16 \ ? \ 2 = 3 \ 2$:

- Press .
- Press  to display the MODE menu.
- Press  to select MAN, then press .
- Press  to exit the MODE menu.
- Press 1 6  2  3 2 .

2. Discuss with the students how to determine the correct operation.

3. Show students this problem and discuss how it corresponds to the number sentence on the calculator.

Mrs. Fibonacci has 16 students this year. She wants to give each of her students two pencils. How many pencils does she need?

4. Discuss the problem on the *Creating Word Problems* activity page with the students. Make sure that the students understand the final product they are to create. Model for them the format for each problem: the number sentence created by the TI-15 with the question mark in place of the operator followed by the word problem created by the team.



Evaluating the Results

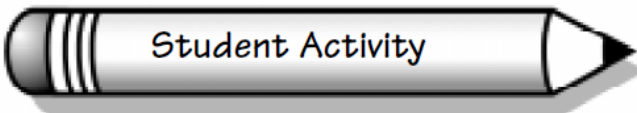
After the presentations have been made, have the students discuss the different problems presented. Have them look for similarities between problems using the same operation.

Have students generate a list of characteristics for each type of problem.

Discuss with the students the difficulty of choosing the correct operation when using the TI-15 to generate the problems. Ask the students if there were any specific problems the team had when trying to determine the correct operation.



SOLUTIONS



Name _____

Date _____

Creating Word Problems: First Things First



Focus: Identifying operations to solve problems.

The Problem: How do you decide which operation to use to solve an equation?

Working the Problem

1. Look at this problem: $14 \ ? \ 2 = 16$

Is the solution larger or smaller than the other numbers in the equation?

Answer: larger

Circle the operations that give you larger solutions when using whole numbers. \oplus - \otimes \div How do you know?

Possible answer: The operations require the adding of groups

Circle the operations that give you smaller solutions when using whole numbers. $+$ \ominus \times \div How do you know?

Possible answer: The operations require the separating of a group.

Use your TI-15 to try each of the operations with these numbers. Write the solutions in this table.

Press	Result
14 \oplus 2 Enter	Answer: 16
14 \ominus 2 Enter	Answer: 12
14 \otimes 2 Enter	Answer: 28
14 \div 2 Enter	Answer: 7

Which operations gave larger solutions? Answer: addition and multiplication



Which operations gave smaller solutions?

Answer: subtraction and division

Which operation gave you the solution you needed?

Answer: addition

To write a word problem for an addition equation, use similar objects for each set. The set of 14 and the set of 2 need to be combined in some way.

For example, *Juan had 14 marbles. He found 2 more marbles. How many marbles does he have now?*

The 14 marbles and 2 marbles are combined to make a total of 16 marbles.

Write your own word problem for this equation.









Answers will vary. Sample answer: Milo ate 14 raisins. Then he ate 2 more. How many raisins did Milo eat?

2. Look at this equation: $1,000 \div 50 = 20$

Is the solution larger or smaller than the other numbers in the equation?

Answer: smaller.

Use your TI-15 to try each of the operations with these numbers. Write the solutions in this table.

Press	Result
1000  50 	Answer: 1,050
1000  50 	Answer: 950
1000  50 	Answer: 50,000
1000  50 	Answer: 20

Which operations gave larger solutions? Answer: addition and multiplication

Which operations gave smaller solutions? Answer: subtraction and division

Which operation gave you the solution you needed? Answer: division



To write a word problem for a division equation, one number is the total number of objects, one number is the number of objects in one group, and one number is the total number of groups. The largest number is usually the number of objects. The objects are separated into equal groups.

For example, *Maria has 1,000 pencils in the school store. She wants to put them in boxes that hold 20 pencils each. How many boxes will she need?*

The 1,000 pencils are the objects. There are 20 pencils in each group. She will need 50 boxes, therefore 50 is the number of groups.

Write your own word problem for this equation.

Answers will vary.

- 3. Sometimes the solution number is between the other equation numbers.

Look at this equation: $150 \ ? \ 50 = 100$

Which operation will give a solution that is smaller than one of the numbers in the equation?

Answer: subtraction

Use your TI-15 to try each of the operations with these numbers. Write the solutions in this table.

Press	Result
150 50	Answer: 200
150 50	Answer: 100
150 50	Answer: 7,500
150 50	Answer: 3

Which operation gave the largest solution? Answer: multiplication

Which operation gave the smallest solution? Answer: division

Which operation gave you the solution you needed? Answer: subtraction



To write a subtraction equation, use similar objects. The largest number is separated into the part that is subtracted and the part that remains.

For example, *Mr. Wong had 150 stamps. He used 50 stamps on birthday cards for his friends. How many stamps does he have now?*

The 150 stamps are the largest number of objects. The 50 stamps on the birthday cards are the subtracted objects. The solution is the 100 stamps he has left.

Write your own word problem using this equation.









Answers will vary.

4. Look at this problem: $250 \div 50 = 12500$

Which operation do you think will give this solution? Why do you think so?

Possible answer: Multiplication; because the solution is much greater than both numbers in the equation

Use your TI-15 to try each of the operations with these numbers. Write the solutions in this table.

Press	Result
250  50 	Answer: 300
250  50 	Answer: 200
250  50 	Answer: 12,500
250  50 	Answer: 5

Which operation gave the largest solution? Answer: multiplication

Which operation gave the smallest solution? Answer: division

Which operation gave you the solution you needed? Answer: multiplication



Use objects and groups of objects in your word problem to write a multiplication equation. The solution will be the total number of objects.

For example: *Demetrius is in charge of the prizes for the school carnival. Each booth will need 250 small prizes. There are 50 booths at the carnival. How many prizes does Demetrius need to buy?*

The prizes are the objects. The booths are the groups of objects.

Write your own word problem for this equation.

Answers will vary.

Creating Word Problems

The Problem: Use the TI-15 to help find the numbers for problems, and then create the words for the problems.

In the second part of the activity, students will write word problems for given numbers, create posters for the problems, and then write explanations for the solutions to the problems. Answers will vary with individual groups.



Using the TI-15 Creating Word Problems

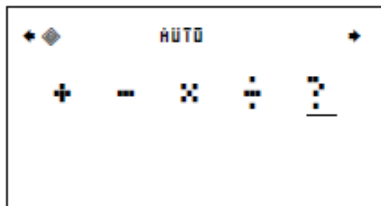
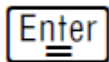
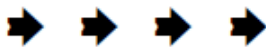
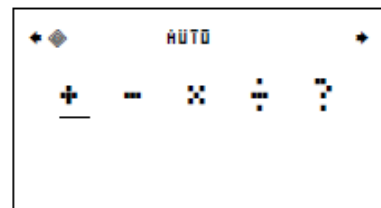
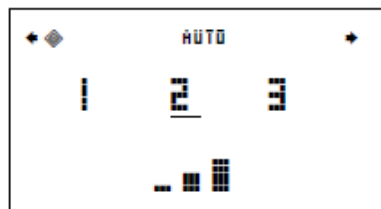
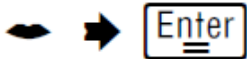
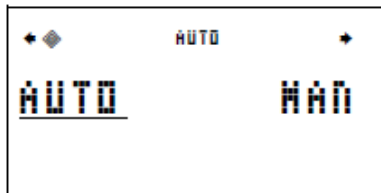
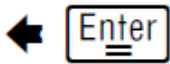
To set up the problems for the activity:



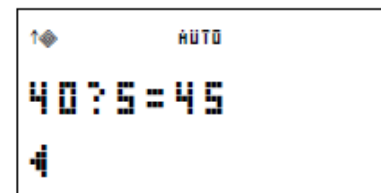
Mode



If auto is not underlined:



Mode



Problems are random.