Overview

Students will work in cooperative groups to solve a real-word environmental problem. Each group's final product will be a visual and oral presentation of the cost of reforestation. Each individual will write an explanation about the processes that the group used to solve the problem.

Grade Levels: K–5

Concepts

- Multiplication
- Division
- Decimals
- Fractions
- Measurement
- Money
- Problem solving

Materials

- TI-15 Explorer™ calculators
- Paper, pencils
- Poster paper
- Chart-sized grid paper (optional)
- Markers
- White board or display board
- Student activity sheet

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 Explorer™ to show their calculations.

Modified from Reforestation, from A World of Mathematics: Activities for Grades 4, 5, 6 using the TI-15

Introduction

Present the students with a problem such as:

> *I know there are about 25 students in each classroom in our school.*
> *How can I estimate how many students are in the school?*

Have the students discuss various ways of solving the problem. Have them determine what other information would be needed to solve the problem (the number of rooms with students).

Presenting the Problem

1. Have the students read the Reforestation problem page. Have them discuss how this problem is like the classroom problem they solved in the Introduction.
2. Review the four steps of problem solving with the students:
   - Understanding the problem
   - Making a plan
   - Carrying out the plan
   - Evaluating the solution
3. Discuss with students the parameters of the final product. Suggest that they consider their visual product as a way to sell their group's idea to Mr. Miller. The teacher will serve as "Mr. Miller" for the final presentations.
4. Groups who have difficulties starting may use the Things to Consider page. This page provides guiding questions to help students complete the problem-solving steps.
5. Have students present their ideas and visual display to the class and "Mr. Miller".

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Evaluating the Results

1. Write the parameters of the project on the board (See Reforestation problem page, *The Task* for the parameters.) Have the students in the class evaluate each presentation and visual display for each parameter.
2. After all of the presentations are complete, ask the students to compare the numbers used.

Questions for Students:

- *Did all groups use the same numbers?*
- *Why do you think this is so?*

3. Ask them to determine the reasonableness of the results.

Questions for Students:

- *Did each group answer the question?*
- *Did each group meet all of the parameters?*

4. Ask them to extend their thinking.

Questions for Students:

- *How could you decrease the cost of reforestation?*

5. Ask students to describe how they used the calculator to solve the problem.

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SOLUTIONS

Student Activity

Name _____

Date _____

Using the Calculator

Reforestation: Multiplying Decimals

Use the TI-15 calculator to solve this problem:

1 Hildegarde's mother bought 3 cans of peaches at 89¢ a can. How much did the peaches cost?

Press	The display shows:
⊡ 89 ⊠ 3 Enter	Answer: 2.67

Does the answer make sense? How do you know?

Possible answer: Yes; If I round the cost of the can up to $1 the estimated total would be $3. The actual answer is a little less than the estimate.

2 Stefan's mother bought 5 cans of green beans at 49¢ a can, 2 boxes of facial tissues at $1.17 each, and 3 candy bars at 38¢ each. How much did she spend?

Press	The display shows:
⊡ 49 ⊠ 5 ⊞ 1 ⊡ 17 ⊠ 2 ⊞ ⊡ 38 ⊠ 3 Enter	Answer: 5.93

Does the answer make sense? Does the calculator multiply or add first? How do you know? How could you use the parentheses to make the problem easier to read? Do the parentheses change the answer? How do you know?

Possible answer: Yes; The calculator multiplies first because that operation is written first. I can use parentheses to group the operations. The parenthesis will not change the answer.

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3 Anna Maria is having a garage sale. She sold 27 paperback books at 5¢ each. How much did she make on the paperback books?

Press	The display shows:
[.] 05 [×] 27 [Enter]	Answer: 1.35

Why do you need to enter a zero before the five? What would happen if you entered [.] 5 [×] 27 [Enter]? How are the two answers alike? Which answer is more reasonable? How do you know?

Possible answer: The zero give the decimal a value of 5 hundredths. If I did not include the zero then it would have a value of 5 tenths. The answers have the same digits, but the decimal is moved one place to the right when the zero is not included in the multiplication. The answer 1.35 is more reasonable because 0.5 is such a small number.

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