EXPLORATIONS™

Unit 4

Putting Things in Place

Concepts

- Place value

Materials

- TI-10
- Book: *How the Second Grade Got $8,205.50 to Visit the Statue of Liberty*
- Chart paper
- Transparency
- Marker
- Set of number tiles, 0-9
- Place value boards

Calculator Connections

- Operations [+] [−] [×] [÷]
- Memory [M+] [M−] [MR/MC]
- Place value [■.]
- Fix [Fix]

Suggested Age/Grade Level

- Ages 7-9
- Second grade

Overview

After a discussion about raising money for a trip, special event, or project and what would be entailed in such an undertaking, read the book *How the Second Grade Got $8,205.50 to Visit the Statue of Liberty* written by Nathan Zimelman and illustrated by Bill Slavin (Albert Whitman & Company, 1992) to the class. Students take a closer look at the bookkeeping involved and follow the actions of the treasurer using the TI-10. Students investigate the value of the digits in $8,205.50 and determine the number of thousands, hundreds, tens, ones, and even the number of dimes and pennies. The concept is then extended to additional situations.

Assessment

Assessment should be done through student work samples and teacher observation. The following items should be considered.

Does the student...

- Know where to place the decimal when writing amounts of money?
- Add the expenses together?
- Subtract the expenses from the money collected to determine profit?
- Make reasonable estimates?
- Make coin combinations for a specified amount?
- Read numbers beyond 100 correctly?
- Identify the value of a digit by its position in the number?
- Communicate his or her thinking to his or her partner? to the class?

Activity A: Connecting Literature and Mathematics

1. Ask the class if they could take a class field trip, what they would decide to do and where they would go. Decide on one destination.

Questions to ask:

- How would the class pay for such an outing? (List responses on the board or chart paper.)
- What must be considered when suggesting activities to raise money? What are expenses and would there be any involved?
- Who might you need to get help from in order to carry out the plan?
- What does the word *profit* mean?
- How do you use the expenses to determine the profit?
- What skills do you think would be needed to raise money?

2. Tell students you have a story about a group of second graders who want to visit the Statue of Liberty.

Questions to ask:

- What is the Statue of Liberty?
- Where is it? How could the class get there?

3. Before beginning the story, tell the class to listen to the activities in the book and think about the expenses and profits of the activities. Read *How the Second Grade Got $8,205.50 to Visit the Statue of Liberty* to the entire class.

4. Remind the students that Susan Olson was the treasurer and reporter in the story. She was responsible for keeping accurate records of the second grade's expenses, collection, and profits in their quest to raise money.

Vocabulary:
About (rounding)
Combination
Decimal
Digit
Expenses
Hundred
Place Value
Profit
Round
Thousand
Transaction

Prerequisite Skills:
Application of addition and subtraction; Decimal use in monetary amounts; Counting groups of coins; Number recognition; and Familiarity with place value.

Teaching Tip:
Point out that there is no dollar sign on a the TI-10, so students must remember that they are working with money. Emphasize the importance of decimal placement and what it signifies.

Activity B: Money with the TI-10

In this activity students calculate and record the money collected and spent in the story *How the Second Grade Got $8,205.50 to Visit the Statue of Liberty*.

The Paper Drive

1. Prepare students for entering money on the TI-10 by asking the following questions.

- How is 10 cents shown on the TI-10?

- How is 25 cents shown?

- What would 50 cents look like?

2. Reread the story (stopping at each money raising activity), identify the transactions, and illustrate the bookkeeping on a transparency or chart paper.
3. Press ON to begin.
4. Press AC to clear anything previously stored in memory.
5. Press Clear. The screen is blank (except for the cursor), the memory is clear, and you are ready to get started.

Begin reading about the paper drive and have students enter the information into their TI-10.

6. Press 3 0 = M+ to store the $30.00 collected from the paper drive into memory.

Add the paper drive expenses.

7. Press 2 to note the amount spent on wagons.
8. Press + 1 0 for comic book retrieval.

Example:
Money Collected:
$30

Expenses:
$ 2.00 wagons
10.00 comic books
5.00 parking ticket

Total Expenses:
$17.00

Net profit:
$30.00-17.00=$13.00

9. Press [+] [5] to include the cost of the parking ticket.
10. Press [=] to find the total expenses.
11. Press [M−] to subtract the expenses from the amount collected (profit).
12. Press [MR/MC] to see the net profit.

Additional questions to ask:

- How much did each younger brother and sister get for lending their wagons? ($2.00 ÷ 5 = .40)
- What are some coin combinations that make 40 cents.

Continue working through each of the money making activities in the story. Check Susan Olson's math to see if she was correct and document the class results on a large piece of chart paper.

Activity C: Place Value Part I on the TI-10

How Many Thousands in $8,205.50?

Take the story a little farther. Assume the bank paid the reward money to Susan by check. Susan combined the check and the other money earned and deposited it all in the bank. The class wanted to see how much money they had, so they all took a field trip to the bank.

Question to ask:

- How much money did the class earn? ($8,205.50)

Billy wondered how many thousands of dollars were in the money the class earned. Use the TI-10 to help find the answer to his question.

1. Reset the TI-10.
2. Press ◈ (Auto).
3. Press [8] [2] [0] [5] [·] [5] [0] [■].

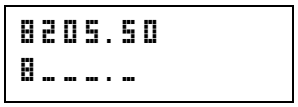
Resetting the TI-10:
Press (On) to wake it up if it has turned off.

Press (AC) if you need to clear the memory.

Press (Clear) to clear the display.

4. Press 1000.

The TI-10 displays (flashes):



There are eight thousands of dollars in the money the class earned.

How Many Hundreds in $8,205.50?

The class wanted to see what that much money would look like, but the bank teller said she did not have any $1,000 bills. The largest bills she had were $100 dollar bills.

Question to ask:

- How many $100 bills would the teller need to show the class to represent the number of hundreds in $8,205.50?

1. Turn to your partner and estimate how many $100 bills that might be. Be prepared to share your reasoning with others.
2. Press 100. to find the number of $100 bills in $8,205.50.

The TI-10 displays:

There are 82 hundred dollar bills in $8,205.50.

How Many Tens in $8,205.50?

The bank manager asked the teller to put the $100 bills in the vault. He told her to use bills with a lower value to show the class their money.

Questions to ask:

- How many $10 bills did the teller need? Estimate your answer.

Check to see how accurately you estimated using the TI-10.

Resetting the TI-10:
Press (On/Off) to wake it up if it has turned off.

Press (AC) if you need to clear the memory.

Press (Clear) to clear the display.

Questions to ask:

- What key will help you find the number of $10 bills in $8,205.50? ([10.])
- How many $10 bills are needed?
- What else would the class need to see all of their money? (accept all possibilities)
- Would it be a bigger stack of money if it were all $1 bills? Why do you think that?

How Many Ones in $8,205.50?

Questions to ask:

- Which stack of money would be taller: 820 ten dollar bills or 8,205 one dollar bills?
- Which stack is worth more?
- What other money needs to be put with the $1 bills? (50 cents) How could this be done with one coin? two coins? and so forth.

Instruct students to find the number of $1 bills in $8,205.50. (press [1.])

Question to ask:

- How many $1 bills are in the money the children earned?

How Many Dimes in $8,205.50?

Questions to ask:

- If a bag of dimes held $8,205.50, how many dimes would be in the bag?
- What key would be used on the TI-10 to determine the number of dimes in the bag? ([0.1])
- How do you read the number of dimes in $8,205.50?
- Is that still $8,205.50?

If you wish to determine the amount of pennies, follow the same procedure and press [0.01].

Practice using the place value feature by creating additional situational problems for the class.

Resetting the TI-10:
Press (On/Off) to wake it up if it has turned off.

Press (AC) if you need to clear the memory.

Press (Clear) to clear the display.

How Many are in $765.75?

Our school cafeteria collected $765.75 on Tuesday. Questions to ask:

- How many $100 bills are in $765.75?
- How many $10 bills are in $765.75?
- How many $1 bills are in $765.75?
- How many dimes are in $765.75?
- How many pennies are in $765.75?

How Many are in $3,091.82?

A PTA fund-raiser brought in a total of $3,091.82 toward new playground equipment.

Ask questions similar to other questions asked in the activity. Be sure to address the thousands place value.

Activity D: Place Value Part II on the TI-10

The treasurer of the PTA decided to use the number of bills and coins represented by the digits in $3,091.82.

1. Reset the TI-10.
2. Press ◈ Auto and 3 0 9 1 . 8 2.
3. Press ■.

Question to ask:

- The largest digit is 9. What did she need 9 of?

4. Press 9.

The TI-10 displays:

```
3091.82
__9_.__
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```
3091.82
9->10
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Nine $10 bills are needed.

Question to ask:

- What bill or coin was not needed?

Teaching Tip:
After you clear $765.75 and enter $3,091.82 into the TI-10, you will need to press the key ■ to continue working.

5. Press [0]. The display indicates the 0 is in the hundreds place. No $100 bills are needed.

Continue to ask questions about the remaining digits. Require the students to use the TI-10 to identify the value of the digit's place.

Create other situations where students apply the place value feature. Students can make up a number and have classmates predict the value of each digit's place and then check it using the TI-10.

> ***Teaching Tip:***
> When a digit is repeated in a number, pressing the digit key once will show the digit's place furthest on the right. Pressing the key twice will indicate the place of the second time that digit is used from the right. Three times shows the third, and so forth.

Conclusion

Pass out a set of number tiles to each student. Have students construct, read numbers, and identify the values of digits by following oral directions. Students may use a place value chart (located at the end of the unit) in conjunction with the number tiles to assist in answering the questions.

Example One

Show the 6 tile. Put the 8 tile to the right of the 6. Put the 4 tile to the left of the 6.

Questions to ask:

- What number did you make? (468)
- What does the 8 represent? (8 ones)
- How many hundreds are there? (4)
- What digit is in the tens place? (6)
- How many tens are in 468? (46)

Example Two

Using the number tiles 0 through 9, instruct students to make a four-digit number. Once they have completed this task, have the students move/replace the tiles based on the following instructions:

- The smallest odd digit is in the place with the highest value.
- The largest digit is in the place with the lowest value.
- The digit that shows the number of sides on a triangle is in the hundreds place.

- The digit that shows the number of pennies in a nickel is in the tens place.

What is the number you made? (1,359)

Students may create their own number riddles for others to solve.

Extension

1. After resetting the TI-10, have students explore the effect the [Fix] key has on a number. Use keys on the left side of the TI-10 below [Fix] followed by [=] or [Enter]. Encourage students to use what they know about place value when describing the results of these keystrokes.
2. Use the table located at the end of this activity to show the different combinations of coins to make 40 cents, the amount each younger brother and sister received for lending their wagon. Begin filling in the chart with students and then let them work in cooperative groups to complete the chart.

Questions to ask:

- What pattern do you see?
- How will you know if you have found all the combinations?
- What can you use to help find the different combinations?
- How might you check your work to make sure all the coins add up to 40 cents?

Sample Chart:

Quarters	Dimes	Nickels	Pennies	Total
1	1	1		40 cents
	4			40 cents
	3	2		40 cents

Place Value Chart

Thousands	Hundreds	Tens	Ones

Number Tiles

0	1	2	3	4

5	6	7	8	9

Name:_____

Date: _____

Forty Cents Table

Quarters	Dimes	Nickels	Pennies	Total