EXPLORATIONS

Activity 6

Overdue Fines

Concepts/Skills

- Multiplication
- Problem-solving

Materials

- TI–15 calculators
- "Overdues" from *A Light in the Attic* by Shel Silverstein; HarperCollins, Publishers, New York; ISBN 0-06-025673-7
- Chart paper
- Markers
- Paper, pencils

Overview

Students will work in cooperative groups to solve a real-world problem: comparing overdue fines at different libraries.

Focus

Read to the students the poem "Overdues" by Shel Silverstein. Discuss overdue fines with them and how they are calculated per day. Ask the students:

- *If the library only charged a penny a day, how much do you suppose the fine will be?*
- *How can you find out?*

Presenting the Problem

1. Review the four steps of problem solving with the students:
   - understanding the problem
   - making a plan
   - carrying out the plan
   - evaluating the solution
2. Have the students read *The Problem* page and paraphrase the problem. Make sure the students are clear on what the problem asks.
3. Discuss with students the information on *The Problem* page. Make sure they understand the information on the chart. Help them determine how they can find the same information about their own library.

4. If groups have difficulty with the problem, use the *Things to Consider* page. This page provides guiding questions to help the students complete the problem-solving steps.
5. In the presentation, students should show a completed display. The display should include a graph with all appropriate labels.

Evaluating the Results

1. After the presentations are made, have students examine the various solutions presented.
   - *How are the presentations similar?*
   - *How are the presentations different?*
2. Ask them to compare the numbers used.
   - *Did all groups use the same numbers?*
   - *Why do you think this is so?*
3. Ask them to determine the reasonableness of the results.
   - *Did each group answer the question?*
   - *Do the numbers used make sense?*
   - *Did all of the groups consider all of the variables?*

Additional Information

The web sites for the libraries used are as follows:

Boston Public Library	www.bpl.org
Boulder Public Library	bcn.boulder.co.us/library/bpl/home.html
Calgary Public Library	public-library.calgary.ab.ca
Pelham Public Library	www.pelham-nh.com/library
Seattle Public Library	www.spl.lib.wa.us

Student Activity

Name _____

Date _____

Activity 6

Overdue Fines

The Problem: How much would the overdue fine be in different cities?

What if a librarian really charged the narrator of the poem for his overdue book? How much would the fine be?

The Facts

- Overdue book fines start the day after a book is due.
- Fines are different from library to library.
- The amount of time a book can be kept also changes from library to library.
- Some libraries have a maximum fine that can be charged for an overdue book.
- The following chart lists some facts about overdue fines at different libraries.

Library	Length of check out	Overdue fines	Maximum fine
Boston Public Library Massachusetts, US	21 days	$.05 per day for adult books $.02 per day for children's books	No maximum
Boulder Public Library Colorado, US	2 weeks	$.10 per day No fines on children's materials	No maximum
Calgary Public Library, Alberta, Canada	3 weeks	$.30 per day adult books $.15 per day young adult books $.05 per day children's books	No maximum
Pelham Public Library, New Hampshire, US	2 weeks	$.10 per day	$5.00
Seattle Public Library Washington, US	3 weeks	$.10 per day	$4.00
Your Library	???	???	???

The Task

1. Your team will create a poster showing the following information:
   - The number of days the book was overdue
   - A chart showing the information from each of the libraries including your own
   - A graph showing the amount of the overdue fine at each of the libraries on the chart
2. Each person on the team will write an explanation of the team's solution. This explanation will answer these questions:
   - How did your group calculate the number of days the book is overdue? How do you know the answer is accurate?
   - Were the fines at the libraries the same or different? Why do you suppose that is true?
   - What kind of graph did your team create? Could another graph have been used? How do you know?

Things to Consider

Understanding the Problem

Read the *Overdue Fines Problem* page, and then answer these questions.

- How many days are there in a year? How many days in a leap year? How often do leap years occur?
- When a fine is listed as "per day," does that include the days the library is closed? Why do you think so?
- What is a maximum fine?

Making a Plan

Before you make your plan, answer these questions.

- Could two different libraries charge the same fine for Uncle Henry's book? Why do you think so?
- How does a librarian calculate an overdue fine?
- How many days will it take to reach the "maximum fine" at those libraries that have it?

Carrying Out the Plan

Before you begin planning your presentation, answer these questions.

- What does your presentation have to include? Do you have all of the necessary information? What other calculations do you need to make?
- How will you make your graph? What kinds of graphs would help show the answer to the question? What information will the graph show?
- What other information needs to be displayed?

Evaluating the Solution

- Did you answer the question? How do you know?
- Does your answer make sense? If a library does not have a maximum fine, will the fine be more or less than at a library with a maximum fine?
- If two libraries charge different fines per day, will the total fine be different?
- Did everyone on the team write an explanation?

Using the Calculator

Name _____

Date _____

Overdue Fines: Basic operations

Use the calculator to solve the following problems.

1. Bill, Roland, and Refugio all save baseball cards. Bill has 73 cards, Roland has 125 cards, and Refugio has 209 cards. How many cards do they have together?

Press:	The display shows:
73 [+] 125 [+] 209 [Enter]	

How do you know your answer is correct?

2. Alicia has 182 baseball cards. She gives 39 cards to Refugio. How many cards does she have now?

Press:	The display shows:
182 [−] 39 [Enter]	

How do you know your answer is correct?

3. Danyel's Explorer troop is going on a camp out. They are taking 17 tents. Each tent needs 9 stakes. How many stakes should Danyel pack?

Press:	The display shows:
17 [×] 9 [Enter]	

How do you know your answer is correct?

4. Tommy is packing teddy bears for the Handy Dandy Toy Company. He has 235 teddy bears to pack. Each box holds 8 teddy bears. How many full boxes will he have when he is finished packing? Will he have any teddy bears left over? How do you know?

Press:	The display shows:
235 [Int÷] 8 [Enter]	

How many full boxes does that make? What happens to the remainder?

Press:	The display shows:
235 [÷] 8 [Enter]	

How is this different from using the [Int÷] key? Which answer is easier to use for this problem? Why do you think so?