

Piggy Banks

Piggy Banks

Click [here](#) to download lesson.

To see a video clip of this lesson being implemented in a third grade classroom go to [The Piggy Bank Problem - Third Grade](#).

Summary	The whole lesson revolves around a multipart story problem involving changes in two quantities over several days of a week. The initial quantities are equal yet unknown. Then transformations are applied to the quantities. Students are asked to compare the quantities throughout the week even though only their relative relationship can be determined.
Goals	<ol style="list-style-type: none">1. Students will use some of the strategies such as reversing the steps and shortcuts that they have been developing over the last few weeks to determine values partially unknown.2. Students will compare the results of transformations on each one of the sub-problems.3. Students will reflect on the preservation of equality and of differences despite transformations on the two amounts.4. Students will develop ways to represent the events and relationships in the problem.
Materials	Overheads, Handouts
Keywords	Contextualized Situations Full Class Discussion Function Representations Interpretation of Algebraic Expressions Interpretation of Stories Number Lines Production of Algebraic Expressions Production of Equations Production of Tables Representing Variables

	Small Group Work Solving Equations
Note	This lesson may need to be split into two days, depending on students' progression. If the lesson is split, give one page of the homework for each day.

Introduction:

Show the problem quickly to students via the overhead. But then cover up all parts of the story except the one referring to Sunday. As the students progress in representing the story, move on, one day at a time. It may be helpful to remind the students, sooner or later, that a letter can represent unknown amounts. In some classes, students will do this on their own, depending on discussions from prior classes.

Activity Plan:

Representing and Solving the Problem

1. Reading and discussing the problem [Whole Class]

Quickly show the problem to students using the first overhead (page 1). Then cover up all parts of the story except that one referring to Sunday.

Mary and John each have a piggy bank with money in it.

On Sunday, they both have the same amount saved in their piggy banks.

On Monday, their grandmother comes to visit and gives \$3 dollars to each of them.

On Tuesday, they go together to the bookstore. Mary spends \$3 on Harry Potter's new book. John spends \$5 on a calendar with dog pictures in it.

On Wednesday, John washes his neighbor's car and makes \$4. Mary also made \$4 babysitting. They run and put their money in the piggy banks.

Ask a child to read the part that refers to Sunday and ask the children:

Does Mary have more money than John?

Does John have more money than Mary?

Do they have the same?

How do you know?

Ask a child to read the part that refers to Monday and ask the class to discuss:

Does Mary still have the same amount of money as John?

How do you know?

What is the difference between Mary and John's amounts on Monday?

What is the difference between the amount they had on Sunday and the amount they had on Monday?

Ask a child to read the part that refers to Tuesday and ask the class to discuss:

Do they still have the same amounts? How do you know?

What is the difference between Mary and John's amounts on Tuesday?

What is the difference between the amount Mary had on Sunday and the amount she had on Tuesday?

What is the difference between the amount John had on Sunday and the amount he had on Tuesday?

Ask a child to read the part that refers to Wednesday and ask the class to discuss:

Do they still have the same amounts? How do you know?

What is the difference between Mary and John's amounts on Wednesday?

What is the difference between the amount Mary had on Sunday and the amount she had on Wednesday?

What is the difference between the amount John had on Sunday and the amount he had on Wednesday?

2. Representing the problem on paper using the N-number line and algebra notation [Group Work]

Distribute the handout (page 2) and display the corresponding overhead (also page 2) and ask the children to represent what happened on each day. As they make progress with each day, show more information.

3. Discussing children's representations [Whole Class]

Choose a few volunteers to explain their work.

4. Representing the problem using the N-number line and algebra [Whole Class]

If there is time left, present the overhead on page 3 and, together with the children represent the problem on the N-number line and complete the table with algebraic expressions to represent the amounts in the piggy banks.

For each row of the table, ask the children:

Does Mary have more money than John?

Does John have more money than Mary?

Do they have the same?

How do you know?

What is the difference between Mary and John's amounts?

What is the difference between the amount they had on Sunday and the amount they have now?

Then ask children to discuss how the story fits the algebraic representation using the overhead on page 4.

5. Homework (Page 5 & 6)

It includes problems somewhat similar to the problem given in the class.

Mary and John each have a piggy bank with money in it.

On Sunday, they both have the same amount saved in their piggy banks.

On Monday, their grandmother comes to visit and gives \$3 dollars to each of them.

On Tuesday, they go together to the bookstore. Mary spends \$3 on Harry Potter's new book. John spends \$5 on a calendar with dog pictures in it.

On Wednesday, John washes his neighbor's car and makes \$4. Mary also made \$4 babysitting. They run and put their money in the piggy banks.

**Overhead and Handout: Representing the Problem,
Day by Day (Page 2)**

Name: _____ Date: _____

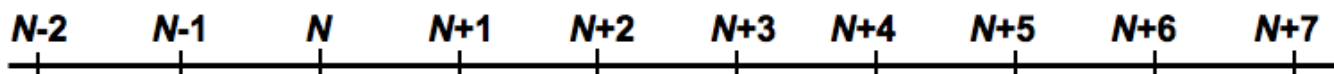
Mary and John each have a piggy bank with money in it.
On Sunday, they both have the same amount saved in their piggy banks.

On Monday, their grandmother comes to visit and gives 3 dollars to each of them.

On Tuesday, they go together to the bookstore. Mary spends \$3 on Harry Potter's new book. John spends \$5 on a calendar with dog pictures in it.

On Wednesday, John washes his neighbor's car and makes \$4. Mary also made \$4 babysitting. They run and put their money in the piggy banks.

Overhead: Let's Represent the Problem Using Algebra
(Page 3)



At the end of....	Mary	John
Sunday		
Monday		
Tuesday		
Wednesday		

Overhead: Telling the Stories in the Notation

(Page 4)

Place a circle around the part of the story that refers to the totals on **Sunday**.

Place a square around the part of the story that refers to the totals on **Monday**.

Place a line under around the part of the story that refers to the totals on **Tuesday**.

And place a line over the part of the story that refers to the totals on **Wednesday**.

Mary

$$k + 3 - 3 + 4$$

John

$$k + 3 - 5 + 4$$

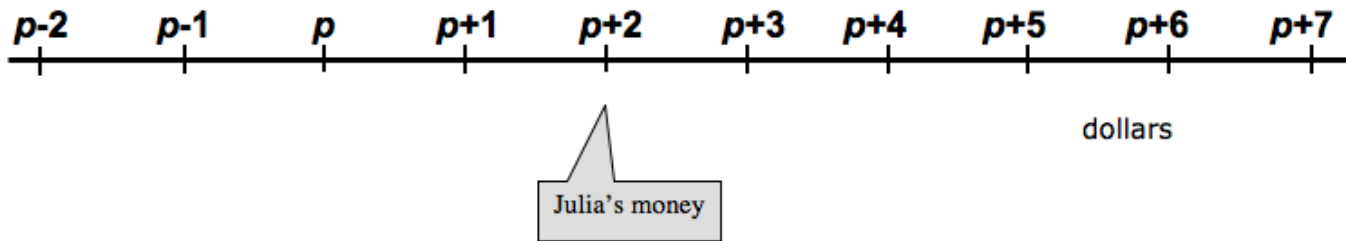
Is the change that happened on Monday the same as the total on Monday? Why or why not?

Overhead and Homework: Comparing Unknown Amounts (Page 5)

Name: _____ Date: _____

Show the following problem on the number line, solve it and show the difference between Julia and Daniel's amounts of money.

Julia has some money. (Let's say she has $p+2$ dollars)
 Julia has 3 dollars more than Daniel.
 Show how much Daniel has.



Give some examples of possible values in the table below

If p equals...	Julia has $(p+2)$...	Daniel has...
\$7.00		
\$1.00		
\$4.00		

Overhead and Homework: Hidden Treasure

(Page 6)

Name: _____ Date: _____

Solve the following problem. Show clearly how you solved it.

Janice had \$15.00.

She found J dollars in her winter jacket.

She then spent \$4.00

After spending it, she had \$17.00 left.

How much money did Janice find in her jacket?