

# Multiple Number Lines

## Multiple Number Lines

Click [here](#) to download lesson.

Summary	Students continue to learn that two partial changes that start at different points on the number line are equivalent. At the end, they will work with notation for variables ( $N + 5 - 3$ or $N + 2$ ).
Goals	<ol style="list-style-type: none"><li>1. To move between different story problems involving the same total change.</li><li>2. To focus on the generality of an additive change despite specific starting points.</li><li>3. To understand that different stories can be represented in similar ways.</li><li>4. To represent verbal problems as arrow/hops, vectors, function tables, and number sentences.</li><li>5. To discuss generalizations and to prepare students for the introduction of <math>N</math> as the starting point on an <math>N</math>-number line.</li></ol>
Materials	Overheads, Handouts
Keywords	Contextualized Situations Full Class Discussion Interpretation of Stories Negative Numbers Number Lines Production of Algebraic Expressions Production of Tables Representing Variables Science Context Small Group Work

## Activity Plan:

### Solving Different Problems Involving Same Changes

#### 1. Representing the problems [Group Work]

Distribute the first handouts (page 1) and display the corresponding overhead (also page 1). Ask each student to choose a number between  $-5$  and  $+8$  as his/her starting point. Then ask them to represent the problem on the number line, solve the problem, and find the difference between the initial and the final amounts. Each problem will thus have a different starting point but will involve the same changes.

The problem is:

It was \_\_\_ degrees outside.  
Then the temperature rose by 5 degrees.  
Later it dropped 3 degrees.  
What was the temperature at the end?

#### 2. Comparing the problems [Whole Class]

Call three or four volunteers and ask them to show their work on the overhead projector. Compare the arrows the children drew on the number lines and ask why they look the same, even though the problems were different. You may want to copy each volunteer's solution on number lines printed on overheads and superimpose them to show that, regardless of the starting point, the changes were the same. Use the overhead on page 2 to show the two changes with arrows and the overhead on page 3 to show the overall change as a vector. You will find multiple copies of the number lines, the arrows, and the vectors at the end of this lesson plan (pages 7-10).

Register all the starting points chosen by children and their computations and solutions on the table on page 4's overhead.

If there is time left, ask them to suggest how we could represent any starting point. If necessary, suggest  $N$  as representing any number. Then ask the children to suggest how to write the number sentence, starting with  $N$ .

If time is too short to introduce the use of letters as variables, bring the table produced during this class to the next class and explore the use of letters to represent variables.

#### 3. Homework (Pages 5 & 6)

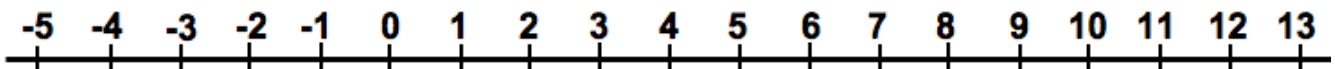
It is very similar to the problem given in class.

**Overhead and Handout: A Problem about Temperature  
(Page 1)**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

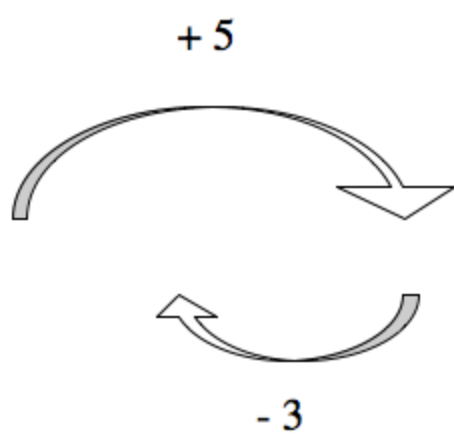
It was \_\_\_\_ degrees outside.  
Then the temperature rose by 5 degrees.  
Later it dropped 3 degrees.  
What was the temperature at the end?

***On the number line, show what happened:***



***Write a number sentence to show the process of change.***

***What is the difference between the number you started with and the final result?***





<b>Student</b>	<b>Initial value</b>	<b>Number sentence</b>	<b>Final value</b>	<b>The difference</b>



## Overhead and Homework

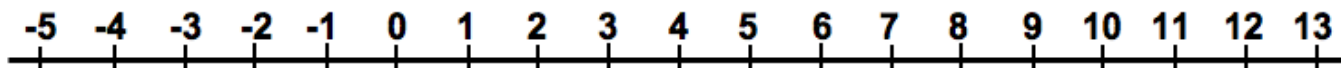
(Page 5)

Name: \_\_\_\_\_ Date: \_\_\_\_\_

For each problem: ① show, on the number line, what has happened, ② write a number sentence to represent the process of change in the problem, and ③ find the difference between the starting point and the final result.

### **Problem 1:**

It was -2 degrees outside. Then the temperature rose by 7 degrees. Later it dropped 3 degrees. What was the temperature at the end?

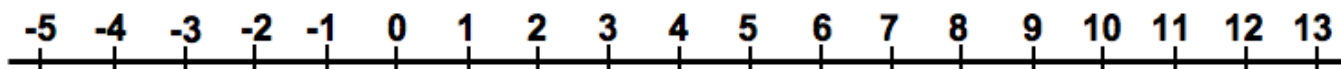


**Number sentence representing the process of change:**

**The difference between the starting point and the final result:**

### **Problem 2:**

Daisy had 7 dollars. Her mother gave her 5 dollars. She then spent 3 dollars to buy candies. How much money did she end up with?



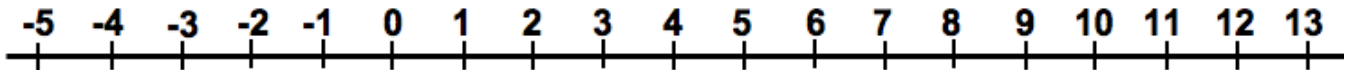
**Number sentence representing the process of change:**

**The difference between the starting point and the final result:**

Name: \_\_\_\_\_ Date: \_\_\_\_\_

**Problem 3:**

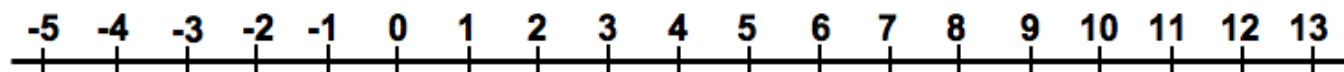
Geronimo's plant was 4 inches tall. After one week it grew by 5 more inches. A bug then ate 5 inches at the top of the plant. How tall was the plant at the end?

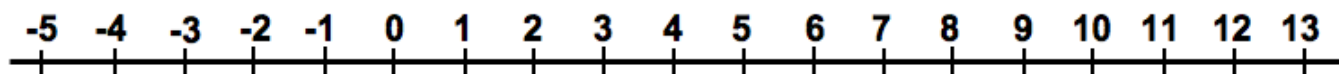
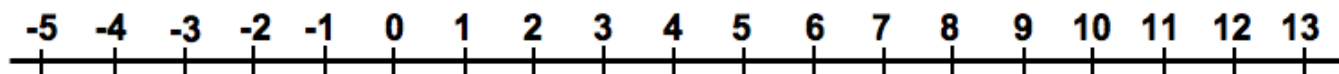
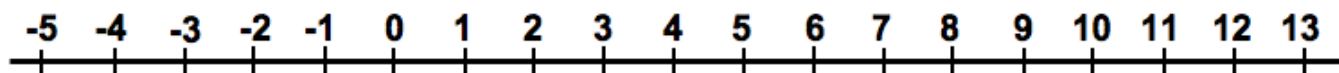


**Number sentence representing the process of change:**

**The difference between the starting point and the final result:**







+5



-3

+5



-3

+5



-3

