

What's Left in the Bucket?

Purpose

Students will work with different models to add and subtract positive and negative integers.

Materials

For the teacher: chalkboard, chalk, overhead projector, 10 yellow and 10 red transparent counting chips, overhead markers

For each pair of students: 10 red and 10 yellow chips or 20 two-sided chips, white paper, lined paper, pencil, copy of Black Line Master (BLM) *What's Left in the Bucket?*

Activity

A. Introduction

1. Tell students they are going to be learning to add and subtract positive and negative integers.
2. Draw on the chalkboard a long number line, numbered from -6 to $+6$ (the number line needs to be long enough so that you can demonstrate walking the length of it).
3. Select a student to stand in front of the origin on the number line, facing to the right (the positive side of the number line).
4. Tell students that positive numbers move the student forward, negative numbers move him/her backward, an addition sign tells the student to keep the same direction, and a subtraction problem changes the direction the student is facing.
5. Provide the following example, and have the student volunteer work the problem by walking the number line: $2 + 3$.
[Student starts on "0," facing right, and moves two spaces forward. Student moves three spaces forward and stops at positive 5.]
6. Give another student the following example: $1 + -3$. [Student starts on "0," facing right, and moves one step forward. Student moves three spaces backward and stops on -2 .]
7. Give the following example to a third student: $4 - (-2)$. [Student starts on "0," facing right, and moves four spaces forward. Student should stay on positive 4 but turn to face left. Student moves two spaces backward. Student should now be at positive 6.]
8. Repeat this process until students understand how the procedure works with a variety of problems.
9. Inform students that they will now use another method. Hand out red and yellow chips and blank paper to each pair of students, and direct students to draw a large bucket on their blank paper.

(continued)

EXTENDING
THE



ACTIVITY

Relate the concept of positive and negative numbers to the rise and fall of temperatures during a certain period of time. Have students research temperature patterns by looking through old newspapers. Ask students to create a table using positive and negative numbers to represent the rise and fall of temperatures. Use students' work to create a classroom display.

INCORPORATING



TECHNOLOGY

Have students convert the exercises on the BLM to addition problems. Show students how to enter the numbers from these problems into a spreadsheet program. Help students create a rule for adding the two numbers within the software program.

Standards Links
6.1.1, 6.3.7

Activity (continued)

10. Tell students they are going to be placing their chips in the bucket to represent different integers so that they can begin to add and subtract. Inform them that yellow chips will represent positives and red chips represent negatives.
11. Model with students some ways of representing 0 in the bucket (e.g., three yellows, three reds; two yellows, two reds, etc.)
12. Tell students to model -3 in the bucket by placing three red chips and zero yellows. Lead students to understand that -3 can also be represented by placing four reds and one yellow, five reds and two yellows, etc., using chips to represent opposites to reach zero.
13. Have students practice modeling different ways of representing other negative and positive integers in the bucket.

B. Partner Activity

1. Have students place seven positive (yellow) chips in their bucket. Tell them to subtract four positive chips. Write the problem on the board: " $7 - 4 = 3$."
2. Have students place nine negative (red) chips in the bucket. Tell them to subtract five negative chips. Write the problem on the board: " $-9 - (-5) = -4$."
3. Have students place five positive chips in the bucket and then ask them to subtract three negative chips. Write the problem on the board: " $5 - (-3)$." Lead students to see that in order to subtract three negative chips from the bucket there needs to be three negative chips in the bucket. Ask: "Is there another way to represent $+5$ so that you will have 3 negative chips in the bucket?" [8 positive and 3 negative]. Take away the three negative chips so eight positives are left in the bucket. Write the problem on the board: " $5 - (-3) = 8$." Repeat the above procedure.
4. Hand out the BLM *What's Left in the Bucket?* and have students work with their partners to complete it using chips and buckets.

C. Follow-up

After students have finished the BLM, call the class together and discuss any rules they discovered for adding and subtracting positive and negative integers.

Classroom Assessment

Basic Concepts and Processes

As students are working on the BLM, ask them to show the solution for one of the problems.



"How did you know if the answer would be a positive or a negative number?"

Names: _____

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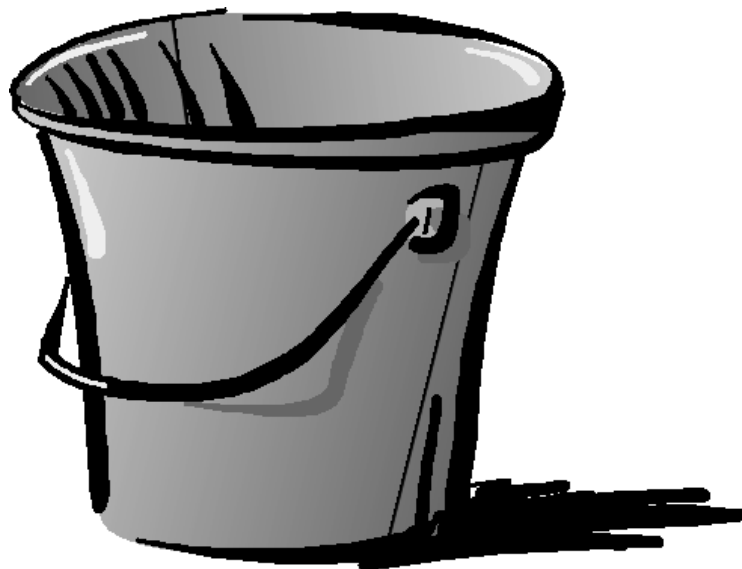
1. $+5 + +2 =$ _____ 2. $-5 + -2 =$ _____ 3. $-5 - +2 =$ _____

4. $-5 - (-2) =$ _____ 5. $+5 + -2 =$ _____ 6. $-3 + +7 =$ _____

7. $+3 + +7 =$ _____ 8. $+3 - (-7) =$ _____ 9. $-3 + -7 =$ _____

10. $+3 + -7 =$ _____ 11. $-6 + -3 =$ _____ 12. $-6 - (-3) =$ _____

13. $+6 - +3 =$ _____ 14. $-6 - +3 =$ _____ 15. $+6 + -3 =$ _____



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Teacher Directions

Distribute one copy of the BLM *What's Left in the Bucket?* to each student. Have students work with a partner to complete these problems using the two-colored chips and paper model of a bucket.

Answer Key

1. 7

2. -7

3. -7

4. -3

5. 3

6. 4

7. 10

8. 10

9. -10

10. -4

11. -9

12. -3

13. 3

14. -9

15. 3