## The Number System

## Objective

Add integers

## Common Core State Standards

7.NS.1b Understand $p+q$ as the number located a distance $|q|$ from $p$, in the positive or negative direction depending on whether $q$ is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.

## Add Integers II

Students may be familiar with integer concepts in everyday situations such as temperatures above and below zero, altitudes above and below sea level, and football yardage gained and lost. Students should recognize zero pairs and be able to use the identity property of addition to simplify computation. At the 7th and 8th grade levels, they need to be able to compute with integers in preparation for using integers in solving equations and inequalities.

## Try lit! Perform the Try It! activity on the next page.

## Talk About It

Discuss the Try It! activity.
■ Ask: What is the opposite of turning on a light? What is the opposite of sitting down? What is the opposite of +1 ? If we add +1 and its opposite ( -1 ) what do we get?
■ Ask: What does a discount do to the price of an item? How should we represent a discount coupon?

■ Ask: How many zero pairs are there? After you have taken the zero pairs off the mat, what is left on the mat?

## Solve It

Reread the problem with the students. Have them write an explanation of the term "zero pairs." Students should include a discussion of why zero pairs are important in solving the problem.

## More Ideas

For other ways to teach the addition of integers-
■ Have pairs of students using Two-Color Counters designate one color as positive and the other color as negative. The first student makes up an addition problem with at least one negative addend and the other student models and solves it. Have students trade roles and repeat.

■ Suggest that some students redo the Try It! activity with Two-Color Counters.

## Formative Assessment

Have students try the following problem.
At 8:00 A.м., the temperature at Arctic base camp was $-38^{\circ} \mathrm{C}$. By 11:00 A.M. the temperature had risen 17 degrees. What was the 11:00 A.M. temperature?
A. $-55^{\circ} \mathrm{C}$
B. $-45^{\circ} \mathrm{C}$
C. $-21^{\circ} \mathrm{C}$
D. $55^{\circ} \mathrm{C}$

## Try lt ! 15 minutes $\mid$ pairs

Here is a problem about adding integers.
At the school store, students can use discount coupons earned in class for excellent work and good behavior. The transactions shown in the chart took place today. How much money did the school store receive today?

| Student | Purchase | Price | Coupon |
| :--- | :--- | :---: | :---: |
| Sally | Pack of Pencils | $\$ 1.00$ | No |
| Damon | Spiral Notebook | $\$ 2.00$ | $\$ 1.00$ |
| Rongita | Pack of Pencils | $\$ 1.00$ | $\$ 1.00$ |
| Chung | Protractor Set | $\$ 1.00$ | No |
| Dean | Compass Set | $\$ 2.00$ | $\$ 1.00$ |
| Paul | Glue Stick | $\$ 1.00$ | No |

Introduce the problem. Then have students do the activity to solve the problem. Write the chart of transactions on the board. Distribute the materials.


1. Have students read the first transaction from the chart. Say: Put one unit block in the positive section of your Algeblocks Basic Mat. Write +1 on your paper.

2. Say: Make zero pairs by pairing a unit block in the positive section with a unit block in the negative section. Repeat until all pairs are made. Now count the remaining unit blocks.

## Materials

- Algeblocks ${ }^{\circledR}$ units
- BLM 4


2. Have students read the second transaction.

Say: Put two unit blocks in the positive section of your mat, and put one unit block in the negative section. Write +2 and -1 on your paper. Now represent the rest of the transactions.

4. Have students circle all of the zero pairs.

Say: Add up the remaining numbers. What is the sum? This is the total amount the school store received.

Use Algeblocks unit blocks and a Basic Mat to model each integer addition sentence. Make zero pairs. Write the sum.

1. $5+(-8)=$ $\qquad$

2. $-3+9=$ $\qquad$ 6


Using Algeblocks unit blocks and a Basic Mat, model each addition sentence. Sketch the model. Circle zero pairs. Write the sum.
3. $12+(-7)=$

4. $-2+(-5)=-7$


Find each sum.
5. $-5+(-2)=$ $\qquad$ 6. $15+(-4)=$ $\square$ 11
7. $8+(-11)=$ $\qquad$ 8. $-9+13=$ 4
9. $-17+(-4)=$ $\qquad$ $-21$
10. $15+3=$ $\qquad$ 18
11. $-12+12=$ 0
12. $21+(-7)=$

## Answer Key

Challenge! Describe how to find a sum of two integers when the signs of the integers are different. How do you decide the sign of the sum?

Challenge: (Sample) When the signs of the integers are the same, add the digits and use the sign of the numbers as the sign of the sum. When the signs are different, subtract the digits and use the sign of the digit with the greater value as the sign of the sum.
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$

Download student pages at hand2mind.com/hosstudent.
$\qquad$

Use Algeblocks unit blocks and a Basic Mat to model each integer addition sentence. Make zero pairs. Write the sum.

1. $5+(-8)=$ $\qquad$

2. $-3+9=$


Using Algeblocks unit blocks and a Basic Mat, model each addition sentence. Sketch the model. Circle zero pairs. Write the sum.
3. $12+(-7)=$ $\qquad$

4. $-2+(-5)=$


Find each sum.
6. $15+(-4)=$ $\qquad$
7. $8+(-11)=$ $\qquad$ 8. $-9+13=$ $\qquad$
9. $-17+(-4)=$ $\qquad$ 10. $15+3=$ $\qquad$
11. $-12+12=$ $\qquad$ 12. $21+(-7)=$ $\qquad$

Name

Challenge! Describe how to find a sum of two integers when the signs of the integers are different. How do you decide the sign of the sum?
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$
$\qquad$


