Dear Family,

The next unit in your child's course of study in mathematics class this year is *Accentuate the Negative: Positive and Negative Numbers*. Although students have intuitively used operations on integers to make sense of some situations in their everyday world, this unit looks at formal ways to compute with these numbers.

UNIT GOALS

In this unit, the focus is on understanding and developing systematic ways to add, subtract, multiply, and divide positive and negative numbers. Students will develop algorithms for computations and will use the order of operations, the Commutative Property, and the Distributive Property to solve problems.

HELPING WITH HOMEWORK

You can help with homework and encourage sound mathematical habits as your child studies this unit by asking questions such as:

- How do negative and positive numbers help in describing the situation?
- What will addition, subtraction, multiplication, or division of positive and negative numbers tell about the problem?
- What model(s) for positive and negative numbers would help in displaying the relationships in the problem situation?

In your child's notebook, you can find worked-out examples from problems done in class, notes on the mathematics of the unit, and descriptions of the vocabulary words.
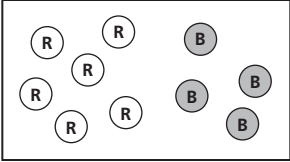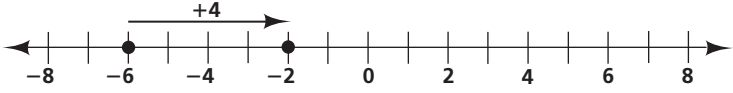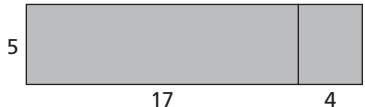
HAVING CONVERSATIONS ABOUT THE MATHEMATICS IN *ACCENTUATE THE NEGATIVE*

You can help your child with his or her work for this unit in several ways:

- Ask your child to describe some real-world situations in which integers are used. If your child talks to you about being "in the red" or "in the black," you may relate this idea to earnings or savings he or she has.
- Look at your child's mathematics notebook. You may want to read some of the explanations that have been written and, if they are unclear, talk with your child about why you think they may need more explanation.
- Look over your child's homework and make sure all questions are answered and explanations are clear.

A few important mathematical ideas that your child will learn in *Accentuate the Negative* are given on the back. As always, if you have any questions or concerns about this unit or your child's progress in class, please feel free to call.

Sincerely,

Important Concepts	Examples
Negative Numbers Negative Numbers are the opposites of positive numbers. **INTEGERS** are the set of the whole numbers and their opposites. **RATIONAL NUMBERS** are the positive and negative integers and fractions.	Negative numbers: $-\frac{2}{3}$, -24, -1 Integers: -14, -29, 0 Rational numbers: -2, $-1\frac{2}{3}$, 0, $\frac{3}{4}$, 14

Addition and Subtraction

Students model and symbolize problems to develop meaning and skill in addition and subtraction before developing algorithms.

The **colored chip model** requires an understanding of opposites. For example, 4 black chips represent $+4$ and 4 red chips represent -4.
$4 + (-4) = 0$ because $+4$ and -4 are opposites.

The **number line model** helps make the connection to rational numbers as quantities.

Sometimes it is helpful to restate an addition problem as a subtraction or a subtraction problem as an addition.

Chip Board

Johnson owed his sister $6.00. He earned $4.00 delivering papers. What is his net worth?

One color chip (black) represents positive numbers and another chip (red) represents negative numbers.

Collections of black and red chips on a board represent the combination of expense and income. The result, or net worth, is that he is "in the red" 2, or $^-2$ dollars. This problem may be represented with the number sentence $^-6 + {}^+4 = {}^-2$.

To calculate $^+12 + {}^-8$, the result is the same as if you subtract $^+8$ in the problem, $^+12 - {}^+8$. To calculate $^+5 - {}^-7$, the result is the same as if you add $^+7$ in the problem $^+5 + {}^+7$.

Multiplication

Multiplication can be modeled using a number line model and "counting" occurrences of fixed-size movement along the number line.

$$8 \times (-6)$$

This can be represented as 8 jumps of $^-6$ on the number line.

$^-6 + {}^-6 + {}^-6 + {}^-6 + {}^-6 + {}^-6 + {}^-6 + {}^-6 =$
$^-48$ or $8 \times {}^-6 = {}^-48$

Division

A multiplication fact can be used to write two related division facts.

We know that $5 \times {}^-2 = {}^-10$. Write the related division sentences:
$^-10 \div {}^-2 = 5$ and $^-10 \div 5 = {}^-2$. From this relationship students can determine the answer to a division problem.

Order of Operations

Mathematicians have established rules for the order in which operations ($+$, $-$, $\times$, $\div$) should be carried out.

1. Do any computations in parentheses.

2. Compute exponents.

3. Do all $\div$ or $\times$ operations in order from left to right.

4. Do all $+$ or $-$ operations in order, from left to right.

$3 + 4 \times \underline{(6 \div 2)} \times 5 - 7^2 + 6 \div 3 =$
$3 + 4 \times 3 \times 5 - \underline{7^2} + 6 \div 3 =$
$3 + \underline{4 \times 3} \times 5 - 49 + 6 \div 3 =$
$3 + \underline{12 \times 5} - 49 + \underline{6 \div 3} =$
$\underline{3 + 60} - 49 + 2 =$
$\underline{63 - 49} + 2 =$
$\underline{14 + 2} = 16$

Commutative Property

The order of addends does not matter. The order of factors does not matter. Subtraction and division do not have this property.

$5 + 4 = 4 + 5$ $-2 + 3 = 3 + -2$
$5 \times 4 = 4 \times 5$ $-2 \times 3 = 3 \times -2$
$5 - 4 \neq 4 - 5$ $-2 - 3 \neq 3 - -2$
$5 \div 4 \neq 4 \div 5$ $-2 \div 3 \neq 3 \div -2$

Distributive Property

The distributive property shows that multiplication *distributes* over addition. This property is introduced and modeled through finding areas of rectangles.

$5 \times (17 + 4) = (5 \times 17) + (5 \times 4)$