#9545

ALGEBRA: A PIECE OF CAKE!
PART TWO

Uses cooking as a platform to teach basic algebraic concepts, from how to write simple and more complex statements to simplifying the expression by combining like terms.

ACADEMIC STANDARDS

Subject Area: Mathematics

★ Standard: Understands and applies basic and advanced properties of functions and algebra

- Benchmark: Knows that an expression is a mathematical statement using numbers and symbols to represent relationships and real-world situations (e.g., equations and inequalities with or without variables) (See Instructional Goal #1.)

- Benchmark: Understands that a variable can be used in many ways (e.g., as a placeholder for a specific unknown, such as $x + 8 = 13$; as a representative of a range of values, such as $4t + 7$) (See Instructional Goal #1.)

- Benchmark: Understands various representations (e.g., tables, graphs, verbal descriptions, algebraic expressions, Venn diagram) of patterns and functions and the relationships among them (See Instructional Goals #1 and 2.)

- Benchmark: Understands the basic concept of a function (i.e., functions describe how changes in one quantity or variable result in changes in another) (See Instructional Goal #1.)

INSTRUCTIONAL GOALS

1. To explain terms, like terms, and expressions.
2. To show how to simplify mathematical expressions.

BACKGROUND INFORMATION

Since the 16th century, variables and formulas have been the key concepts and instruments of algebra. Formulas offer an easy example of connected variables and therefore provide a helpful preparation for the further study of functions. In this video, mathematical formulas are represented through some real-life situations. Formulas, together with the related concepts of introducing variables and solving equations, are a cornerstone for the further study of mathematics.

VOCABULARY

1. formula
2. simplify
3. pattern
4. variable
5. expression
6. term
7. like terms
8. constant

BEFORE SHOWING

1. Review the contents of the video *Algebra: A Piece of Cake! Part One*.
2. Find the formulas to calculate the amount of ingredients needed to make fruit smoothies. (See Instructional Graphics.)
3. Write the following terms on the board or overhead: 3x, 2x, 4y, 3, 8xy, and 4x2. List the ways in which these terms are similar. List the ways they are different.
4. Variables are not always letters. They can be symbols as well. Î and Δ each represent a different number. Which expression is equivalent to 2□ + 4Δ + 7 + 3Δ - □?
   a. 15□Δ
   b. + 7Δ + 7
   c. + 14Δ
5. Display a shoe box full of knives, forks, and spoons. Discuss the advantages of orderly arrangement. Explain that the video focuses on a way to arrange mathematical terms.
6. Review the commutative property of addition and the associative property of addition.

DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Stop at each part that displays a pausing prompt. Calculate and discuss the answers.
3. Pause after the segment about the cherry dessert.
   a. Write the formula if there are ten pieces in each tray and three pieces have been eaten already.
   b. Write the formula if there are 14 pieces in each tray and four pieces have been eaten already.
4. Pause at the section that teaches about writing formulas for patterns. Look for other ways to figure out formulas of number relations in a pattern.
5. Pause at the section where the like terms are combined. Point out where the commutative and associative properties of addition apply.

AFTER SHOWING

► Discussion Items and Questions

1. What are some ways to simplify formulas?
2. How does one determine which variable(s) to use in the formula?
3. What should one do if two words in the formula start with the same letter?
4. What are some examples of like terms?
5. What are some examples of unlike terms?

6. What is meant by simplifying the expression?
7. What is the best way to determine if the new formula is correct or not?
8. What will the answer be if these expressions are simplified?
   a. $2x + 4 - 3x + 7$
   b. $6t - 27 + 4 - 5$
   c. $4 - 5v + 6 + 5v$
   d. $3 + 5x + 6 - 7y$
   e. $5a + 8 - 3 + 6a + 3b$

► Applications and Activities

1. Divide the class into small groups. Assign each group a formula or equation written in words. The group is to rewrite the equation using variables. Examples are:
   a. The number of boys at the party is equal to three times the number of girls decreased by two.
   b. The amount paid by a customer is the selling price minus the discount.
   c. Money left in a checking account is the balance minus the withdrawal.
   d. The class income is two times the dues added to the profit from the dances.
2. Solve the following problem as a group. One serving of canned fish contains 1 gram of saturated fat and 4 grams of other kinds of fat.
   a. Find the formula for the amount of saturated fat (s) in several (n) servings of this fish.
   b. Find the formula for the amount of other kinds of fat (o) in several (n) servings of this fish.
   c. Combine these formulas and derive the formula for the total amount of fat (T) in several (n) servings of this fish.
3. Set up an activity using algebra tiles to teach the concept of combining terms. Show how the distributive property plays a role in combing terms.
4. Using the data presented in the video, set up a spreadsheet on the computer. Once the formula is typed in the correct place, find the answers for other values of the variables.
5. Complete the worksheet "Formulas and Combining Terms". (See Instructional Graphics.)

SUMMARY

   The hostess in the video uses algebra as she calculates the number of pieces of coconut and cherry pastries available for the party based on the number of trays. Formulas were developed separately for the two kinds of pastries. Then the hostess developed another formula by combining all the terms involved. This was done by adding and subtracting like terms thereby simplifying the expression.

RELATED RESOURCES

- Algebra: A Piece of Cake! Part 1 #9544

World Wide Web

The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

- **COMBINING LIKE TERMS**

http://school.discovery.com/homeworkhelp/webmath/liketerms.html

Contains an interactive solver that simplifies expressions that have like terms.

- **ALGEBRA: SIMPLIFICATION, COMBINING LIKE TERMS**
http://www.syvum.com/cgi/online/serve.cgi/squizzes/algebra/liketer1.tdf?0

Allows the view to practice combining terms by taking a quiz or playing a Thrillionaire Game.

- **ASK DR. MATH**
http://mathforum.org/dr.math/

Has an extensive archive of previous questions and answers related to math topics including variables and simplifying equations.

INSTRUCTIONAL GRAPHICS

- FRUIT SMOOTHIE
- FORMULAS AND COMBINING TERMS

Fruit Smoothie

Directions: The ingredients for one smoothie are: 3/4 cup of yogurt, 1 cup of orange juice, 3/4 cup of diced strawberries, and 1 cup of ice cubes. Find the number of cups of yogurt (y), orange juice (O), strawberries (s), and ice cubes (i) necessary to make several (n) smoothies.
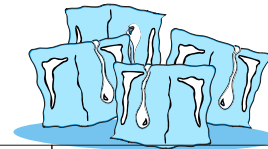
number of smoothies	cups of yogurt
1	3/4
2	
3	
4	
n	

number of smoothies	cups of diced strawberries
1	3/4
2	
3	
4	
n	

number of smoothies	cups of orange juice
1	1
2	
3	
4	
n	

number of smoothies	cups of ice cubes
1	1
2	
3	
4	
n	

Questions:

1.   Find the amount of each ingredient needed to make 20 smoothies.

2.   How many cups of yogurt and diced strawberries are needed for 100 smoothies?

3.   How many cups of orange juice and ice cubes are needed for 75 smoothies?

4.   If one has only 15 cups of yogurt, what is the largest number of smoothies that can be made?

5.   If one has 6 ½ cups of orange juice, what is the largest number of smoothies that can be made?

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Formulas and Combining Terms

Directions: Melanie made vanilla and chocolate bars for algebra class. The tray with the vanilla bars holds ten pieces. The one with the chocolate bars holds twelve pieces. Melanie already ate three vanilla bars and one chocolate bar.
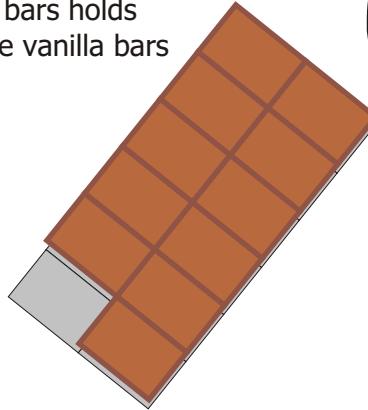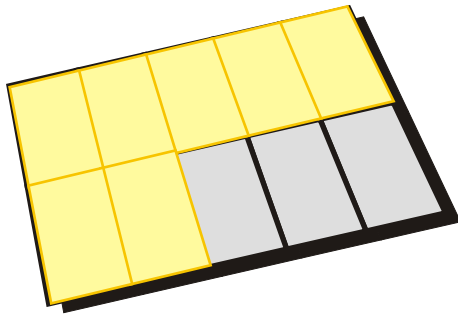
1. Find the formula that connects the number of trays and the number of bars.

Tray (t)	Bars (v)
1	7
2	17
3	?
4	?

Formula: V = ?

Tray (t)	Bars (c)
1	11
2	23
3	?
4	?

Formula: C = ?

2. Combine the terms to find the formula for how many bars altogether.

	+		=	

Formula
(vanilla bars)

Formula
(chocolate bars)

Formula
(both)

3. Check to see if the new formula is correct by selecting a specific value for the variable.

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