

# Unit 1 – The Building Blocks of Algebra

## CUBES

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

CC Algebra 1

### Lesson 4: Translating Sentences to Algebraic Expressions

- **Objective:** Students will be able to translate sentences into algebraic statements by annotating text and identifying the operations applied to a given variable.

**Warm Up:** List *at least* three words that describe each of the following four operations.

Addition	Subtraction	Multiplication	Division
Sum more than increased combined Total	difference Less than decreased Take away diminished by	product Times "of" → "Half of" ( $\times \frac{1}{2}$ ) Twice, Double ( $\times 2$ ) Triple ( $\times 3$ )	quotient Half "of" → ( $\div 2$ ) Split up equally Grouped evenly

**Modeling:** Translate each of the following statements into an algebraic expression.

- (a) If  $z$  represents a number, then write an expression for a number that is two more than twice that number.

$$2z + 2$$

- (b) If  $y$  represents a number, then write an expression for a half of that number decreased by six.

$$\frac{1}{2}y - 6$$

or 
$$\frac{y}{2} - 6$$

- (c) If  $x$  represents a number, then write an expression for three times the sum of  $x$  and one.

$$3(x + 1)$$

- (d) If  $w$  represents a number, then write an expression for the quotient of  $w$  and five less than  $w$ .

$$\frac{w}{w - 5}$$

**Independent Task:** Translate each of the following statements into an algebraic expression.

- (a) If  $h$  represents a number, then write an expression for a number that is seven more than one-third the value of  $h$ .

$$\frac{1}{3}h + 7$$

- (b) If  $s$  represents Sally's age and her father is four years less than five times her age, write an expression for her father's age in terms of the variable  $s$ .

$$5s - 4$$

- (c) If  $y$  represents a number, then write an expression for three-quarters of the difference of  $y$  and eight.

$$\frac{3}{4}(y - 8)$$

**Group Task:**

1. The Miller family made mathematical statements out of their ages as follows. Tom is four less than twice Gary's age. Rebecca is two less than half Gary's age after it was increased by three. Sam's age is the ratio of seven more than Gary's age to eight less than Gary's age.

(a) Translate each of the family members ages into algebraic expressions in terms of Gary's age,  $g$ .

Tom's Age:  
 $2g - 4$

Rebecca's Age:  
 $\frac{1}{2}(g + 3) - 2$

Sam's Age:  
 $\frac{g + 7}{g - 8}$

(b) If Gary is 11 years old, how old are Rebecca and Sam?

$\left( \begin{array}{l} g = 11 \\ \text{plug in} \end{array} \right)$

Rebecca:

$\frac{1}{2}(11 + 3) - 2$   
 $\underbrace{\hspace{2cm}}_5$

Sam:

$\frac{11 + 7}{11 - 8} = \frac{18}{3} = 6$

2. Frank owns  $x$  books and Sarah owns three more than twice Frank.

(a) Create an algebraic expression that represents the total number of books for Frank and Sarah.

(b) If Sarah has 25 books, how many books does Frank have?

**Extension:** Bill is twice as old as Joyce and Sam is 5 years older than Bill. The sum of their ages is 100. If Joyce is  $n$  years old, how old is Sam?

**Exit Slip:** If  $x$  represents a number, write an expression for one half the difference of  $x$  and  $x$  squared. Then, determine the value of the expression when  $x = -3$ .

**Homework: *Translating Sentences to Algebraic Expressions***

1) Translate each of the following statements into an algebraic expression.

(a) *Two less than one fourth of  $n$ .*

(b) *Three times the sum of  $x$  and 20.*

(c) *The product of  $g$  and six, divided by the difference of  $g$  and six.*

(d) *The quotient of  $w$  and five more than  $w$ .*

(e) *Seven less than four times the difference of  $n$  and 5.*

2) Francisco is three years more than twice Jenna's age. Harrison is two years less than three times Jenna's age. If Jenna's age is given by  $a$ , then write an expression for Francisco's age, Harrison's age, and the sum of all three ages in terms of  $a$ .

- Francisco's Age:
- Harrison's Age:
- Sum of All **Three** Ages:

3) Using the information above, determine Harrison's age if Francisco is 17 years old.