



Merit Education Group

What Is a Variable?

Algebra 1 · Pacing ID: WhatIsAVariable

Standard: 9.3.5.7

Standard: 9.3.5.8

Lesson Overview

Objectives	• Define a variable and distinguish it from constants and coefficients. • Identify variables in algebraic expressions and real-world contexts. • Write one-variable algebraic expressions to model quantitative situations.
Key Vocabulary	Variable, Expression, Constant, Coefficient
Skills Targeted	Variable identification; one-variable expression writing
Materials	Whiteboards, markers, erasers (1 set per student) · Direct Instruction slide deck · Guided Practice handout (3 examples + GEMDAS box) · Tiered Independent Worksheet (T1/T2/T3) · Prime Time card sets · Exit Ticket slips · Visual vocabulary anchor chart

Phase 1: Activate & Explore 16 min

Bell Ringer

4 min

Display slide with header Whiteboards Ready! Students solve independently on whiteboards, hold up on teacher cue. Focus: arithmetic fluency, pattern recognition, and solving for unknowns without formal variable notation.

Companion: See bell ringer problem set in LMS.

Direct Instruction

6 min

1. Variable:

A letter or symbol that represents an unknown quantity or a value that changes within a given context. Variables allow us to generalize relationships rather than compute single numerical answers.

2. Expression:

A mathematical phrase composed of numbers, variables, and operation symbols. Expressions do not contain equality or inequality signs.

3. Constant:

A fixed numerical value in an expression that does not change.

4. Coefficient:

The multiplicative factor placed directly before a variable term. If no number is written, the coefficient is implicitly 1 (e.g., $x = 1 \cdot x$).

Precision Language: We do not say “x times n” — state “the product of a constant and a variable” or use proper notation cn . An expression evaluates to a single value only when the variable is assigned a specific number.

Culture & Career Spotlight

6 min

Ojibwe Context

Traditional Ojibwe basket weavers construct patterned baskets by varying the number of willow reeds per row based on desired circumference. If a weaver uses 8 base reeds for the foundation and adds r reeds for each subsequent tier, the total reeds used is modeled by $8 + r$. The variable r captures how material needs scale with design complexity.

Career: Data Analyst / Actuary

Professionals use variables to model fluctuating datasets — population growth, insurance claim frequencies. Variables enable predictive modeling rather than static calculations. Example: $C = 150 + 2.5m$ estimates monthly cellular costs, where m represents gigabytes used beyond a base plan.

Phase 2: Practice & Apply 26 min

Guided Practice

8 min

Example 1 (Identification):

Given $7k - 4$, identify the variable, constant, and coefficient.

Solution: Variable: k | Constant: -4 | Coefficient: 7

Example 2 (Translation to Expression):

Write an expression for “5 less than three times a number.”

Solution: Let n represent the unknown number. Three times the number is $3n$. Five less than that quantity is $3n - 5$.

Example 3 (Contextual Modeling):

A community garden charges a flat registration fee of \$12 and \$4 per plot rented. Write an expression for the total cost if p plots are rented.

Solution: Base fee = constant 12. Variable cost = $4p$. Total: $12 + 4p$.

GEMDAS Reminder: When substituting numerical values for variables, apply the order of operations (Grouping, Exponents, Multiplication/Division, Addition/Subtraction) strictly left-to-right within each precedence tier.

 Independent Worksheet + Circulate & Support

18 min

Tiered Structure:**T1 Foundational**

Identify variables/constants/coefficients in given expressions; match simple verbal phrases to one-variable expressions.

T2 Application

Write one-variable expressions from multi-step verbal descriptions and real-world scenarios (e.g., subscription costs, perimeter models).

T3 Extension

Determine whether two expressions represent the same relationship when variables are assigned specific values; justify using substitution and order of operations.

Teacher Action: Circulate systematically. Use proximity monitoring to check notation accuracy ($5x$ not $5 \times x$), correct coefficient identification, and proper translation syntax. Provide targeted scaffolding per tier.

Phase 3: Assess & Reflect 8 min **Game — Prime Time: Translation Match**

5 min

Students work in pairs to match verbal phrase cards to algebraic expression cards containing variables. Emphasis on precise terminology (“product of,” “sum of,” “decreased by”). Teacher facilitates rapid round-robin verification and corrects common syntactic errors aloud.

Zero-device activity — card sets pre-laminated.

 Exit Ticket

2 min

1. Define a variable in your own words using precise mathematical language.
2. Write an algebraic expression for: “Twice a number decreased by 9.” Let n represent the unknown number.

 Today & Tomorrow

1 min

Today: We defined variables, distinguished them from constants and coefficients, and wrote one-variable expressions to model quantitative situations.

Tomorrow: We will systematically translate complex verbal phrases into algebraic expressions using operation keywords and structural analysis.

SPED & ELL Cross-Reference

S

[SPED

Provide graphic organizers with labeled slots for [Variable] [Coefficient] [Constant]. Allow use of concrete manipulatives (algebra tiles or colored counters) during Guided Practice. Extend independent work time using the built-in 9-minute circulate window.]

L

[ELL

Pre-teach vocabulary with bilingual glossaries and visual anchors. Provide sentence frames for exit ticket: “**A variable is a _____ that represents _____.**” Pair ELL students with structured peer supports during Translation Match game.]

Misconceptions & Redirect Questions

	Misconception	Redirect Question
Corrective Strategy	Confuses variable with constant	“Which part of the expression changes depending on the situation?”
Use color-coding: variables in blue, constants in black.	Writes $5 \times n$ instead of $5n$	“How do mathematicians abbreviate multiplication between a number and a letter?”
Model implicit multiplication notation; emphasize coefficient placement.	Translates “3 less than x ” as $3 - x$	“Read carefully: what is being decreased, and by how much?”
Use arrow diagrams or sentence frames to reverse operation order.		

Materials Checklist

☐ Whiteboards, markers, erasers (1 set per student)

☐ Guided Practice handout (3 examples + GEMDAS box)

☐ Direct Instruction slide deck (navy headings)

☐ Tiered Independent Worksheet (T1 / T2 / T3 versions)

☐ Prime Time card sets (laminated, zero-device)

☐ Exit Ticket slips

☐ Visual vocabulary anchor chart