



Lesson 01: What Is a Variable?

Course: Algebra 1 | **Pacing ID:** WhatIsAVariable **Standards:** MN 9.3.5.7, 9.3.5.8 **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

1 PHASE 1: ACTIVATE & EXPLORE (16 MIN)

Bell Ringer 4min

• Display slide with header Whiteboards Ready! 4min • Students solve independently on whiteboards, hold up on teacher cue. • See companion file for problem set. Focus: arithmetic fluency, pattern recognition, and solving for unknowns without formal variable notation.

Direct Instruction 6min

Teacher Script & Slide Content:

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

Precision Language Check: • “We do not say ‘ x times n ’. We 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 6min

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 Spotlight:** *Data Analyst / Actuary* — Professionals in these fields use variables

to model fluctuating datasets (e.g., population growth, insurance claim frequencies). Variables enable predictive modeling rather than static calculations. Example: An actuary might write $C = 150 + 2.5m$ to estimate monthly cellular data costs, where m represents gigabytes used beyond a base plan.

2 PHASE 2: PRACTICE & APPLY (26 MIN)

Guided Practice 8min

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 = $4 \cdot p = 4p$. Total cost expression: $12 + 4p$.  **GEMDAS Reminder:** When you later substitute numerical values for variables to evaluate these expressions, apply the order of operations (Grouping, Exponents, Multiplication/Division, Addition/Subtraction) strictly left-to-right within each precedence tier.

Independent Worksheet + Circulate & Support 9min + 9min

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.

3 PHASE 3: ASSESS & REFLECT (8 MIN)

Game 5min

Prime Time: Translation Match (Zero-device) 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.

Exit Ticket 2min

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.
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Today & Tomorrow 1min

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.

4 MATERIALS CHECKLIST

[] Whiteboards, markers, erasers (1 set per student) [] Direct Instruction slide deck (Navy #1C2950 headings, Arial body) [] Guided Practice handout (3 examples + GEMDAS reminder box) [] Tiered Independent Worksheet (T1/T2/T3 versions) [] Prime Time: Translation Match card sets (laminated, zero-device) [] Exit Ticket slips [] Visual vocabulary anchor chart

5 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 the phrase carefully: what is being decreased, and by how much?”	Use arrow diagrams or sentence frames to reverse operation order.

6 SPED & ELL CROSS-REFERENCE

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

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