

Defining Variables and Substitution

Lesson time: 30-60 Minutes

LESSON OVERVIEW

In this activity, students will learn to define variables that can be used to reference values and expressions. Once defined, their variables can be used repeatedly throughout a program as substitutes for the original values or expressions.

LESSON OBJECTIVES

Students will:

- Define variables by giving them a name and assigning them a value or expression.
- Use variables within Evaluation Blocks.
- Describe a situation where using variables as substitutions for values or expressions is more efficient.

ANCHOR STANDARD

Common Core Math Standards

- **6.EE.4:** Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). For example, the expressions $y + y + y$ and $3y$ are equivalent because they name the same number regardless of which number y stands for.

Additional standards alignment can be found at the end of this lesson

TEACHING SUMMARY

Getting Started

- 1) [Vocabulary](#)
- 2) [Introduction](#)

Activity: Defining Variables and Substitution

- 3) [Online Puzzles](#)

TEACHING GUIDE

GETTING STARTED

1) Vocabulary

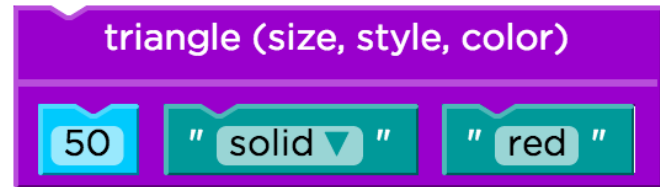
This lesson has two new and important words:

- **Define** - associate a descriptive name with a value
- **Variable** - a container for a value or expression that can be used repeatedly throughout a program

2) Introduction

Suppose we want to make an image with fifty identical, solid red triangles. To do so you'd have to create this Evaluation Block fifty times!

Even worse, if you decided you wanted fifty blue triangles instead, you'd have to go through and change each and every block. There must be a better way!



We can store that red triangle Evaluation Block in a Variable, let's call it "red-triangle." That name "red-triangle" now becomes a shortcut for the blocks inside the variable, and we can use that shortcut over and over in our program. If we decide that we want that red triangle to be 100 pixels instead of 50, we only need to change it in the variable definition.

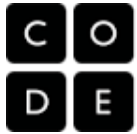
LESSON TIP

*If students have used variables in other programming languages, it's essential to note that in functional programming, as in math, variables are considered **immutable** - meaning the value can't be changed during the execution of a program. Think about it this way: saying $x = 50$, and then $x = x + 1$ might make sense in Javascript, but it's impossible in Algebra.*

ACTIVITY: DEFINING VARIABLES AND SUBSTITUTION

3) Online Puzzles

In this stage you'll use variables to reference a variety of values and expressions. Head to [CS in Algebra stage 6](#) in Code Studio to get started programming.



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