

# SWIFT VARIABLES AND CONSTANTS

Week 1 - Day 4 - Lesson 2

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## CONNECTION TO LONG-TERM GOAL

This is the first lesson on the subject of code.

## LEARNING OBJECTIVES

- + **Articulate** the difference between a constant and a variable
- + **Declare** variables and constants
- + **Identify** different types of Swift expressions
- + **Create** expressions like multiplication and addition
- + **Print** variables like Strings and Numbers

## INSTRUCTOR PREP

- + Take a look at the [lab](#)
- + Take a look through the [solution code](#)

## STUDENT PRE-WORK

- + Create a new Playgrounds file

## GROUND RULES

- + Students should have ~~their laptops closed~~ ~~their phones beside~~ unless it is time.

# LESSON GUIDE

<b>TIMING</b>	<b>TYPE</b>	<b>TOPIC</b>
5	Opening	What is a variable? What is a constant?
5	Introduction	This is a variable and a constant
5	Independent Practice	Write some variables and constants
5	Introduction	This is a Swift expression
10	Guided Practice	Creating variables and expressions
10	Independent Practice	Create some expressions
10	Introduction	Data Types
10	Guided Practice	Declaring Data Types
10	Summative Practice	Declare and use variables in expressions
5	Conclusion	Key takeaways
75 mins		

# OPENING (5 mins)

Start with an activity that brings to light any ideas and assumptions students might have about what a variable or constant is.

## WRITE-PAIR-SHARE

- + What kinds of things in life change often?
  - + What kinds of things in life are constant?
  - + How do you think this applies to programming?
  - + Share and compare notes with a partner
  - + Discuss with the class
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# INTRODUCTION: VARIABLES AND CONSTANTS (5 mins)

## DEFINITION

“Constants and variables associate a name with a value of a particular type.”

- Swift Reference

## ANATOMY

- + Show the anatomy of a variable declaration
- + Show the difference between a variable and constant

## CHECK FOR UNDERSTANDING

Show a few pieces of incorrect code, asking the students what is wrong with it?

- + Storing an Int in a String type.
  - + Trying to assign to a constant after.
  - + Trying to retrieve a declared but uninitialized constant.
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# INDEPENDENT PRACTICE (5 mins)

## ACTIVITY

Create a new Playgrounds in XCode. Declare the following variables

- + Write a variable called age with the value 99
- + Write a constant called name with your name
- + Update the age variable's value to be your age
- + Print your age
- + Type "`date +%s`" into the command line
- + Copy that value into a constant
  - + What type did you use?

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# INTRODUCTION: SWIFT EXPRESSIONS (5 mins)

## DIAGNOSTIC

"Who remembers PEMDAS from middle school?"

Parenthesis, Exponents, Multiplication, Division, Addition, Subtraction  
The same rule applies in programming.

```
--- source swift
let name = "Wellington"
var age = 26
age = 2016 - 1989
---
```

Cover the different expression types:

- + Assignment
- + Arithmetic
- + Remainder
- + Compound Assignment
- + Comparison
- + Parenthesis

- + Function Call

## CHECK FOR UNDERSTANDING - WRITE-PAIR-SHARE

Check the class with the by asking them to guess what the result of the following expressions are:

```
--- source swift
let first = 5 * 10 + 6
let second = 10 + 5 * 6
let areEqual = first == second
let isCorrect = first == 56
---
```

## GUIDED PRACTICE: CREATING VARIABLES EXPRESSIONS (10 mins)

This section is like a demo, but **have the students guide you**. They should not be using their laptops for this section.

### PRACTICE PROBLEMS

Do as many of these calculation as you can during class time.

- + Take all of the student's ages and calculate the sum
- + Take all of the student's ages and calculate the average
- + Store all of the student's names in variables
- + Print their names to the console

## INDEPENDENT PRACTICE ( 10 mins)

### PRACTICE PROBLEMS

"Do as many as you can."

- + Create constants for each one of your family members
- + Print their names

- + Find the current weather in LA, NYC, and London, and calculate their average.
    - + Print it
  - + Store the following in a variable: "Have you ever programmed before?"
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## INTRODUCTION: DATA TYPES (10 mins)

Discuss the primitive data types

- + Integers
- + Doubles
- + Strings
- + Booleans
- + UIImageView \* (Bonus)

## GUIDED PRACTICE (10 mins)

- + Demonstrate how to explicitly declare data types in Swift.
- + Attempt to store an incorrect type in a variable to demonstrate Swift's strongly-typed semantics.

## INDEPENDENT PRACTICE (10 mins)

This is a summative assessment of the lesson materials for the students to do independently. For this section, students should open up a new Playgrounds.

### PRACTICE PROBLEMS

"Do as many as you can."

- + At the market, 6 batteries cost \$10.38. How much do 8 batteries cost?
  - + Brenda can deliver 644 newspapers in 7 hours. How many newspapers can Brenda deliver in 9 hours?
  - + Robin can clean 72 rooms in 6 days. How many rooms can Robin clean in 2 weeks?
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# CONCLUSION (5 mins)

## CLASS DISCUSSION

Class prompt: "If you could make a variable to store anything you want in life, what would you store?"

## TAKEAWAYS

- + Variables are used to store information.
- + Constant values cannot be changed once it is set.
- + Variable values can be changed.
- + There are 4 main data types used to store basic pieces of information.
- + Expressions are operations that perform actions on variables

## TAKE-HOME QUESTIONS

- + "Where do you think variables are stored?"
- + "What happens to your variables when your program restarts?"
  - + "Why?"