Course: AP Computer Science Principles in Roblox | Module: Getting Started with Roblox

CodeHS

Lesson 1.5: Variables

Description	In this lesson, students learn how to assign values to variables, manipulate those variable values, and use them in program statements. This is the introductory lesson into how data can be stored in variables.
Objective	Students will be able to: • Explain what variables are and what they are used for • Use the different types of variables in Lua • Distinguish between declaring, initializing and assigning variables • Create their own variables with proper naming conventions • Print out the values stored in variables
Activities	1.5.1 Video: Variables 1.5.2 Example: Collecting Treasure 1.5.3 Exercise: Explore: Tracking Player Health 1.5.4 Exercise: Level Up 1.5.5 Video: Variables in Roblox Tutorial 1.5.6 Notes: Variables in Roblox Tutorial Code 1.5.7 Exercise: Rainbow Wall 1.5.8 AP Practice: AP Practice: Variables

Prior Knowledge	• Basic knowledge of `print` function
Planning Notes	• There is a handout that accompanies this lesson that gives practice on the assignment and displays coding instructions from the exam reference sheet. It can be used as an in-class activity or a homework assignment. Determine how and if this handout will be used and make the appropriate number of printouts prior to the class period. • Decide if students will take notes in a notebook, on paper handouts, or through the "Take Notes" function on CodeHS. Even though the lesson is shorter, there are a number of new concepts (variable types, declaration, initialization, assigning, naming conventions, and printing). • Write new vocabulary (variable types, declaration, initialization, assigning, naming conventions) on the board or on an anchor chart that hangs in your class. • This is a 2+ day lesson.
Standards Addressed	
Teaching and Learning Strategies	**Lesson Opener:** • Write a simple mathematical equation on the board that uses variables. Ask students what information they need to know in order to solve a mathematical equation, then ask them why mathematics includes variable values. [5 mins] ○ Consider using the beginning of class discussion questions to aid in this

conversation.

Activities:

- Watch the lesson video or present and discuss the slides as a class. [5 mins]
  - After the video, ask students to share with a partner how variables might be used in computer programs. Push students to think about how Snapchat or mobile apps use variables.
- Explore the *Collecting Treasure* example. [5 mins]
  - Students can discuss the questions in the item description with a partner or write down their answers in a notebook.
- Complete the *Explore: Tracking Player Health* and the *Level Up* exercises. [10-12 mins]
- Follow along and work through the *Variables in Roblox Tutorial*. [15 mins]
  - Alternatively, students can view the completed program in the *Variables in Roblox Tutorial Code* item and answer the guiding questions. [5-7 mins]
- Complete the *Rainbow Wall* activity in Roblox Studio. [15-20 mins]
- Complete the *AP Practice: Variables* quiz. [5 mins]
  - Discuss with the class how the language on the AP exam differs from the Lua programming language. \
- Complete the *Variables* handout. [10 mins]
  - This could be assigned as homework.

Lesson Closer:

- Have students complete the end-of-class discussion questions. [5- 7 mins]

Discussion Questions

Beginning of Class:

- What are some mathematical formulas that you know that use variables in them?
  - *y = mx + b*
- What is a variable in mathematical terms, and what is its purpose?
  - *Variables are used to represent a numerical value or formula. We use them as placeholders so that when the actual values that are being input are known, we can easily place them in the correct location in a particular formula. They are also useful to help organize information and store data.*

End of Class:

- What are the different variable types that can be used in Lua?
  - *Booleans, numbers, strings*
- How would you create a variable named `myDog` and give it the value "Karel"?
  - *local myDog = "Karel"*
- How would you print out the value stored inside of a variable named `numApples`?
  - *print(numApples)*
- Why might variables be useful in our programs?
  - *Variables are useful because they allow us to store data, and change the results of a program depending on the input that is provided. This way we can create formulas that are executed rather than have to write new programs every time we want to change the numbers that are involved.*

Resources/Handouts	Variables (teacher version) Variables (student version)

Vocabulary

Term	Definition
Boolean	A boolean is a true or false value.
Declare a Variable	Declaring a variable is defining it for the first time.
Variable	A symbol or container that holds a value.
Initialize a Variable	Initializing a variable is giving it an initial value.
Assigning to a variable	Assigning to a variable is updating the variable's value

Modification: Advanced	Modification: Special Education	Modification: English Language Learners