MARTY TEACHER GUIDE

Prompts and Questions to Support Delivery of Lessons

What is a Variable?

The definition

Working with variables is tricky at this stage since it is possible that learners have not studied their use in mathematics, either very much or at all. It is possible that learners have discussed unknown values, representing a number with a letter (like x + 3 = 8, so x = 5), but this is not the same as using variables in equations where there are dependent and independent variables.

The goal here is not to get in to the technical understanding of variables and defining the different types but rather to get a feel for how and why variables change.

- If 6 muffins need one egg, how many eggs for 12 muffins?
- If I complete one page of writing in 20 minutes, how long to complete 3 pages?

When one value, in these situations, changes, the other value changes.

The agreed on definition should be along the lines of, "A variable is a value that changes depending on other values in a situation." This is not the only answer but a key feature must include that variables can change in terms of value.

Declaring and assigning a value to a variable

In order to use a variable, in programming, it must first be declared and a value needs to be assigned to it. In the code, this is with the code blocks indicated in the image. The reason this needs to happen first is because you cannot perform on anything if there isn't a starting point:

- the basic code for today's lesson declares a variable called 'Value' and then assigns a value of 0; after this, the value of the variable is increased;
- the slightly more complex code declares a variable called 'Steps' and then assigns a value of 0; after this, the value of the variable is increased;

Without first declaring a variable – giving it a name – the program can't use it. You will see in the lesson video what happens after clicking 'Make a variable' and typing in a name: a new block appears in the variables section and now there is something new to select in the dropdown menus for the variable blocks.

Without first assigning a value to the variable, the program doesn't know what to do with said variable: with the expression x+8, the answer could be

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anything and everything, which breaks the program. In mathematics, questions often begin with something like, 'Evaluate the expression when x=5," which is the action of assigning a value. There is no way to evaluate the expression without first assigning a value.

Changing a variable's value

All of the code, so far, has dealt with variables that have numerical values. A variable can be text as well but that will not be explored in this lesson. Suggest that learners assign a numerical value to their variable to avoid problems.

Numerical values can use arithmetic to change them:

- a variable is declared, named 'my variable'
- a value is assigned, count is set to 0
- a change block is executed, change my variable by 1
- my variable is now 2
- a user could subtract, divide or multiply as well, in MartyBlocks

Recipe variables (from the workbook)

Ingredients	1 cake	2 cakes
flour	3 tbsp	6 tbsp
Sugar	2 tbsp	4 tbsp
cocoa	2 tbsp	4 tbsp
Salt	1 pinch	2 pinches

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Milk	3 tbsp	6 tbsp
Vanilla essence	½ tsp	1 tsp
Oil	2 tbsp	4 tbsp
Chocolate chunks	20 g	40 g

Changing a variable's value (color)

This code sets the variable, color, to whatever the sensor detects. If statements are present for each color. The video shows Marty walking when the color is not one of the choices. There is a small bit of additional code to account for that but it is a bit complex for learners here.

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