

Name:

Student Number:

Date:

Lesson 12 The Magic Box

Activity Sheet

Context

Once upon a time, there was a magic box. The magic box could store anything you would like to place inside it – even though, it seemed that the magic box only had a very very tiny space. You could pick your things up when you need them at any time. Do you want to own the magic box that can store anything?

Lesson 12 will introduce the “magic box” – variables – and you will learn how to create this kind of “magic box” to store various information and data. You have already encountered this kind of block in your previous learning activities. Let's start it by recalling the use of mBot's light sensor and its relevant blocks.

Task 12-1 Compare the Blocks You've Learned

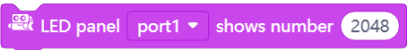
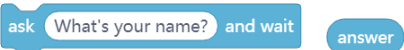
Most of the blocks can store values – the number of the light intensity of the brightness, the beat and note, the color or pattern of LEDs, etc. Except for the shape of these blocks, can you figure out any other differences among them?

The table below lists some of the blocks you have encountered in the previous learning activities. Drag and combine them with appropriate blocks and constructs to explore the differences and similarities.

Tips: (1) Recall your previous practical experience and predict whether the block is a variable or not.

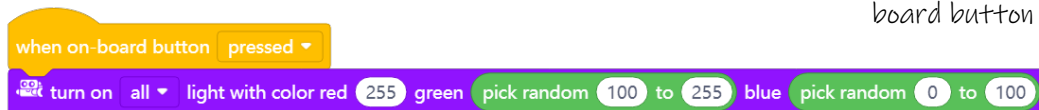
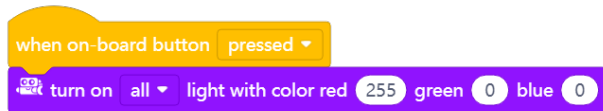
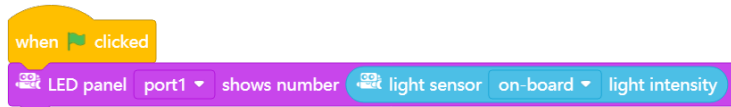
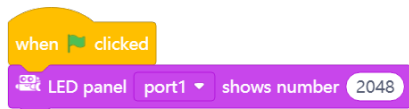
(2) Test it combined with coding blocks, run and observe the result.

(3) Explain why you think the block is (not) a variable.

Blocks	Your Prediction	It is (not) a variable, because...
(mBot)		
		
		
		
		
(mBlock)		
		
		

Note: You can try other blocks that do not appear in this table if you want to challenge yourself!

Examples: Here below is what you can experiment, for example:



Example 1

Which one can make the number on the LED Panel change by themselves?

Example 2

Which one can make the light color change by themselves when the on-board button is pressed each time?

Task 12-2 Compare Brightness

In Lesson 3, you have conducted a brightness experiment. Could you make mBot compare and make the judgment by itself? Use conditional algorithms and variables to program mBot, teach mBot to report which situation is brighter in between the two trials.

If Trail 1 (or “brightness 1”) is brighter, light up the left LED bulb;

If Trail 2 (or “brightness 2”) is brighter, light up the right LED bulb.

Tips: (1) You need to create two variables in the “Variables” category in mBlock.

(2) Think of how you could store the first and the second light intensity data into the two variables.

(3) How to divide trail 1 from trail 2 (or to indicate the break between the two tests during your experiment)?

(4) What kinds of conditional constructs will you use? Why?

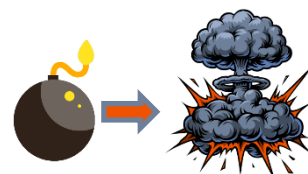
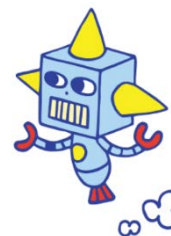
Task 12-3 The Magic Variables

With the help of Variables blocks, you are able to create a lot of interesting interactive projects. Think of what kind of project will you like to create by using variables and conditional algorithms as well as looping algorithms.

Ask your teacher to deliver the two demo programs for your reference if you don't have ideas at this moment.

One of the demos is based on the chatbot project in Lesson 1 and Lesson 2. By using the built-in variables “answer” blocks and newly created variables to store the answers, your chatbot would be able to remember, e.g. who you are, where you live and the food you like, etc.

The second demo is a very engaging game – the random number bomb. When the game begins, a random number (called “BONG” number) will be selected. Play in pairs (or groups) and each person click on the Bomb sprite to generate a number. If this number is equal to the “BONG” number, the bomb will switch its costume to “BONG” (“Boom”).



Key Concepts from this Learning Activity

Terms	What it means
Variable*	A variable can hold different information and data and the value of it is changeable.

* New term