



## TITLE: Rock Paper Scissors

### LEARNING SCENARIO

<b>School:</b>	<b>Duration (minutes):</b>	90
<b>Teacher:</b>	<b>Students age:</b>	10+

**Essential Idea:**

Let's play the game with Codey Rocky

**Topics:**

- designing, creating and writing in a visual programming language: ideas, stories and solutions to problems of varied complexity
- experimenting with AI
- civilization related implications of AI

**Aims:**

- understand the concept of variable
- learn how to create a variable and use the variable in the code

**Outcomes:**

- design, create and test simple program in a graphic environment to create animations

**Work forms:**

- individual work, work in pairs, group work

**Methods:**

- presentation, talk, discussion, interactive exercise

### ARTICULATION

The course of action (duration, minutes)

#### INTRODUCTION

The teacher starts a discussion:





Washing hair requires three steps: shampoo your hair, massage hair to form foam and rinse the foam off. But if we don't use the phrase "wash hair" to describe the set of steps, what will be the situation then? In everyday life, we often give a set of actions a single name and use the name to refer to the whole set of actions when necessary.

After we name the set of actions as "wash hair", the situation will be like this:

When your friends are asking you out, you will say, "I'm going to wash hair. Wait."

Use a simple phrase to name the set of actions. The name is what we call a function.

In programming, we use a function to name a set of instructions and call the function in the code if necessary. The first thing to create a function is to give the function a name. Next, you need to define the function by adding instructions.

**Announcement of the goal of the lesson:**

The goal of this lesson is to understand the functions, to define the function by adding instructions.

**MAIN PART**

Imagine that a variable is a box. You can put a value into the box and replace it with another value anytime. It works like a scoreboard which is used to record the scores during a contest. As the contest proceeds, the scores keep changing. So you can change the scores on the board accordingly. In computer programming, a variable is a storage location paired with an associated name. When a variable is created, the computer will leave a storage location to store the variable and give the location a symbolic name. By calling the variable name, programs can read and change the value in the storage location.

**Let's play the game The Squirrel's Nuts Box**

Take these steps:

1. There is a little squirrel. He has a nuts box. Every day, the squirrel puts nuts into the box and takes nuts out of the box, so the number of the nuts keeps changing all the time. One day morning, the little squirrel gets up, opens the box and finds out that there are 10 nuts left. The number of nuts will change based on different situations.
2. For instance, the squirrel is hungry and eats two nuts, so there are 8 nuts left. Then the squirrel picks another 5 nuts so there are 13 nuts in total. Now let's play a game, counting how many nuts are left.
3. The teacher writes down the number 10 on the blackboard and tells students there are 10 nuts left in the box.
4. Students take turns picking a paper strip out of the box.
5. Students read out what the paper strips say and try to figure out the number of nuts left based on the information. Then write down the result on the blackboard.



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In the morning, the little squirrel eats 2 nuts for breakfast.

If the maximum temperature exceeds 5°C , the squirrel will pick 10 nuts in the wild.

At noon, the squirrel eats 3 nuts for lunch.

In the afternoon, a little bird pays a visit and gives the squirrel 5 nuts.

Today is the monkey's birthday. The squirrel gives him 3 nuts as a gift.

In the evening, a rat steals 4 nuts.

The squirrel plays the rock-paper-scissors game with a friend three times. If he loses the game, he gives away a nut; if he wins the game, he gets a nut; if it's a draw, then no gain or loss for both sides.

In the evening, the squirrel eats only 1 nut to keep fit.

It's hot today. The squirrel buys a straw hat from Aunt Bear. It costs him 7 nuts.

If the amount of the nuts in the box is less than 5, the squirrel will pick 10 nuts outdoors.

If the amount of the nuts in the box exceeds 12, the little squirrel will turn in a circle happily.

What's the variable in the game? How did you name it?  
What's the initial value for the variable?  
What operations were done with the value?

**Task 1:**

Using the variable to assign a value, you can make Codey Rocky move forward at any speed you would like. When button A is pressed, set the speed to 30, and Codey Rocky will move forward at a speed set for 1 second.

```

when button A is pressed
  set speed to 30
  move forward at power speed % for 1 secs

```

Codey Rocky, standing on the stage, is saying hello to the audience. Codey Rocky turns left 70 degrees and then turns right 140 degrees. Finally, it returns to the starting point. To make Codey Rocky turn specific degrees, you need to create a variable named "angle". Set the angle to the value of 70.

```

set angle to 70

```

Make Codey Rocky turn left by specific degrees as programmed.

```

turn left angle degrees until done

```

Assign a new value to the variable "angle". As programmed, Codey Rocky will turn right at 140 degrees and then turn left at 70 degrees.



Add facial expressions, sounds and light effects to Codey Rocky.

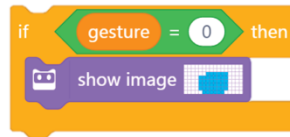
Students can show some well-done projects. When sharing the projects, students are supposed to give their answers to the questions proposed by others.

### Task 2: Rock-Paper-Scissors

Using Codey Rocky, you can play the game rock-paper-scissors with friends.

When Codey Rocky starts up, the initial values are all set to be 0.

Codey Rocky changes its hand gestures randomly. The numbers 0, 1 and 2 are used to represent Rock, Scissors and Paper respectively. When Codey is shaken, the variable "gesture" will be one of the three numbers randomly. If the value is 0, the LED screen will show an image of a fist. If the value is 1, the LED screen will show an image of scissors. If the value is 2, the LED screen will show an image of the paper.

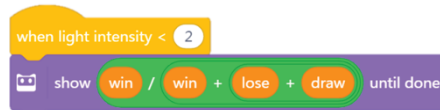


If Codey wins the game, you need to press button A and the variable "win" will change its value by 1. Meanwhile, Codey shows a smiley face and plays the sound "laugh".

If Codey loses the game, you need to press button B and the variable "lose" will change its value by 1. Meanwhile, Codey shows a sad face and plays the sound "sad".

If it is a draw, you need to press button C and the variable "draw" will change its value by 1. Meanwhile, Codey looks calm and gives you a humming sound.

In some cases, Codey might steal a glance at its chance of winning. When the light intensity is lower than 2, the chance of winning will appear on the LED screen in the form of decimals.



### Notes:

When coding Codey Rocky, you are supposed to use no more than six Events blocks.

To get the chance of winning, you'll need to add multiple Operators blocks to the code.

Formula:  $\text{Winning times} / (\text{winning times} + \text{losing times} + \text{draw times}) = \text{Chance of winning}$



When button A is pressed, Codey transmits an infrared signal; if another Codey receives the signal, its health points go down by 1; the game ends when the health points fall to 0.

The ears of the Codey are preset with IR receivers and IR transmitters, which facilitates the wireless communication between two Codeys.

#### IR Transmitter

Facilitate the communications between Codeys



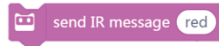
#### IR Receiver

Receive the signals from the IR transmitter



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Select the block send IR message in the category "Infrared". Have two Codeys send each other different messages. In this way, they can identify each other. For instance, one Codey sends the message "red" and the other Codey sends the message "blue". In this case, the messages serve as bullets.



Once Codey A receives the message from Codey B, Codey A gets shot and its health points reduce by 1. You can use the if statement block to assess whether Codey receives an IR message (gets shot). Once Codey gets shot, it will make a surprised sound and the health points will fall by 1.



When Codey starts up, the initial value of the health point is 10. The next step is to use the forever block to keep detecting whether Codey gets "bullets" from its "enemy". If Codey gets shot, the health point change by "-1" and plays the sound "surprised". The game will be over when the health points fall to 0 and Codey will look sad.

If Codey still has health points left (the value is greater than 0) when button A is pressed, it will then send an IR message and play the sound "laser".

Students can show some well-done projects. When sharing the projects, students are supposed to give their answers to the questions proposed by others.

### CONCLUSION

In computer programming, a variable is a container that can store information. You can duplicate the variable, change the information stored in the variable and make comparisons between variables. With the Operators blocks, you can use variables to store the calculation results.

<b>Methods</b>	<b>Work forms</b>
<p><i>presentation</i></p> <p><i>talk/discussion</i></p> <p><i>work on the text</i></p> <p><i>graphic work</i></p> <p><i>interactive exercise /simulation on the computer</i></p>	<p><i>interview</i></p> <p><i>demonstration</i></p> <p><i>role playing</i></p> <p><i>individual work</i></p> <p><i>work in pairs</i></p> <p><i>group work</i></p> <p><i>frontal work</i></p>

### Material

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*Literature*

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**PERSONAL OBSERVATIONS, COMMENTS AND NOTES**

