

Using coding to facilitate the learning of multiplication

Key Stage: 2

Strand:

Mathematics: Number (Learning Unit: 4N1 Multiplication (II))

General Studies: Science and Technology in Everyday Life

- Objectives:**
- (i) To consolidate the knowledge and skills in the application of coding to solve problems and develop computational thinking skills
 - (ii) To explore the multiplication of 2-digit numbers

Prerequisite Knowledge: The concept of basic multiplication

Resources Required: micro:bit, Scratch or other coding platform

Related Links: <https://microbit.org/code/>
<https://scratch.mit.edu/>

Description of the Activity:

Activity 1

1. In order to draw random digits from 0–9 to conduct group learning and teaching activities on multiplication, instead of rolling dice, a random number generating programme in coding platforms such as micro:bit or Scratch is to be designed.
2. Students perform simple coding to construct a random number generator.
 - (a) When using micro:bit, a programme is shown in Figure 1 for reference.



Figure 1

- (b) When using Scratch, a programme is shown in Figure 2 for reference.

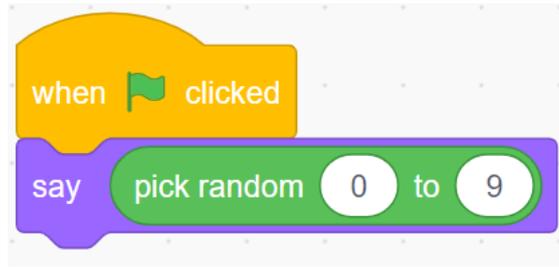


Figure 2

Note for Teachers:

Teachers may collaborate with IT teachers in the school on the teaching arrangement of coding education on micro:bit, Scratch or other coding platforms according to the school contexts.

Activity 2 (As an example, the procedures below illustrates the activity using micro:bit. The procedures of the activity using Scratch is similar)

1. Students are grouped to perform the activity of multiplication.
2. The details of the group activity are as follows:
 - a. Each group includes 4 students. A digit is to be generate by each student through shaking the piece of micro:bit he/she holds. At most one “0” among the 4 generated digits are accepted. Otherwise, students should shake the micro:bits again and generate a new set of digits.
 - b. The first student writes the number generated by shaking the micro:bit (for example, “2” in Figure 3) under Question 1 of the worksheet.

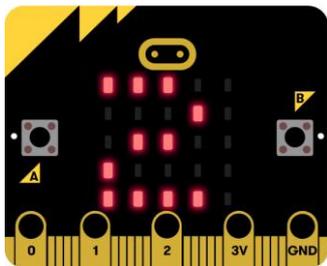


Figure 3

- c. The second student writes the number generated by shaking the micro:bit (for example, “7” in Figure 4) under Question 1 of the worksheet.

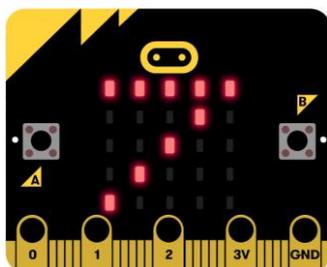


Figure 4

- d. Similarly, the third and the fourth students write the number obtained under

Question 1 of the worksheet.

3. Students use the numbers generated to form different pairs of 2-digit numbers and write the numbers under Question 2 of the worksheet.
4. Students complete Question 3 and put down their conclusions after group discussion.

Questions for discussion:

1. Among the four generated digits, if more than one digit is “0”, how will the numbers of ways of forming the pairs of 2-digit numbers be affected?
2. Under what circumstances, the product of the two 2-digit numbers is the largest?

Notes for Teachers:

1. Through the activity, the teacher may nurture students the habit of estimating results before doing calculation.
2. The teacher may modify the activity according to students’ ability.
3. The teacher may allow students to check their answers by using calculators.
4. Suggested answers for the questions for discussion:

Question 1: Among the four generated digits, if more than one digit is “0”, the numbers of ways of forming the pairs of 2-digit numbers will be reduced.

Question 2: Assuming that the four generated digits are A, B, C, and D in descending order, the product of the two 2-digits numbers AD and BC is the largest.

This example mainly involves the following generic skills:

1. **Mathematical Skills**
 - Perform comparison and calculation of numbers
2. **Communication Skills**
 - Use clear and appropriate ways to express their ideas and feelings
 - Collaborate and discuss with other people to finish simple tasks
3. **Information Technology Skills**
 - Use software to conduct learning activities

Worksheet

Four students form a group. Take turn to shake the micro:bit and record the results below:

1. The 4 digits generated by this group are:

, , ,

2. By using the above numbers, the following pairs of 2-digit numbers can be formed:

(,) , (,) , (,) , (,) ,

(,) , (,) , (,) , (,)

3. Among the pairs of 2-digit numbers formed, which pair of numbers gives the greatest product? Write down your guess and discuss with your classmates on how to validate your guess.

My conclusion:

After generating the 4 digits, I use the following way to form the pair of numbers which give the greatest product:
