**Getting active**

**Lesson 4: Random activities**

**Introduction**

In this largely-unplugged lesson, pupils complete a micro:bit times table test and analyse the program to identify how variables and random numbers have been used, before identifying how the program can be modified to make it suitable for younger children. They then consider how variables and random numbers can be used to help a family become more active and plan how a micro:bit can be incorporated into their solution.

**Time:** @60 minutes

**Learning objectives**

* To predict how variables will be used in programs
* To understand how a variable can be set to a random number
* To write algorithms that use random number variables

**Materials needed:** lesson presentation, printouts of help cards (slides 10 & 11) and support sheet (slide 12), variables times table programworksheet and activity selector worksheet, mini-whiteboards and dry-wipe pens, dice, large paper and marker pens, MakeCode editor for teacher to show class starter times table project

**Lesson summary**

1. Introduction: variable times tables test (10 minutes)
2. Modifying programs (15 minutes)
3. Getting Active (20 minutes)
4. Solving the problem with a micro:bit (15 minutes)

**Introduction: Variable times tables test (10 minutes)**

* Display **slide 3** and use it to explain to pupils that they are going to be given a times table test by a micro:bit.
* Open the [**Maths variable starter MakeCode project**](https://makecode.microbit.org/#pub:_4yp8CzKv0LFt) in the MakeCode editor and press button A on the simulator to generate each question. As you ask each question, pupils should respond by writing their answers on the mini-whiteboards and changing their variable score when the answer is displayed.

**Modifying programs (15 minutes)**

* Invite pupils to think/pair/share what variables were used in the program and how they were used.
* Display **slide 4** and explain to pupils that this is the program you used.
* Give out copies of **variables times table programworksheet** and ask pupils to work in pairs to discuss and record their answers before reviewing as a class (see speaker notes for answers).
* Display **slide 5** and ask pupils to discuss with their partner how the program could be modified to make the test more suitable for younger pupils. When taking feedback, use the program in the MakeCode editor to allow pupils to make the changes and run the program to see the impact (see speaker notes for suggestions).

**Getting Active (20 minutes)**

* Display **slide 6** and explain to pupils that a family wishes to become more active but each member of the family has a different idea of what activity they should do.
* Give out dice, large sheets of paper and a marker pen to each small groups or pairs and explain you would like them to create a solution so that an activity is randomly selected for the family (**slide 7**). Invite pupils to share their initial ideas with the class and discuss these ideas to further stimulate the pupils’ thinking.
* Give pupils time to identify how they can use the equipment given to help a family decide what activity to do and then write an algorithm to instruct the family on how to use the equipment to select which activity to do using the **activity selector worksheet** (see examples on slide 13).

**Solving the problem with micro:bit (15 minutes)**

* Display **slide 8** and explain to pupils that their next task is to consider how a micro:bit can be incorporated into their solution. Invite pupils to respond to the questions on the slide and discuss these ideas as a class.
* Give pupils time to respond to the questions on the reverse side of the **activity selector worksheet** and give them copies of the **help cards** (print-outs of slides 10 & 11) to help structure their thinking.
* Review their ideas and if you wish, use **slide 9** to review the learning objectives of the lesson.

**Extension ideas**

* Pupils could write an algorithm to represent the program that they will write to use a micro:bit as an activity selector.

**Differentiation**

**Support:** Pupils can work in an adult-led group to plan a solution that selects between three different activities. Use **slide 12** of the lesson presentation to help pupils identify which activity the family will do when each pair of numbers (1&2, 3&4, 5&6) are rolled. After pupils have identified this, they can write the algorithm as a shared writing activity.

**Stretch & challenge:** Pupils could be challenged to write a more detailed algorithm to instruct the family how to use the equipment to select which activity to do.

**Opportunities for assessment**

* Informal observation of pupils understanding of how random number variables are set and used through class discussions and paired activities.
* More formal assessment of pupils’ written algorithms if wished.