## **Number Patterns with the Counter**

## Using this projectdecorative

Students can use the BBC micro:bit to represent their given rule as an algorithm and test the pattern results.

Students can modify an existing program to confirm their understanding of odd and even numbers in the results of a given rule.

## Standards relevant to this project

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| **Relevant CA CCSS Math Standard** |
| **Operations and Algebraic Thinking: Generate and analyze patterns**4.OA.5 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself.*For example, given the rule “Add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.* |

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| **CA CS Standard Alignment** |
| 3-5.AP.11 Create programs that use variables to store and modify data. (P5.2)  3-5.AP.12 Create programs that include events, loops, and conditionals. (P5.2)  3-5.CS.2 Demonstrate how computer hardware and software work together as a system to accomplish tasks. (P4.4)  3-5.CS.3 Determine potential solutions to solve simple hardware and software problems using common troubleshooting strategies. (P6.2)  3-5.AP.14 Create programs by incorporating smaller portions of existing programs, to develop something new or add more advanced features. (P4.2, P5.3)  3-5.AP.17 Test and debug a program or algorithm to ensure it accomplishes the intended task. (P6.2) |

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## Find the right level for you and your class

Select the level of integration spice you’ll use:

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| **Mild**  🌶️  30 mins | **Learning outcome:** I can test number patterns that follow a given rule using the micro:bit counter. |
| **Activity description:** Using existing code, test a given rule by increasing the pattern by increments of 2 (hit the button 1 time to increase the pattern by 2) to generate the resulting sequence. |
| **Medium** 🌶️🌶️  45 mins | **Learning outcome:** I can modify my own counter program to test number patterns that follow a given rule. |
| **Activity description:** Modify the starter project to test a given rule by changing the pattern increment (hit the button 1 time to increment the pattern by 3) to generate the resulting sequence. |
| **Spicy** 🌶️🌶️🌶️  45-60 mins | **Learning outcome:** I can create my own counter program to test number patterns that follow a given rule. |
| **Activity description:** Code your own counter program to test a given rule by changing the pattern increment to generate the resulting sequence. |

## Let’s get started…Screenshot of Teacher Project Guide for this project

* Use our Teacher Project Guide to plan how to integrate this project into your teaching. The guide outlines the recommended steps for each level, including the relevant code links and helpful hints.
* Use the [Project Quick Reference Chart](https://mbit.io/us-quickreference) as a quick summary of the project, including the key standards covered mapped to integration level.