

## TEMPLATE for the TEACHERS

★ **Name of the project:**

Morse me

★ **Subjects covered from STEAM areas:**

Computer Science, Informatics, Programing, Computer systems, Computer networks (Binary code, Programming, Communication...), Art, Craft, Design, Printing, 3D Printing

★ **Target group (age range and size of the group)**

14-18, whole class in groups of 3 students

★ **Duration of the activity:**

- Two workshops in school, one for the design, one for coding.
- One evaluation workshop in the school (for evaluating learning objectives and for evaluation and summarizing results)

Workshop activity lasts 90 minutes. Evaluation activity last 45 minutes.

★ **Keywords:**

Programing, micro:bit, Morse code, communication

★ **Key sentence describing context of the activity, followed by short description (200 words):**

This activity should encourage students to create a kind of MORSE PHONE using BBC micro:bit.

Morse code was invented in 1836. - long before texting! Morse code only transmits one sound, so the alphabet is turned into combintations of short and long beeps.

Similar to this, BBC micro:bits can't send voice messages, but they can send simple radio messages. This allows lots of micro:bits to talk to each other! In this task sudents should program micro:bit to send signals from one micro:bit (dot or dash) to any other micro:bit and make a handy translation code book that holds the BBC micro:bit with space to write down messages.

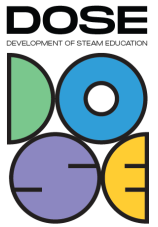
This project doesn't just focus on math skills, as there are components of social studies (mapping skills), drawing, making collages, recycling, researching about sustainability, problem solving and comprehension skills too.

★ **Description of the activity environment, including the list of materials and tools needed:**

Formal activities are performed in the school, in the classrooms, where students practice their knowledge about programming (Binary code, Programming, Communication...). Also, evaluating activities were taken in a school setting.

Required resources: computer with access to the internet, micro:bit , 3D printer, printer, paper, cardboard, scissors, glue, pencils, colours...

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## ★ Step by step, detailed description of the activity, including teaching and learning strategies.

- Students engage in a dialog with the teacher and each other about which programming skills that they have already acquired can be used in this project
- Students take part in workshops and learn about micro:bit
- Students draw their solution design
- Students prepare files for 3d printing of their box
- Students learn Morse Code
- Students make proposals of coding messages using Morse Code

During this scenario, students will explore:

- Binary code
- Programming with micro:bit
- Communication using Morse Code
- Programming concepts
- Design options

## ★ Learning objectives/competencies:

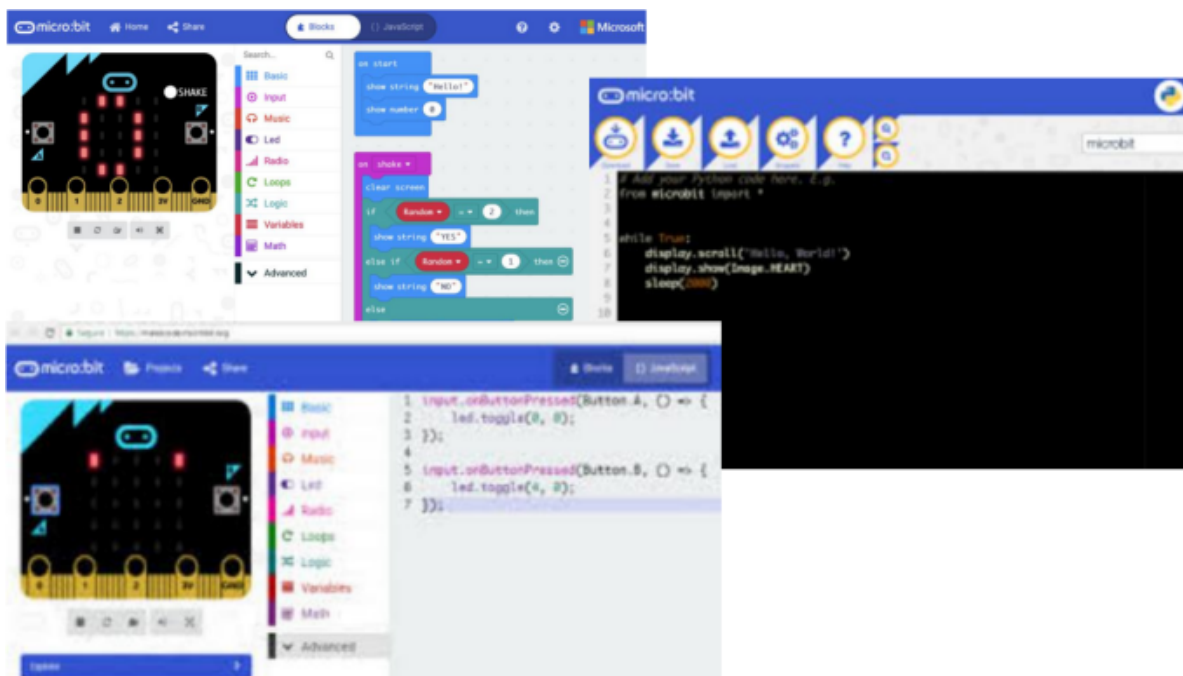
This workshop describes how to investigate possibilities of micro:bit with the help of hand-on activities.

Described activities can be used for connections between programming and art. The workshops could be implemented in regular school lessons as a project.

The domain specific objectives are:

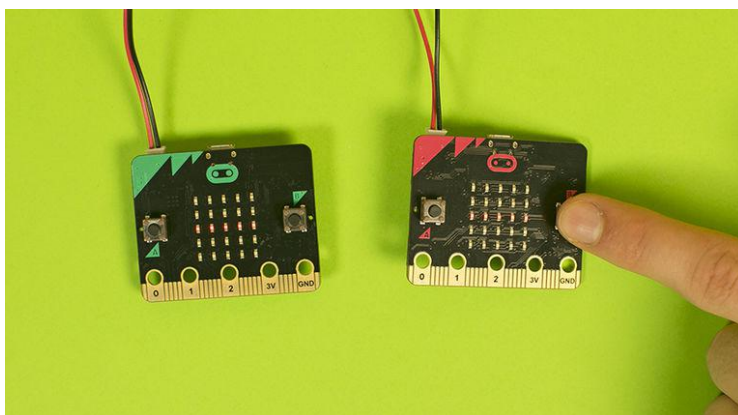
- Inspire young people to become creative in the digital world
- Programming micro:bit in three different ways:
  - Using blocks on official micro:bit site - <https://makecode.microbit.org/>
  - Using Java Script
  - Using Python
- Learning Binary code
- Developing programming skills
- Learning about different ways of communication

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### HOW OUR MICRO:BIT WORKS

When you press button A short signal will appear on the screen, and pressing button B will show a long signal. Combining buttons A and B, we can write out a letter on a screen, which will be shown only if we press both buttons at the same time. To send a message to another micro:bit you need to shake yours.





## International Morse Code

1. The length of a dot is one unit.
2. A dash is three units.
3. The space between parts of the same letter is one unit.
4. The space between letters is three units.
5. The space between words is seven units.

A	● —	U	● ● —
B	— ● ● ●	V	● ● ● —
C	— ● — ●	W	● — —
D	— ● ●	X	— ● ● —
E	●	Y	— ● — —
F	● ● — ●	Z	— — ● ●
G	— — ●		
H	● ● ● ●		
I	● ●		
J	● — — —		
K	— ● — —	1	● — — — —
L	● — ● ●	2	● ● — — —
M	— —	3	● ● ● — —
N	— ●	4	● ● ● ● —
O	— — —	5	● ● ● ● ●
P	● — — ●	6	— ● ● ● ●
Q	— — ● —	7	— — ● ● ●
R	● — ●	8	— — — ● ●
S	● ● ●	9	— — — — ●
T	—	0	— — — — —

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### ★ Evaluation/Assessment guidelines

Evaluation is done through students' feedback by testing the solution and via formal assessment made by the teacher.

### ★ Lessons learned:

Micro:bit is a powerful device that encourages creativity, innovation and imagination and in a natural and spontaneous way teaches students to program and develop the ability to think critically and solve problems in an original way.

### ★ Additional information/Links:

- The basic idea has been gotten from the site <https://make.techwillsaveus.com/microbit/activities/micro-morse-phone>, same as the idea for the frame of micro:bit.
- The solution and the code are original.

### ★ Contact person:

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