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InnoExperiment

INNOVATIVE APPROACH TO TEACHING THROUGH EXPERIMENT

SCENARIO

Title	LETTER AND MOVEMENT
Summary	This exercise is about learning basics on Block Programming with Mbot. During this exercise student will add letter to screen, Each letter have different movements assigned each time user makes click over them. Rotation, Scale, ...
Author/s	AIJU

DIDACTIC OBJECTIVES

- Teach basics of coding by block
- Learning about BLOCK CODING, rotation, movement, scales.

Physics Mathematics Information Technology Robotics Programming

Education Level: 10-12 years 12-14 years

PROBLEM STATEMENT

Begin to teach programming to students through simple block language and image assignment. In a simple way, students begin to understand concepts such as variables, assignments, conditionals.

BOM (Bill Of Materials needed)

- MBOT software 5.3.0v
- Assets from MBOT software

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The screenshot shows the mBlock v5.3.0 interface. At the top, there's a menu bar with "makeblock | mBlock", "Archivo", "Editar", "Guardar", and "Publicar". Below the menu is a tab bar with "9. LETTERS AND MOV..." and "Python Editor". The main area features a stage with a backdrop titled "InnoExperiment" and several objects: "ZPixel-N2" (a blue square), "Glow-E3" (a green square), "ZPixel-N3" (a blue square), and "Axe2" (a sword icon). On the left, there's a palette for "Dispositivos" (Devices) showing "ZPixel-N2", "Glow-E3", "ZPixel-N3", and "Axe2". The "Objetos" (Objects) palette lists "Logo" with X: 141, Y: 138, Tamaño: 50, Dirección: 90, and Muestra: on. The "Fondo" (Background) palette shows a backdrop titled "InnoExperiment". The right side of the interface is the script editor, which displays a list of blocks categorized by color: Movimiento (blue), Apariencia (purple), Sonido (pink), Eventos (yellow), Control (orange), Sensores (light blue), Operadores (green), Variables (red), and Mis bloques (pink). The "Bloques" (Blocks) tab is selected at the top right.

ACTIVITY DESCRIPTION

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For the development of the activity, we will use software that allows us to unify the game developed in Scratch with the use of the Arduino board. In this case, we have used the mBlock software: (<https://mblock.makeblock.com/en-us/>)

First of all, we will make the graphic composition of the activity:

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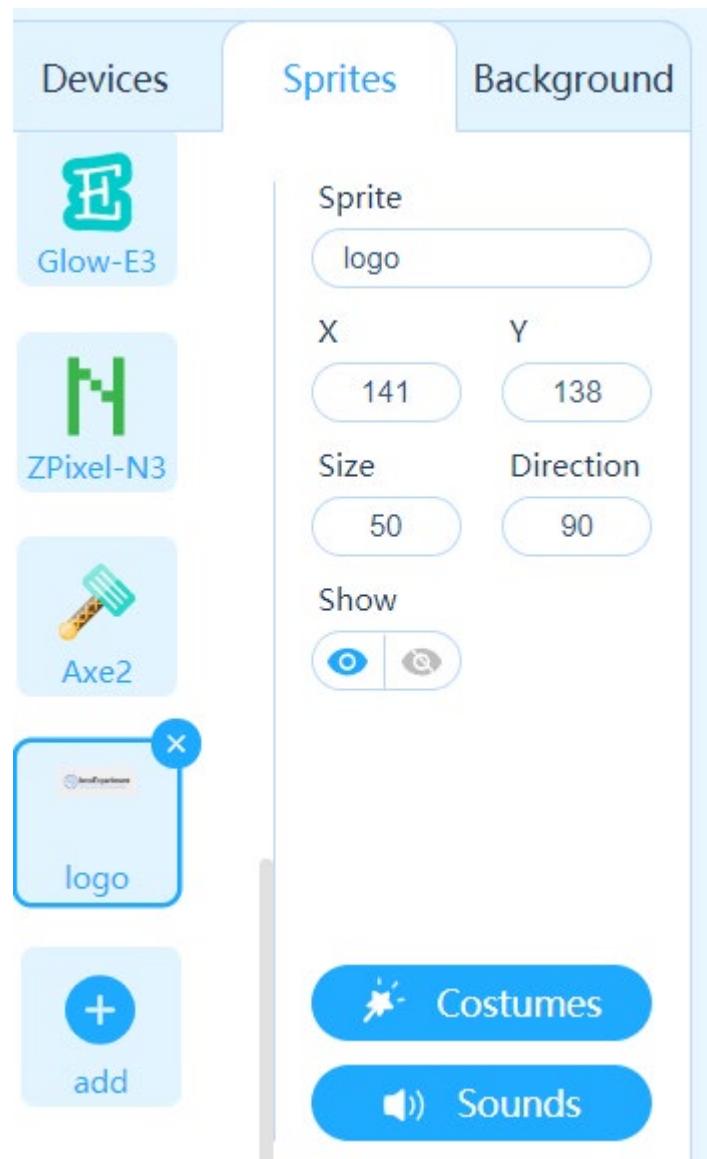
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Using ADD button from SPRITE folder:



Students need to find all letters of INNOEXPERIMENT.

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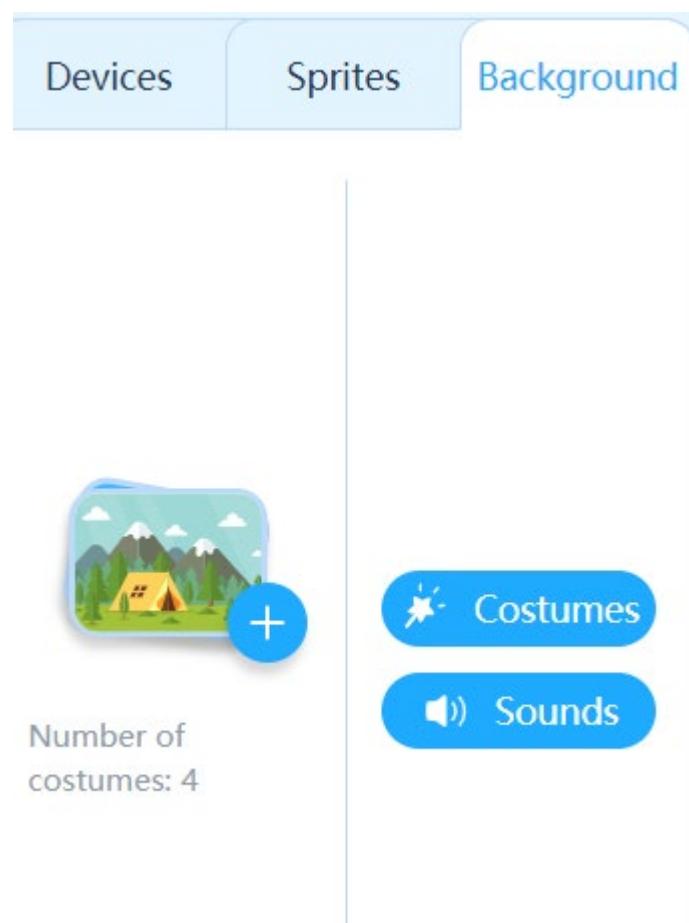


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We need to add also different backgrounds on costumes, checking in Background folder:



Chekking in “+” you can find this backgrounds:

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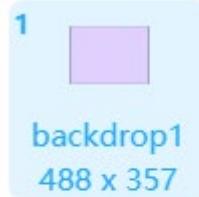


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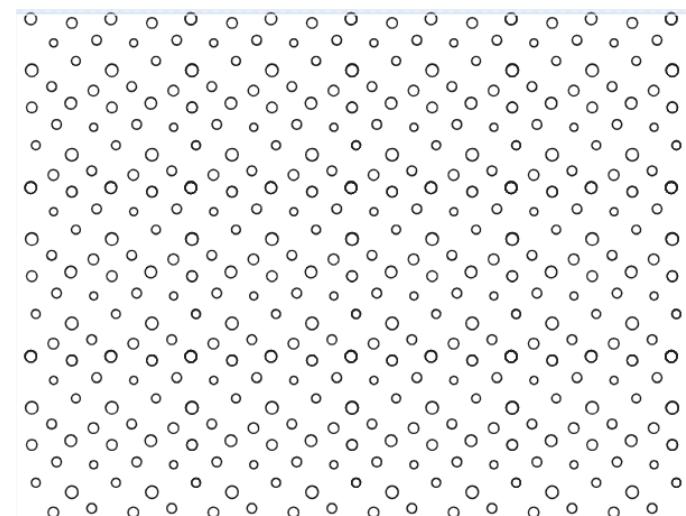


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And create one just painting in Pink



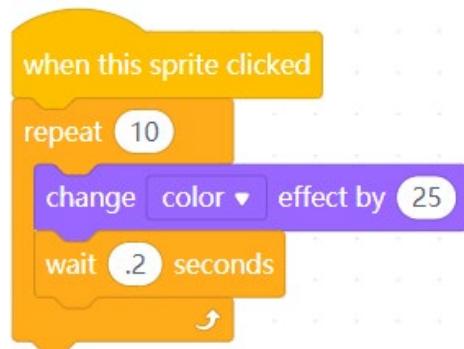
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Once we have the graphic composition and the variables created, we will start with the programming adding functionalities at each type of Letter:

1) Letter E – changing colors



2) Letter I – changing scale



3) Letter O -



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```
when this sprite clicked
repeat (3)
  wait (0.1) seconds
  switch costume to [Animal numbers-1 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-2 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-3 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-4 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-5 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-6 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-7 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-8 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-9 v]
  wait (0.1) seconds
  switch costume to [Animal numbers-0 v]
```

4) Letter N – Changing Background

```
when this sprite clicked
switch backdrop to [next backdrop v]
```

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5) Letter X – Playing sounds

```
when this sprite clicked
play sound meow v until done
```

6) Letter P – Scaling Out

```
when this sprite clicked
change size by -100
wait 1 seconds
set size to 100 %
```

7) Letter M – Translation to 0,0

```
when this sprite clicked
go to x: 0 y: 0
wait 1 seconds
go to x: 74 y: -80
```

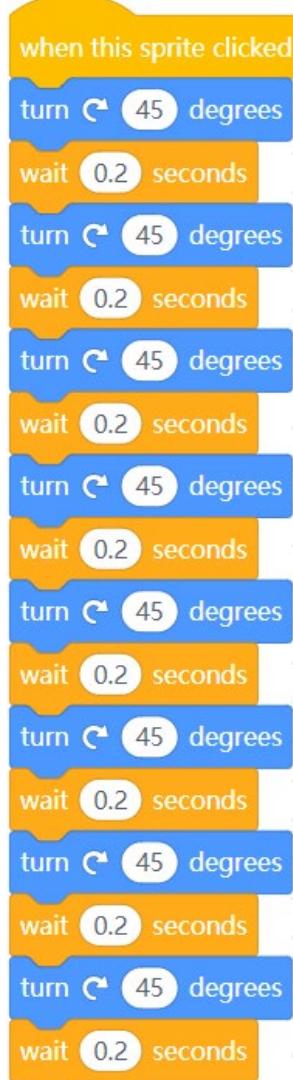
Letter T – Complete rotation

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```
when this sprite clicked
repeat (10)
  turn (45) degrees
  wait (0.2) seconds
end
```

STUDENTS' EVALUATION

The way to evaluate the students would be for them to demonstrate on paper how they have developed the exercise and to use the program / game to check the solutions.

SCALABILITY

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Regarding the concept of scalability, the complexity could be increased by adding problems that need more letters and functionalities

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