SCENARIO		
Title	SPEED LIGHT	
Summary	In this activity the Speed of Light and the constant "c" are revealed.	
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DIDACTIC OBJECTIVES

- Teach math in a different and attractive way.
- Teach how to calculate speed light based on the time.

Physics **X** Mathematics **X** Information Technology ☐ Robotics ☐ Programming ☐

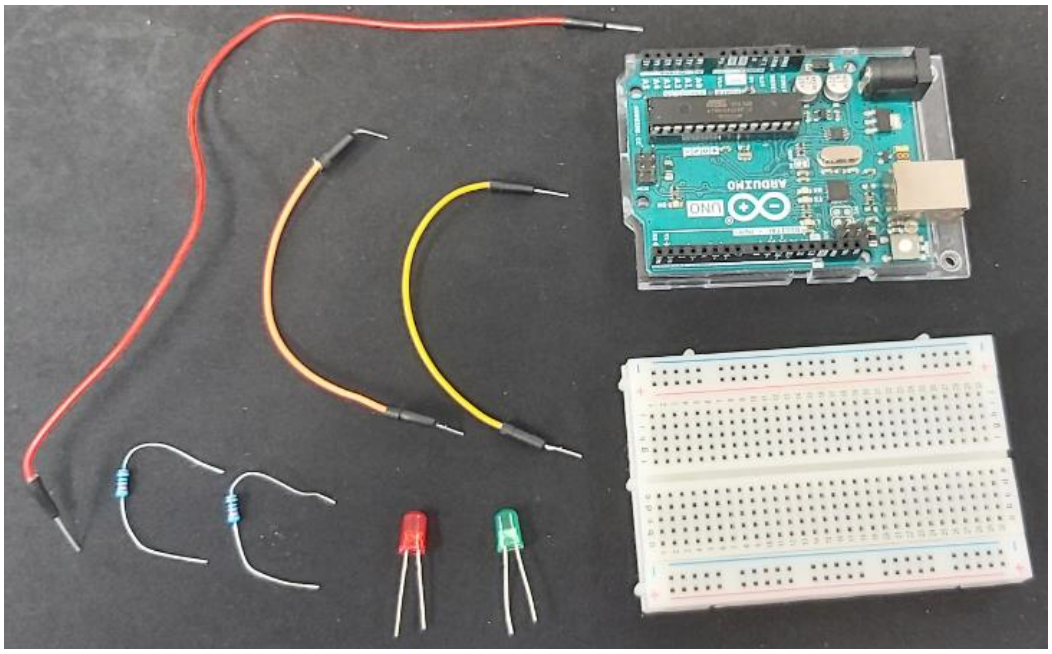
Education Level: 10-12 years ☐ 12-14 years **X**

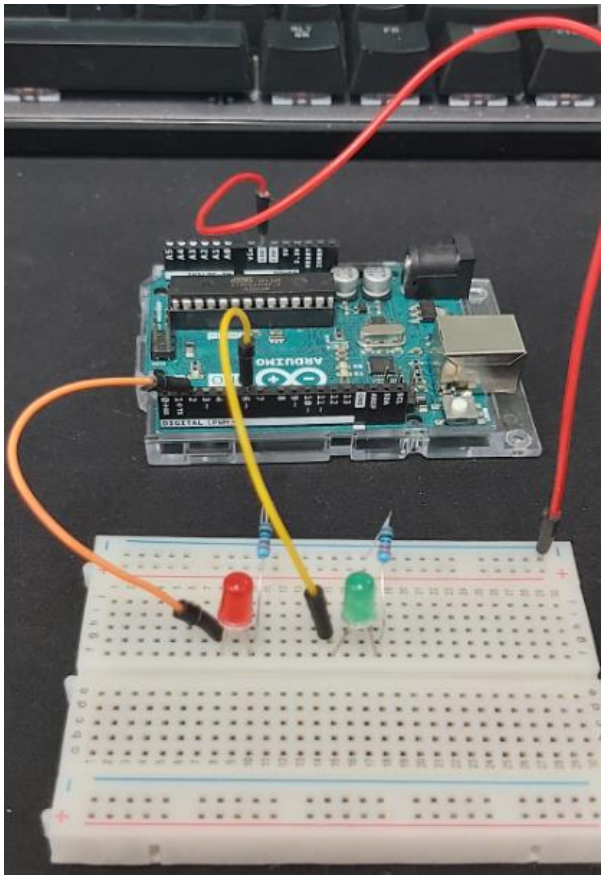
PROBLEM STATEMENT

Some students have problems understanding the concept of what the mathematical or physics problem asks, so through a visual example it is intended to facilitate learning and understanding.

BOM (Bill Of Materials needed)

- Arduino Device
- Board
- (x2) Leds (Red and Green)
- (x3) Cables
- (x2) Resistors

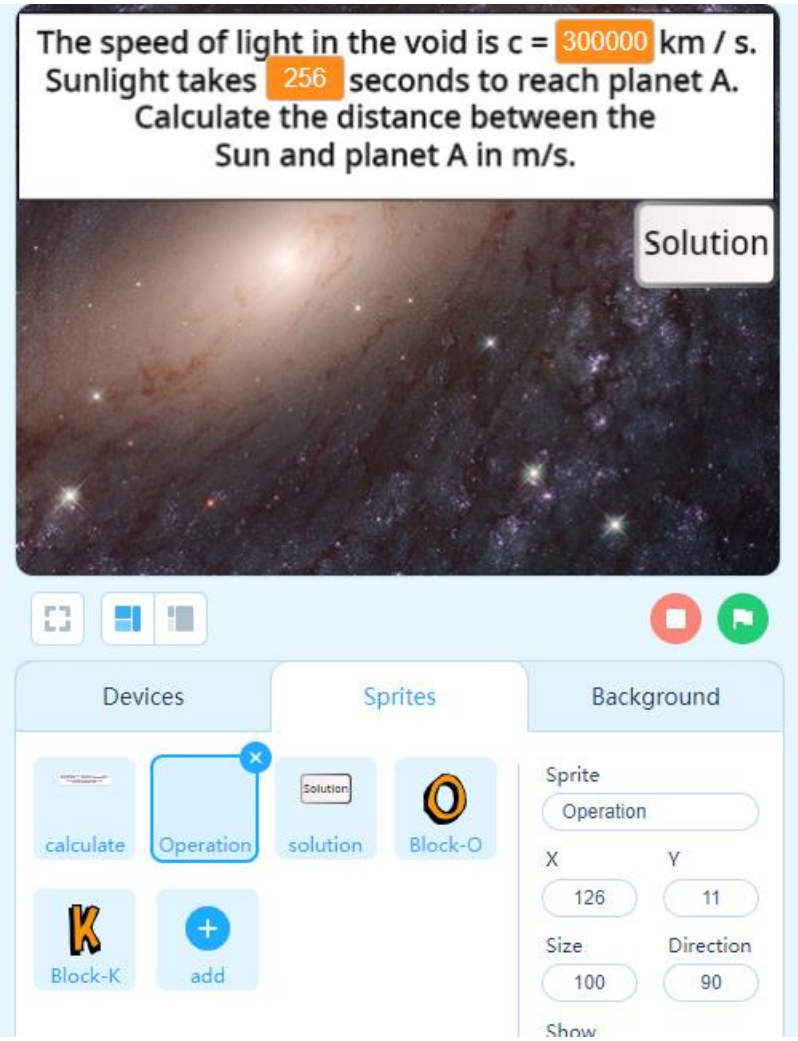




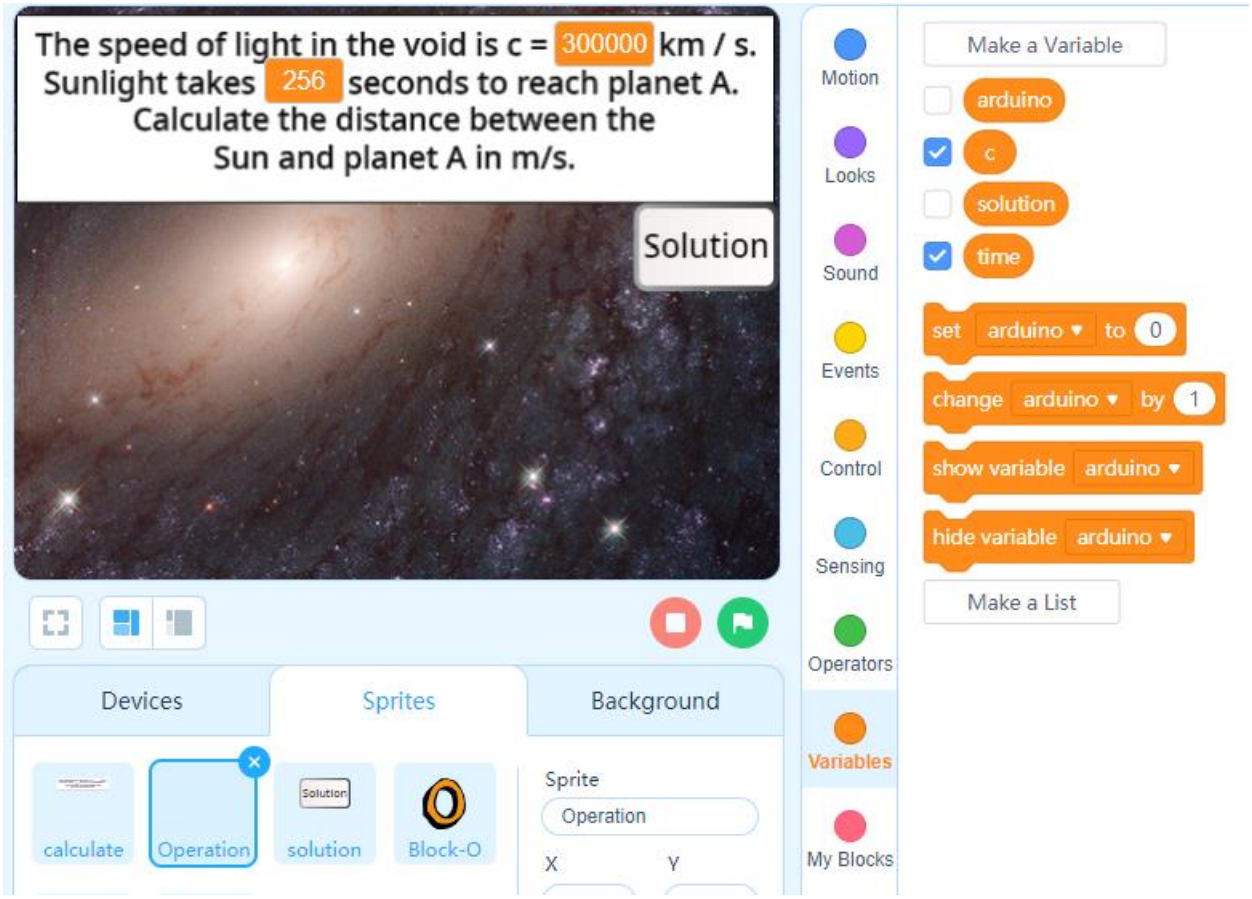
ACTIVITY DESCRIPTION

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:



We add the “c” and “time” variables for the problem statement:

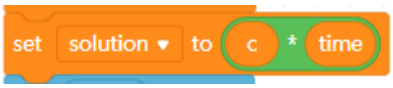


In addition, we will create the "Solution" variable, which will be the one that calculates the solution to the problem, and the "Arduino" variable, which will be in charge of sending to the Arduino board when and that the corresponding LED lights up.

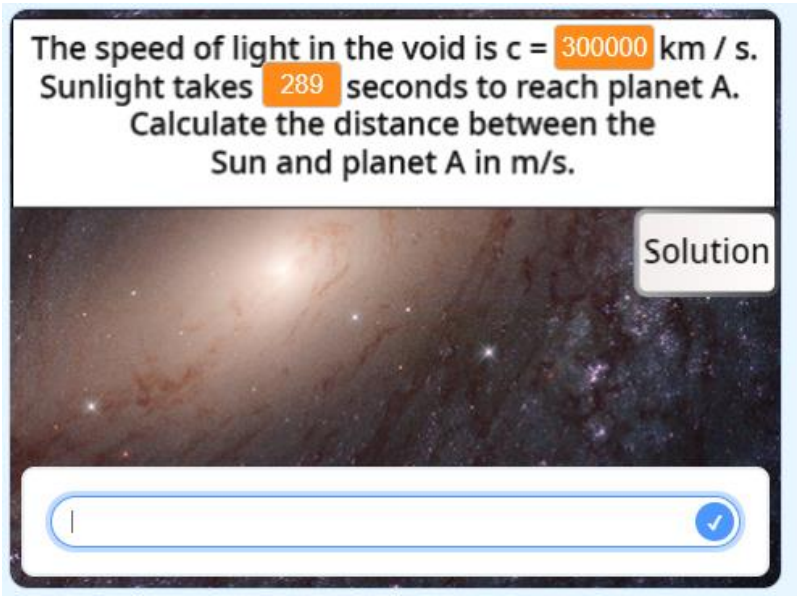
Once we have the graphic composition and the variables created, we will start with the programming:

1. We will start by setting the visual background that we want to appear while the mathematical/physics problem is being posed and we will set the “Arduino” variable to 0, so that the LEDs are off. In addition, for the “time” variable, random value will be created, so that whenever the Activity starts, different values come out:

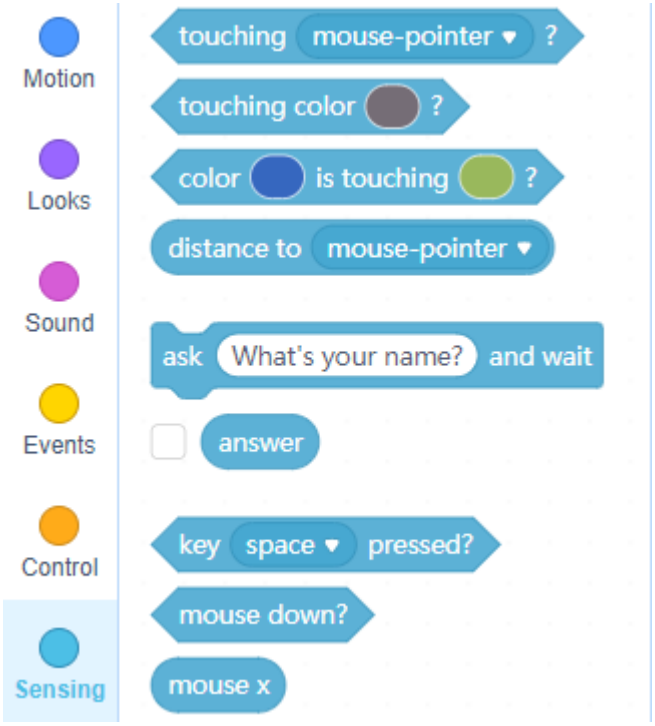
2. Then, we apply the formula that will calculate the problem:



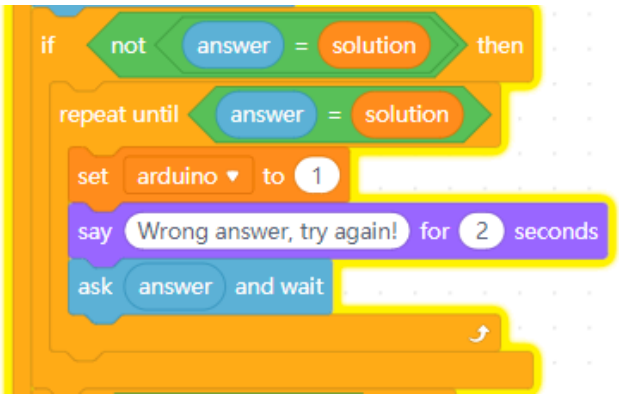
3. Next, the system wait for the user to write the result:

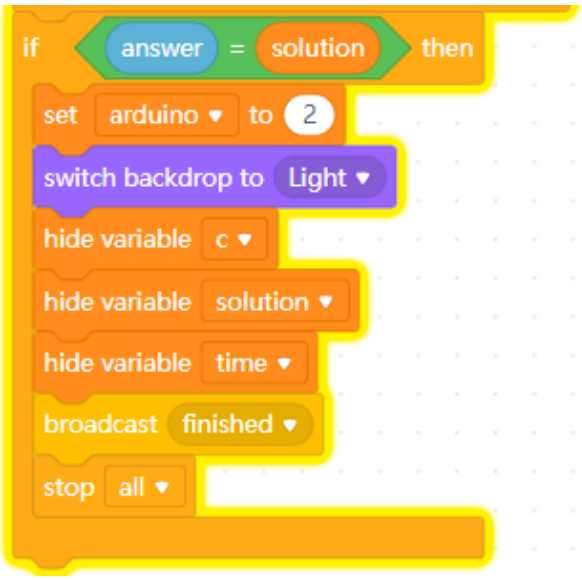


4. The result indicated by the user will be saved in a variable called “answer”, which will be created in the “Sensing” section:

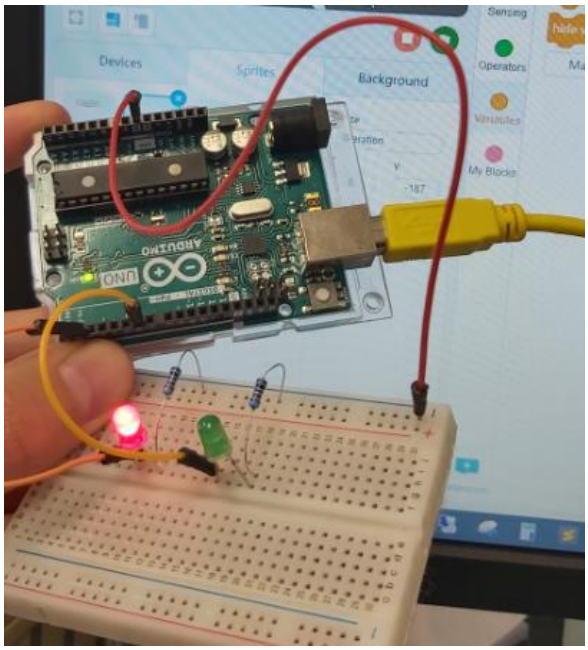


5. Once the answer has been inserted, the programming will check to verify the result:

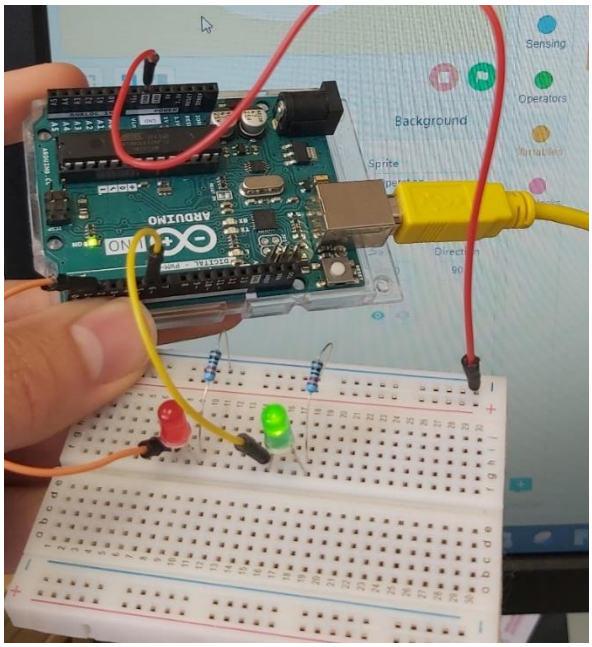




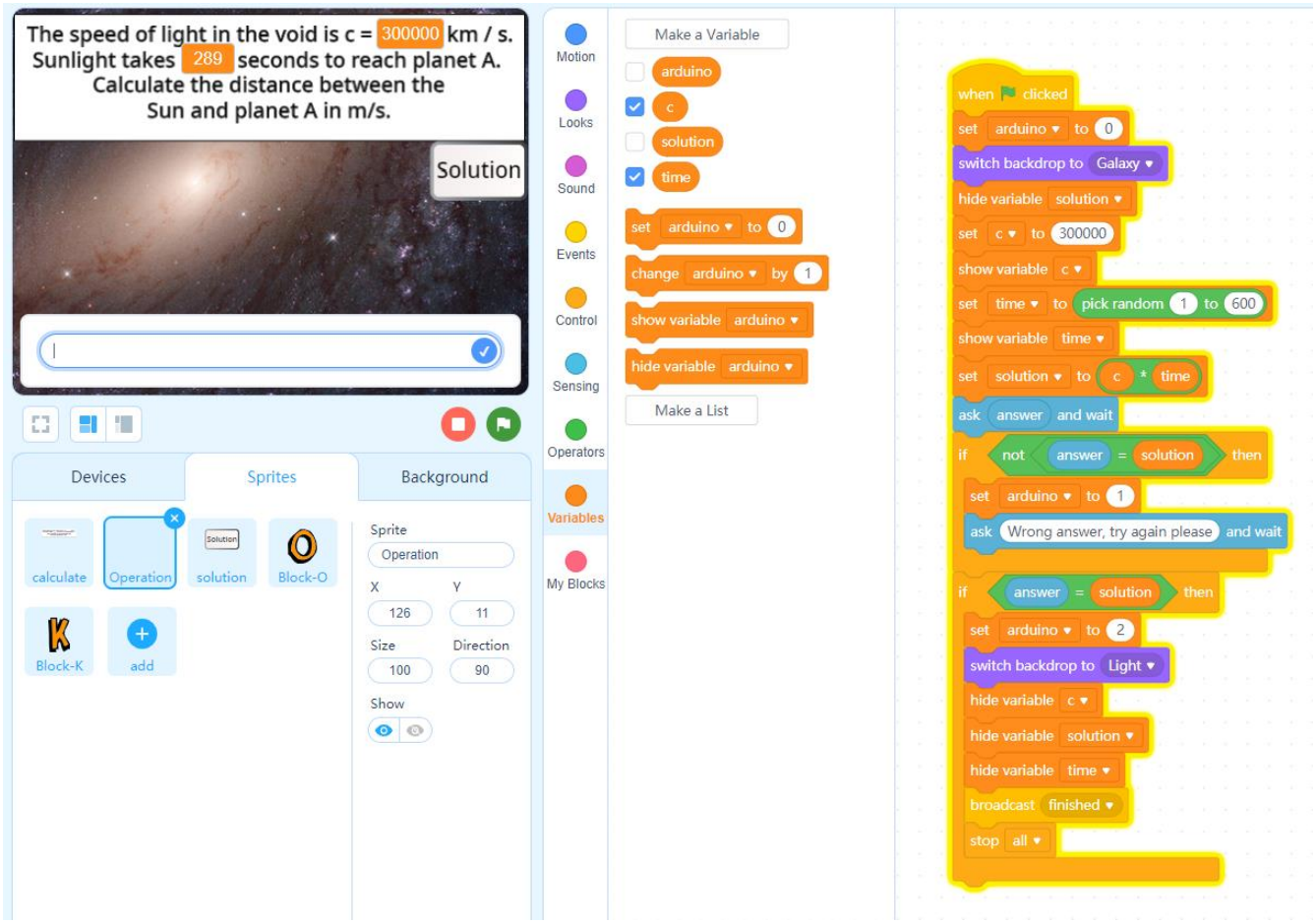
6. If the entered result is wrong, the game will display "Wrong answer, try again!" and will prompt the user to retype the answer. In this block the Red LED of the Arduino will light:



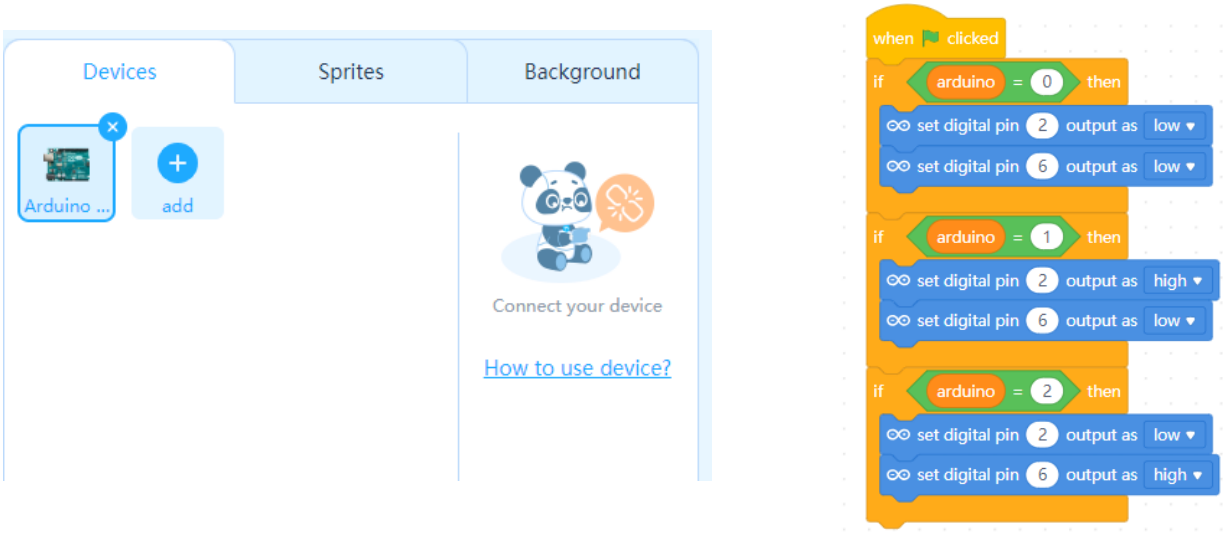
7. If, on the contrary, the user types the correct answer, the Green LED will light up and the variables will be hidden and the background will change:



8. The main Code would be as follows:



9. The code that would be in charge of lighting the LEDs on the Arduino board would be as follows:



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
Regarding the concept of scalability, the exercise could be extrapolated to other branches of physics.