

SCENARIO	
<b>Title</b>	<b>Arduino - what is a microcontroller and how can it be used?</b>
<b>Summary</b>	Students will be introduced to the basics of Arduino controllers, learn to connect it to a computer and implement their first program.
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	Date: 30/01/2020

Didactic objectives	
<b>General objectives:</b> - learning the definitions related to microcontrollers - getting to know the composition of the Arduino platform <b>Detailed objectives:</b> Arduino support - the ability to write a program in Arduino	
Physics <input type="checkbox"/>	Mathematics <input type="checkbox"/> Information Technology <input checked="" type="checkbox"/> Robotics <input checked="" type="checkbox"/> Programming <input type="checkbox"/>
Education Level:	10-12years <input checked="" type="checkbox"/> 12-14years <input type="checkbox"/>
Problem Statement	
How does Arduino work? How to configure the platform, connect it to the computer? How to create a script in Scratch for Arduino?	
BOM (Bill Of Materials needed)	
- computer station for a group of students (3-4 people) - multimedia board with a projector for presentation - Internet access - Arduino set - Arduino IDE software	
Activity description	
The scenario is planned for 3 lessons. <b>Course of classes:</b> <ol style="list-style-type: none"> <li>1. Organization in the classroom. Division of students into groups.</li> <li>2. Conversation with students about intelligent devices, how they work and what makes machines “think”.</li> <li>3. Introduction of the term microcontroller. Showing examples of the use of microcontrollers in everyday life. Presentation of the Arduino microcontroller.</li> <li>4. The structure of the Arduino board. Overview of items.</li> <li>5. Connecting boards to computers. After the teacher's instructions, the students should connect the</li> </ol>	

boards by themselves.

6. Overview of the basic functions of the Arduino IDE.
7. The first program in the Arduino IDE environment - Blink (blinking LED). Use of the pinMode, = () digitalWrite (), delay () functions.
8. Introduction to the Scratch for Arduino program - switching the diode on / off, changing the diode brightness.
9. Summary of the classes. Analysis of new skills. Self-evaluation of students.

## Resources

```
robotyka3-1  
  
void setup() {  
  // put your setup code here, to run once:  
  pinMode(13, OUTPUT);  
}  
  
void loop() {  
  digitalWrite(13, HIGH);  
  delay(1000);  
  digitalWrite(13, LOW);  
  delay(1000);  
  // put your main code here, to run repeatedly:  
}
```

Blinking LED in the Arduino IDE



Enable the diode in the Scratch environment



Smooth change of LED brightness in the Scratch environment

### Students' Evaluation

#### Evaluation tools:

- observation of students' work and their activities,
- observation of the ability to work in a group,
- students' self-assessment - what I have learned, what I can, what I would like to know, what algorithm I can create,
- program feasibility.

### Bibliography

<https://www.arduino.cc/>

<http://forbot.pl/blog/artykuly/programowanie/kurs-arduino-w-robotyce-1-wstepid936>

<http://s4a.cat/>

### Scalability

Older students can complete tasks on their own. Task proposal: programming the Arduino diode which will be on for 3 seconds, off for 1 second, on again for 3 seconds, off for 1 second, etc. Younger students are recommended to work in the Scratch environment, while older ones in the Arduino IDE environment (work on code).

### More information

Scenario was created as part of the project "InnoExperiment - Innovative Approach to Teaching through Experiment" carried out under Key Action 2. Erasmus +. The scenario will be made available on the project platform.

„InnoExperiment – Innovative Approach to Teaching through Experiment”

Project Leader: Zespół Szkolno – Przedszkolny w Goniądzu (ZSP)

