

SCENARIO		
Title	Motion sensor programming - Arduino	
Summary	Students will use the Arduino set to build a motion sensor model.	
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Didactic objectives	
General objectives: - getting to know the concept of PIR sensor and principles of operation Detailed objectives: - can connect a sensor - can read data sent via 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 the motion sensor work? What is a PIR sensor and how does it work? How are motion sensors used?	
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. Course of classes: <ol style="list-style-type: none"> 1. Organization in the classroom. Division of students into groups. 2. Connecting Arduino to computers. 3. Connecting the RGB diode to the Arduino. 4. Discussion on motion sensors, what they are, where they are, what is their using. 5. Introduction of the PIR motion sensor. Overview of the principle of operation. 6. Installing the PIR sensor in the Arduino. Trying out sensitivity - changes in sensitivity. 7. Writing of the sensor controlling algorithm (pin number declarations, reading the sensor status, turning 	

- on the LED at the HIGH signal, turning off at the LOW signal).
8. Testing the program.
 9. Correction of irregularities and errors.
 10. Summary of the classes. Analysis of new skills. Self-evaluation of students.

Resources

```
robotyka6-1  
  
int ledPin=13;  
int inputPin=8;  
int val=0;  
void setup() {  
  pinMode(ledPin, OUTPUT);  
  pinMode(inputPin, OUTPUT);  
  // put your setup code here, to run once:  
  
}  
  
void loop() {  
  val=digitalRead(inputPin);  
  
  if (val==HIGH){  
    digitalWrite(ledPin, HIGH);  
  }  
  else {  
    digitalWrite(ledPin, LOW);  
  }  
}  
  
// put your main code here, to run repeatedly:  
|
```

Basic program code that detects motion

```
robotyka6-2
int ledPin=13;
int inputPin=8;
int val=0;
void setup() {
  pinMode(ledPin, OUTPUT);
  pinMode(inputPin, OUTPUT);
  // put your setup code here, to run once:

}

void loop() {
  val=digitalRead(inputPin);

  if (val==HIGH){
    digitalWrite(ledPin, HIGH);
    delay(1000);
  }
  else {
    digitalWrite(ledPin, LOW);
    delay(1000);
  }
}

// put your main code here, to run repeatedly:
```

Program code modified by the length of LED lighting

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/>

<https://www.youtube.com/watch?v=rhnjMTDNvL0>

Scalability

„InnoExperiment – Innovative Approach to Teaching through Experiment”

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



Older students can perform tasks on their own and modify the program so that the LED lights up in the following mode: 1 second on and one second off.

Junior students can work in the Scratch environment.

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.