Lesson plan

2023-1-SK01-KA220-SCH-00015112

CODING GIRL

GIRLS JUST WANT TO HAVE FUN CODING

Topic	Safety	
Block name	Digital guardian – motion sensor for a safe home	
Age category 12– 15	**Age category** 135 minutes	**Number of teaching hours** 3

Student-centered educational goals (content and performance standards)

Content standard:

- understands the importance of securing a home
- can describe the principle of operation of a motion sensor
- can give examples of the use of sensors in practice

Performance standard:

- can program micro:bit with motion sensor (PIR sensor)
- can record sensor activation and trigger an alarm
- can suggest simple improvements to the security system

Integration of subjects:

- Science (physics): motion, infrared radiation
- Mathematics: recording activation time, statistics
- Technology/INF: micro:bit programming, working with sensors

21st century skills:

- problem solving,
- digital literacy,
- teamwork

Didactic aids and teaching techniques:

- micro:bit
- PIR sensor (motion sensor)
- USB cable, battery module
- computer/laptop with internet access

References / Resources (videos, methodologies):

- https://www.microbit.org/
- https://makecode.microbit.org/

Motivational phase:

Duration: 20 minutes

Objective: The student will understand the importance of technology in home security.

Introductory activity – motivation: The teacher will show a short video about modern security systems.

Keywords: sensor, motion, alarm, security

Interactive questions:

- How does the alarm work?
- Where have you seen motion sensors before?

Exposure phase (discovery):

Duration: 95 minutes

Objective: Create a simple security system using a micro:bit and a motion sensor.

Science Integration:

- infrared sensor and motion detection principle

Informatics integration:

- programming the micro:bit to trigger an alarm or display a warning when motion is detected

Activities:

1. Connecting the PIR sensor to the micro:bit.
2. Programming of the response (sound signal, text on the display, LED flashing light).
3. Testing the device in various situations.

Group discussion:

- How would you improve this system?
- In what other situations could it be used?

Fixation phase (fixing and deepening):

Duration: 20 minutes

Objective: To consolidate knowledge and suggest practical improvements.

Activities:

- Design an extension that sends a notification to your mobile phone when you move.

Student evaluation:

- program functionality
- creativity of solutions
- ability to explain how the system works

Attachments:

- Wiring diagram of PIR sensor to micro:bit (power, data output and ground marked)
- Sample MakeCode program:
  - when motion is detected, it displays the text "MOTION!"
  - triggers an audible signal via a buzzer or LED flashing pattern
- Sensor activation test table:

Test Location	Activation Time	Number of Detected Movements	Notes
Classroom			
Corridor			
At the Door			

- Photo of PIR sensor for visual component identification
- Project extension example – connecting a micro:bit radio module to send a signal to another micro:bit