Lesson plan

2023-1-SK01-KA220-SCH-00015112

Topic	Health	
Block name	Follow your heart – measuring your heart rate while moving	
Age category 13 – 15	**Duration** 135 minutes	**Number of teaching hours** 3

Student-centered educational goals (content and performance standards)

Content standard:

- understands the concept of heart rate and its relationship to physical activity
- can describe the importance of heart rate monitoring for health and prevention
- can use digital technologies to collect and evaluate data

Performance standard:

- can program a micro:bit with a pulse sensor to measure heart rate
- can record and evaluate measured data
- can interpret the results in the context of a healthy lifestyle

Integration of subjects:

- Science (biology): cardiovascular system, physiological responses of the body to stress
- Mathematics: data processing and graphical representation
- Technology/INF: micro:bit programming, working with sensors

21st century skills:

- analytical thinking
- digital literacy
- teamwork
- data interpretation

Didactic aids and teaching techniques:

- micro:bit
- pulse sensor compatible with micro:bit
- USB cable, battery module
- computer/laptop with internet access
- data recording table (paper or online)

References / Resources (videos, methodologies):

- https://www.microbit.org/
- https://makecode.microbit.org/
- methodological materials about pulse sensors (e.g. Gravity: Heart Rate Sensor)

Motivational phase:

Duration: 20 minutes

Objective: The student will realize the importance of monitoring bodily functions and discover how technology can help promote health.

Introductory activity – motivation: The teacher plays a short video or shows a real sports bracelet that measures heart rate. He compares it with a simple micro:bit-based system.

Introduction to the issue (keywords): heart rate, pulse, physical activity, health, sensor

Interactive questions and answers:

- What is heart rate?
- How does the heart rate change at rest and during exercise?
- Why do athletes monitor their pulse?
- How can the micro:bit help with heart rate measurement?

Explain the purpose of the activity: to show students that digital tools can be used to monitor their health. Set expectations: students will program their own micro:bit to measure their heart rate and display it on the screen.

<u>Exposure phase (discovery):</u>

Duration: 95 minutes

Objective: To learn how to work with a pulse sensor and micro:bit, record and evaluate the measured data.

Science Integration:

- comparison of resting and exercise heart rate
- discussion about optimal heart rate values during exercise

Informatics integration:

- programming the micro:bit in MakeCode to read data from the sensor and display the result
- saving measured values in a table

Activities:

1. Connecting the pulse sensor to the micro:bit according to the diagram.
2. Programming the micro:bit to measure and display heart rate (BPM).
3. Measuring pulse at rest – recording values in a table.
4. Measuring your pulse after a short physical activity (e.g. 20 squats or a short run).
5. Comparison and discussion of differences.

Group discussion:

- What did you find out about your pulse?
- Why does the pulse increase when moving?
- How can this measurement help with training or health monitoring?

<u>Fixation phase (fixing and deepening):</u>

Duration: 20 minutes

Objective: to verify and consolidate the knowledge and skills acquired during the lesson.

Activities:

- Design a simple micro:bit application that alerts you if your heart rate exceeds a set limit.
- Create a short presentation of the group's results.

Student evaluation:

- program functionality

- correct sensor connection
- ability to interpret results
- teamwork

Attachments:

- sensor wiring diagram
- sample MakeCode program
- table for recording values