Dofinansowane przez Unię Europejską

ERASMUS+ PROJECT, PROJECT TITLE: "Developing Selected Key Competences of Students in Classroom and Extracurricular Activities at School" No. 2024-1-PL01-KA220-SCH-000247484/2

Scenario for a Demonstration Lesson Conducted as Part of the Erasmus+ Project
Subject: **Biology**
Grade Level: **Grades IV – VI of Primary School**
Number of Lessons: **1 lesson (45 minutes)**
Class: **VII**
Teacher: **Katarzyna Wojnowska**
School: **Szkoła Podstawowa im. Bohaterów Września w Radziejach**
Lesson Topic: **Structure and Functions of the Heart**
Key Competences Developed During the Lesson:

- **The ability to learn**
- **Social and civic competencies**
  Social and civic competenices

Lesson Objective:
The student can identify the location and components of the heart, explain its working mechanism, independently measure pulse and blood pressure, and analyze the effect of physical exercise on these parameters.

General Educational Goals (Curriculum):
• Understanding the structure and function of human organ systems.
• Ability to conduct biological observations and measurements.
• Shaping a health-conscious attitude and responsibility for one's health.

Specific Educational Content:
The student:
• Identifies the location of the heart.
• Lists the components of the heart's structure.
• Describes the heart’s mechanism of action.
• Explains what the pulse is and measures it.
• Explains what blood pressure is, knows the correct values, and measures it.
• Conducts an experiment examining the effect of physical exercise on blood pressure.

Teaching Methods:
• Multimedia presentation,
• Group work,
• Practical exercises,
• Biological experiment,
• Interactive educational game,
• Guided discussion.

Teaching Aids:
• Virtual Tee (T-shirt with AR application),
• Human anatomical model,
• 3D animation (ZPE MEN),
• Blood pressure monitor,
• Stopwatch,
• Observation sheet,
• Multimedia monitor,
• Educational animations "Structure and Location of the Heart," "Heart's Work Cycle" (Multibook – Puls Życia 7, Nowa Era),
• Wordwall platform,
• Kahoot platform.

Lesson Flow:
Introduction Phase (Approx. 5 minutes)
Objective:
The student knows the topic and lesson objectives, understands the main function of the heart.
Teaching Situation:

1. Greeting and organizational tasks – the teacher checks attendance and student readiness.
2. Introduction to the topic – the teacher displays the lesson topic on the multimedia monitor and discusses the lesson goals in the context of daily life.
   • Projection of an educational animation – students watch about a 1-minute multimedia clip about the structure and location of the heart. (Multibook – Life Pulse 7, Nowa Era).
3. Guided discussion – opening question: "What is the heart's function in the body?" – students suggest their ideas.
   Teacher's Instructions:
   • Ensure the video runs smoothly on the monitor and check the sound.
   • Pay attention to student activity and encourage less active students to speak.
   Student's Instructions:
   • Listen carefully.
   • Raise your hand to share your knowledge or associations about the heart.

Implementation Phase (Approx. 30 minutes)

1. **Heart's Location (5 minutes)**
   Objective:
   The student can point out the location of the heart and understand why its placement is important for protection and function.
   Teaching Situation:
   • The teacher demonstrates the location of the heart using the Virtuale Tee T-shirt (the student wears the T-shirt, and the image is visible on a mobile phone).
   • A demonstration on the anatomical model: the teacher indicates the heart's position in the chest.
   • Brief discussion: "What protects the heart? Why is its position behind the sternum and between the lungs beneficial?"
   Instructions for the teacher:
   • Test the application before the lesson.

• Ask students: “Is the heart's location symmetrical?” (Answer: slightly to the left).

Instructions for the students:

• Carefully observe the heart’s location, compare it to your own body.

• Ask questions if something surprises you.

2. **Structure of the Heart – Animation, Anatomical Model, Interactive Exercise – Wordwall (10 minutes)**

   Objective:

   The student recognizes the basic components of the heart’s structure.

   The student consolidates knowledge about the structure of the heart in the form of an educational game.

   Teaching Situation:

   • The teacher runs a 3D animation (ZPE MEN) and discusses the atria, ventricles, valves, and vessels.

   • The teacher runs the "Structure of the Heart" game on the Wordwall platform – two difficulty levels.

   • Students work individually on the interactive monitor.

   Instructions for the teacher:

   • Prepare the exercise link in advance.

   • Observe students’ work pace and assist with technical issues.

   Instructions for the students:

   • Select the difficulty level and complete the task within the estimated time.

   • Remember the results and questions that were difficult.

   Materials:

   https://wordwall.net/pl/resource/936628/biologia/budowa-serca

   https://wordwall.net/pl/resource/6861306/biologia/serce-budowa

   Feedback: After completing the task, the system checks its correctness and indicates possible errors.

3. Heart’s Work Cycle – Educational Animation

   Objective:

   The student lists the phases of the heart's work cycle in the correct order (ventricle contraction, atrial contraction, rest).

   Teaching Situation:

   • The teacher presents the animation “Heart’s Work Cycle” (Multibook – Puls Życia 7, Nowa Era). The students are asked to repeat the information they learned.

   Instructions for the teacher:

   • Check the application before the lesson.

   • Ask students: “List the phases of the heart’s work cycle and define the direction of blood flow.”

   Instructions for the students:

   • Listen carefully and watch the animation, try to remember the phases of the heart’s work cycle.

   • Pay attention to the direction of blood flow in the heart.

4. **Biological Experiment: The impact of physical exercise (10 minutes)**

   Objective:

   The student can measure pulse and blood pressure and analyze the impact of physical exercise on the circulatory system.

   Teaching Situation:

   • Short introduction: the teacher explains pulse and blood pressure concepts and gives correct values.

   • A demonstration of pulse measurement (teacher + chosen student) and blood

pressure measurement (with a blood pressure monitor).
• Students conduct an experiment in groups – Testing the impact of physical exercise on blood pressure values. They complete the observation sheet, record results, analyze them, and draw conclusions.
• The teacher discusses why the parameters increased and their consequences for health.
Instructions for the teacher:
• Prepare the blood pressure monitor and stopwatch.
• Assist with the equipment and ensure safety during the experiment.
Instructions for the students:
• Work carefully and follow the instructions.
• Accurately record the measurements in the observation sheet.

Conclusion Phase (Approx. 10 minutes)
Objective:
The student consolidates knowledge and evaluates their level of understanding.
Teaching Situation:

1. Kahoot Quiz – students answer questions regarding the lesson content (structure of the heart, location, pulse, pressure).
2. Evaluation – students fill out a brief survey/or verbally share what was interesting and what was difficult.
3. Thanks – the teacher thanks students for their participation.
   Instructions for the teacher:
   • Prepare the quiz in advance and check network accessibility.
   • After the quiz, praise students for their engagement.
   Instructions for the students:
   • Participate in the quiz – compete with the class.
   • Reflect on what you remember and what you've learned.
   Feedback: After each answer, the student receives immediate feedback on correctness, and their answer is compared with others.
   Materials:
   https://kahoot.it/challenge/?quiz-id=7378a0c6-a06d-4b28-94c9-4e7d0cbe3102&single-player=true

Guidelines for Working with Individuals with Diverse Developmental Needs:

1. Clear, brief instructions
2. Additional questions to ensure understanding of tasks
3. Group work to allow peer assistance
4. Teacher support during exercises

Bibliography:

1. M. Jefimow Puls Życia *7. Biology Textbook for Seventh Grade of Primary School*, Nowa Era
2. Ministry of National Education, Integrated Educational Platform (ZPE MEN)
3. Wordwall.net, Interactive Educational Games – "Structure of the Heart"
4. Kahoot.it, Educational Quiz – "Structure and Function of the Heart"
5. Virtuali-Tee, Augmented Reality Application for Learning Anatomy

6. Publicly available materials on the internet

TEACHER'S METHODOLOGICAL OPINION
Opinion: **Structure and Function of the Heart**

The lesson scenario is very well prepared—detailed, well-structured, and based on the curriculum. Here are a few aspects worth appreciating, and one suggestion to improve it.

Strengths:

- **Detail** – The scenario includes specific goals, teaching methods, materials, and a step-by-step lesson plan.
- **Active Teaching Methods** – Students do not just listen to a lecture, but also engage in interactive exercises and biological experiments.
- **Use of Technology** – The interactive board, educational game, and Virtuale Tee shirt help students understand new material.
- **Teamwork Elements** – Students are encouraged to collaborate and communicate.
- **Evaluation** – A well-planned conclusion phase with a Kahoot quiz provides immediate feedback.

Possible Improvements:

- The key competences being developed in the lesson are not explicitly listed and named in the scenario.

Biology Teacher – Ewa Szarmacher

APPROVAL BY SCHOOL PRINCIPAL

Radzieje, 24th March 2025.

Approved for implementation