



**Dofinansowane przez  
Unię Europejską**

## **Lesson Plan for 8th Grade of Primary School**

**Teacher:** Ewa Szarmacher

**Topic:** Electric Circuits

**Subject:** Electric Current

**Duration:** 1 lesson

### **Curriculum Content from the Core Curriculum:**

- VI 7: The student describes the flow of current in circuits as the movement of free electrons or ions in conductors.
- VI 9: The student uses the concept of electrical voltage as a quantity needed to transfer a unit charge in a circuit; uses the unit of voltage.
- VI 13: The student draws diagrams of electrical circuits consisting of one energy source, one receiver, meters, and switches; uses graphical symbols for these elements.
- VI 15 d: The student experimentally connects, according to a diagram, an electrical circuit consisting of a source (battery, power supply), a receiver (light bulb, buzzer, motor, diode, heater, resistor), switches, voltmeters, and ammeters.

### **General Objectives:**

The student:

- I. Uses concepts and quantities to describe phenomena and indicate their examples in the surrounding reality.
- II. Solves problems using physical laws and relationships.
- III. Plans and conducts observations or experiments and draws conclusions based on their results.

### **Skills Developed During the Lesson in Terms of Key Competencies:**

- Understanding and creating information (the ability to read, write, understand, and create information, the ability to communicate, using appropriate aids, formulating and expressing arguments orally and in writing).
- Mathematical competence and competence in the field of natural sciences (mathematical thinking and perception in perceiving problems in everyday situations, the ability to calculate, knowledge of measures, understanding terms and concepts, using appropriate aids, conducting experiments, the ability to use and handle technical devices, the ability to draw and present conclusions).
- Personal and social competence (the ability to work in a group, understanding the principles of conduct and communication, the ability to communicate constructively).

### **Specific Objectives:**

- A: Memorizing information:
  - The student knows the conditions that must be met for an electric current to flow in a circuit.
  - The student knows the basic symbols used in electrical engineering (current source, light bulb, ammeter, voltmeter, switch, motor).
- B: Understanding information:
  - The student understands what conditions must be met for an electric current to flow.
- C: Applying information in typical situations:
  - The student can build a simple electrical circuit (current source, wires, light bulb).
  - The student can include an electrical meter in the circuit, e.g., a voltmeter or ammeter.
  - The student can measure electrical voltage.
  - The student can draw a diagram of a simple electrical circuit consisting of one energy source, one receiver, and meters.
- D: Applying information in problem situations:
  - The student can assemble an electrical circuit according to a diagram.
  - The student distinguishes between the methods of connecting electrical circuit elements: series and parallel.

**Methods and Forms of Work:** lecture elements, discussion, experiment, group work, Learning.Apps.org platform.

**Teaching Materials and Aids:** worksheets with circuit diagrams, multimedia presentation, electrical circuit construction kits, laptop, multimedia projector.

### **Adaptation for Students with Special Educational Needs (SEN):**

Questions directed to students with learning difficulties should be precise. Clear and short instructions. The teacher should make sure that students understand the instructions properly by asking additional questions. It is good to seat students with learning difficulties near the teacher, thanks to which their concentration will increase, the number of distracting stimuli will be reduced, and direct teacher control will increase.

### **Success Criteria (NaCoBeZu):**

In today's lesson:

- You will recall the symbols of electrical circuit elements.
- You will recall what steps should be taken to build a simple electrical circuit based on a diagram, so that current flows in it.
- You will connect light bulbs in series and parallel.
- You will read the voltage on the meter in the constructed circuit.

## Lesson Stages:

Teacher's Actions	Students' Activities	Student Instructions
The teacher ensures student safety during experiments. The teacher reminds students what electricity is, presents the symbols of circuit elements, and supervises the planning and execution of student experiments: connecting components according to a given circuit diagram. The teacher emphasizes the correct way of integrating measuring devices into circuits.	Students write down the topic and review the lesson objectives.	
	Students build electric circuits based on diagrams and develop their ability to read meter measurements.	

## Implementation Phase (30 min)








Teacher's Actions	Students' Activities	Student Instructions
<b>Introduction to the topic:</b> The teacher presents a multimedia presentation, reminding students: <ul style="list-style-type: none"><li>- What electricity is</li><li>- What an electric circuit is</li><li>- The basic symbols used in circuit diagrams (symbols are also displayed in a visible place)</li></ul> The teacher divides students into groups of 2-3 people. Each group receives worksheets with circuit diagrams and instructions. <i>(The worksheet is included as Appendix 1.)</i> The teacher discusses the results of the experiments with students.	Students familiarize themselves with the instructions on the worksheets and ask questions if anything is unclear.	You have received worksheets with circuit diagrams that you need to build. Based on these diagrams, construct the circuits. Then, present the created circuit to the teacher. Choose a leader from your group who will present your experiment.

### Evaluation (5 min)

Teacher's Actions	Students' Activities	Student Instructions
<b>Take part in the quiz!</b> Students complete the "Who Wants to Be a Millionaire" quiz on LearningApps.org. <a href="#">Quiz Link</a>	After answering each question, students receive feedback on their correctness.	
<b>Fill out the evaluation form (Appendix 2).</b>	Students complete the evaluation form.	

### APPENDIX 1. Worksheets for Groups with Circuit Diagrams and Instructions

**Task 1.** Match the electrical components (ammeter, voltmeter, voltage source, electrical wire, open switch, resistor, light bulb) to their graphical symbols.

### Experiment 1. Building a simple electric circuit.

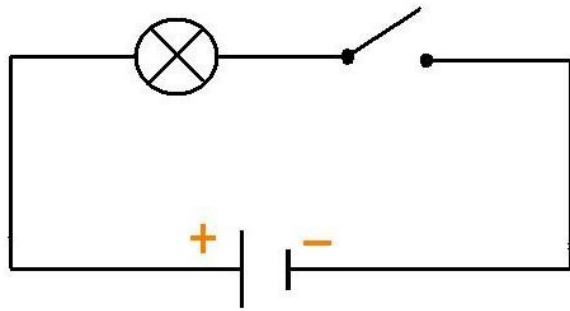
Based on the electric circuit diagram, build a simple electric circuit so that the light bulb lights up.

#### Equipment:

battery, light bulb, wires, switch

**Question:** How to connect the circuit elements together so that the light bulb lights up?

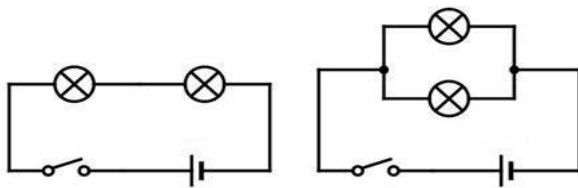
**Conditions for the flow of electric current in the circuit:**



## Experiment 2. Series and Parallel Connection of Light Bulbs in a Circuit

Based on the electric circuit diagram, build electric circuits 1 and 2. Do the light bulbs in these circuits illuminate with the same intensity?

**Equipment:** light bulbs, switch, batteries



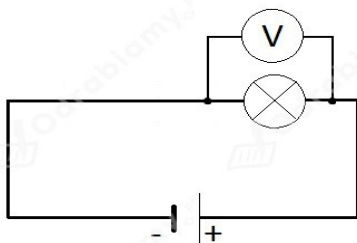
**Observations:**

**Conclusion:**

## Experiment 3. Measuring Electrical Voltage in a Simple Electric Circuit.

Based on the electric circuit diagram, build an electric circuit. Measure the electrical voltage. Record the result.

**Equipment:** light bulb, switch, battery, voltmeter



Oto tłumaczenie na język angielski:

**Examples of other diagrams for experiments (if there is enough time):**

- battery, wires, motor with a disc
- battery, light bulb, wires with alligator clips, pencil (with graphite exposed at both ends)

**APPENDIX 2. Evaluation Sheet**

**Evaluation Sheet**

Place an "X" closer to the answer you consider appropriate.

**TODAY I LEARNED**

Put X closer to the answer you consider appropriate		
fast	.....	Slowly
With pleasure	.....	Without pleasure
actively	.....	I did nothing
A little	.....	A lot
With effects	.....	Without effects

**Bibliography:**

- <https://leszekbober.pl/fizyka/prad-elektryczny/obwod-elektryczny/>
- Physics Curriculum for Primary School "Meetings with Physics" Grażyna Francuz-Ornat, Teresa Kulawik
- "Meetings with Physics" Physics Textbook for 8th Grade of Primary School
- Physics Core Curriculum