

ELECTRONICS: CONCEPTS AND BASIC COMPONENTS

THEME	Switch and LED
FORMAT	Group (students work in small groups)
PREPARATION TIME	30 minutes
ACTIVITY LENGHT	30-45 minutes
DIFFICULTY LEVEL	average

PEDAGOGICAL GOALS

- To exercise reading and understanding a schematic diagram
- To assemble a circuit with a relay and LED and understand how this circuit works.

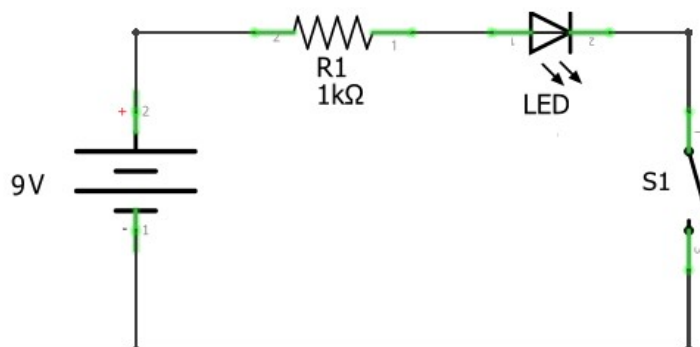
NECESSARY MATERIALS

For each group of students.

- 1 9V battery
- 1 breadboard
- 1 1k Ω resistor
- 1 red LED
- 1 push-button switch

Preparation:

- Assemble kits with the necessary materials for each group of students
- Draw the circuit on the board with Red LED, resistor and push-button switch



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Leading the activity:

- The activity begins with a discussion with the class to read and understand the circuit drawn on the blackboard.
- Ask students to explain what the designed components are and how the circuit works.

Step 1:

- Ask the groups to assemble the same circuit as the one on the board, using red LED, resistor, push-button switch, battery and the breadboard
- Ask the groups to measure the voltage across the red LED and the current
- Share the results. Ask students who have completed the activity to help other groups.

Step 2:

- Present a challenge to the class: “How could we modify the circuit so that when the push-button is pressed, the LED goes off, and when the push-button is released, the LED is on?”
- Ask the groups to experiment by modifying their circuits.
- Encourage groups that finish first to help colleagues having difficulty.

Discussion and reflection:

After completing the activity, create a collective discussion with the class about the activity. See some examples of possible questions:

- What is the difference between the first circuit (which is on the blackboard) and the second circuit (of the challenge)?
- How do the circuits work?
- Considering that normally the operating current of the LED is 20mA, is this circuit with the highest or lowest current? What is the implication?
- What can we do to make the red LED shine brighter? The answer is: calculate a smaller resistor, within the LED specification.
- Discuss battery current consumption versus battery life. How to consume less? (The minimum current must always be consumed to fulfill the circuit's purpose.)
- Are there other types of switches besides the push-button?
- Is the light switch a type of switch? How does it work?

Credits:

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