6.1 Simple electrical circuit

Basic information and collecting ideas 	In experiment 6.1, your students will: ▪ learn about basic components for doing electricity and electronic experiments, e.g. batteries and battery holders, cables with crocodile clips, and a buzzer. ▪ learn how to use the materials to set up a first electrical experiments. ▪ experience and learn the basic components of an electrical circuit. ▪ learn about circuit diagrams and symbols for electronic components. **Additional information** Be sure to inform the students about the dangers of electricity and safety measures to avoid them. Point out that the voltage used in the experiment (usually 3V) is harmless. However, emphasize that household voltage is much stronger and can be dangerous if handled incorrectly. Since the students are working with the materials for the first time, explain the individual components and specify their purposes. The experiment works equally well with an incandescent bulb instead of the buzzer. For our worksheet, we have chosen a buzzer simply because incandescent bulbs are prone to break and must then be replaced. If your students use incandescent bulbs in the experiment, make sure to point out in the “Analysis and reflection” that the bulbs do not produce light but heat: The wire filament is heated to such a high temperature that it glows with visible light. Point out the dangers of a battery being short-circuited. Point out that the circuit diagram uses abstract symbols, which represent real components.
Observing and documenting 	For the buzzer to ring, the electrical circuit must be closed. When you disconnect any cable (open the circuit), the buzzer stops ringing.

Analysing and reflecting 	**Basic rule:** The current flows from one pole of the battery to the buzzer via the cable. Then the current flows through the buzzer and to the other pole of the battery via the cable. This is called a closed circuit. A circuit is a closed path through which electric current can flow from power to ground (or from positive to negative). Anything that is part of this closed system and that allows power to flow is considered to be part of the circuit. There are two types of current: alternating current (AC) and direct current (DC). In the experiments, we use DC only. It is very important to prevent short circuits. Make sure that the positive voltage is never wired directly to ground (negative).
Technical and vocational application 	Depending on their personal experiences, students can be expected to name a wide range of occupations, as many vocational domains require knowledge about electricity. If you do this exercise with students, as an option you may want to cluster the answers of students into vocational domains, or alternatively into entry requirements for TVET or university study.

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