

9. How to observe electric current and resistance?

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The electricity is known as a topic that is described as an abstract and difficult to visualize. The concepts such as electrical current, electrical circuits, electrical resistance, voltage and others are commonly discussed and explained with the help of hydraulic analogy (canal system, water mills, pumps, etc.). The above analogies help to better understanding of the electricity, but only if the students understand it.

The resistivity is a concept that is most commonly introduced through the Ohm's law. The resistor(s) is/are connected in electric circuit, where the current and voltage are measured. Although the resistors are one of the most basic electronic components and have a convenient linear dependence of the current on the voltage, the resistors are still abstract or "black-box" elements. Students are not able to observe its properties directly. With ambition to bring the concept of resistance closer to students an alternative or supplementary device for visualization of the effects of resistance is presented in this contribution. The electronic device is used as a detector of the resistance, where the frequency of the blinking diodes gives us the information of the electrical current. With this device the resistance becomes "visually observable quantity".

The activities connected to resistance were designed on the basis of active learning strategy, where we try to encourage students to develop ideas, interdisciplinary integration of knowledge, technical skills training, teamwork and discovering the basic principles of researching. The role of a teacher using active learning teaching strategy is particularly challenging. A teacher is expected to guide students and provide the tips and information for their work. The building and use of the device allows creativity and innovation for both: teachers and students.

With ambition to use active learning activities starting in elementary school we will stress out ideas for activities that can be done with the electronic device which perfectly serves for wide resistance interval.