

*Title:* Electricity and magnetism: Hands-on minds-on approach

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*Abstract:* The PhD. thesis is focused on high school students' understanding of electricity and magnetism and on experiments which can help students to develop this understanding. The thesis can be divided into two parts:

In the first research part typical misconceptions of high school students in the area of electricity and magnetism are described, both misconceptions known from foreign literature and results of Czech Conceptual Test of Electricity and Magnetism. This test is based on the known Conceptual Survey of Electricity and Magnetism, but unlike it and other conceptual tests in electricity and magnetism this new Czech test is intended for high school students.

The second part of the thesis is developmental. It contains methodical materials, lab works and experiments which partly arise from the discovered misconceptions. In this part of the work four learning sequences (we chose topics, which were identified as problematic for students), four laboratory works and 13 experiments are described. Prepared materials were verified during instructions in high school and during conferences for physics teachers. Experiences with them are described in the thesis.

*Keywords:* Electricity and magnetism, physics teaching, hands-on minds-on experiments, misconceptions