

*Title:* Experiments supporting the teaching of thermodynamics at high school level

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*Abstract:* This doctoral thesis is aimed at chosen aspects of teaching of thermodynamics on high school. The thesis can be divided into two main parts:

The research part deals with investigation of typical students' conceptual difficulties in the field of thermal phenomena and its primary goal is to identify the most distinctive misconceptions of observed population. More than 500 students were questioned using a conceptual test both as pretest and posttest; approximately half of them also participated in the retention test which took part two years after pretest. The results of the conceptual test are connected with data obtained on the basis of the simultaneously conducted research of students' attitudes.

The developmental part of the thesis – partly inspired by previous misconception research – deals with arranging, documentation and testing of experiments relevant to teaching of thermodynamics. In total, 46 experiments were arranged, students-tested and published in the electronic Collection of Physics Experiments. These experiments are primarily intended for teachers as inspiration and in aid of their own experimental work. The text for teachers is complemented with a set of ten worksheets, which help students in their individual experimentation in the Interactive Physics Laboratory.

*Keywords:* experiments, high school students, misconceptions in thermodynamics, thermal imaging camera, thermal phenomena