

T3_87 DEVELOPMENT OF STUDENT EXPERIMENTAL SKILLS EXPLORING PHYSICAL PHENOMENA

Marián Kireš, Zuzana Ješková, *Faculty of Science Safarik University in Kosice, Kosice, Slovakia*
(marian.kires@upjs.sk, zuzana.jeskova@upjs.sk)

In conditions of formal school education, students come across with physical experiments in the form of teacher demonstration experiment, students experiment and laboratory work. Experiments are carried out according to predetermined procedure, with specified teaching aids, according to pre-selected measuring methods. Our experience shows that students lack the necessary experimental skills for self investigation of physical phenomena. Among the basic skills for experimental problem solving we consider: redefinition of the problem, prediction of physical factors affecting the process, production of experimentally verifiable hypotheses, design of verification apparatus, pilot measurement, qualitative analysis of measured data, selection of appropriate method of measurement, design and set up of measuring apparatus, data collection, their processing and evaluation, comparison of experimental and theoretical data, upgraded design and set up of new improved apparatus, collection, processing and evaluation of more-accurate experimental data, confirmation of hypotheses and final conclusion of the measurement results. Based on our four years experience with gifted students' activities we present the procedure for developing of student experimental skills. There are the basic stages of certain physical problem exploring described in details. The exploring procedure of experimental problems is presented with the help of three examples of the Young Scientists Tournament problems, i.e. Air pocket, Steering engine, Bouncing drop. The described methodology with sample solutions of selected experimental problems can be used as an idea for school laboratory work. To successfully meet the challenges it is necessary to use video measurement, computer-aided measurement, high-speed camera clip and to work with digital data.