

## **INTRODUCING CHEMISTRY WITH CALCULATORS IN TEACHER TRAINING: MEASUREMENTS WITH THE TI-83 PLUS™ IN FOUR GOOD LABORATORY PRACTICE EXPERIMENTS**

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In 2002 The School for Life Sciences at the transnationale Universiteit Limburg/ Limburgs Universitair Centrum started with an Academic Teacher Training for graduates in Life Sciences, Chemistry and Biology.

Nowadays secondary school teachers have to stimulate students to increase their interest in sciences and mathematics by exploring different ways of teaching. Therefore we offer our students of the Academic Teacher Training a variety of teaching methods. One of these methods is the integration of the TI-83 Plus™ connected to a CBL2™ interface in chemistry experiments at secondary level.

The TI-83 Plus™ is commonly used in secondary schools as a graphical calculator in mathematics. But the TI-83 Plus™ is more than a calculator. It can also be used in chemistry lessons as well: Connected to a CBL2™ interface it is possible to measure temperature, pH, conductivity and extinction and many other parameters. For these measurements we use sensors and probes provided by Vernier-Technology™. DataMate™, the software needed for these experiments, can be transferred from the CBL2™ to the TI-83 Plus™. The set-up of the experiment is elementary so there is no need for sophisticated laboratory tools.

Another advantage is the interdisciplinary character of the TI-83 Plus™ as a multifunctional device. The data gathered during experiments in chemistry can be evaluated in chemistry lessons as well as in other disciplines e.g. mathematics. By means of this teaching method students of secondary schools learn that sciences and mathematics have a close relationship. This perception is very important because students get more involved and as a result their interest in sciences and mathematics will increase. Furthermore, issues in context chemistry can be handled in a better way so students can relate the different sciences and mathematics.

As a first contact with this teaching method our students of the Academic Teacher Training have to develop a TI-83 Plus™ good laboratory practice (GLP) experiment with a student report, information for the teacher and safety rules for the student and the teacher. In a workshop for chemistry teachers they present their module. So they not only get used to prepare GLP experiments but they can also interchange views with experienced future colleagues.

