



NTSE - Nano Technology Science Education

Project No: 511787-LLP-1-2010-1-TR-KA3-KA3MP



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In the framework of NTSE project, the Italian partner Fondazione Idis carried out several educational activities involving different schools and implementing the educational materials developed in the framework of the project and available in the Virtual Lab.

In 02 May 2013, an online video lesson was held between Bursa Doğa Anatolian High School (TR) and John Atanasov High School (BG). This on line session was a trial session in order to get back feedback about the effects and the impact of an existing lesson plan and experiment from the Nano web sites about LEDs. Although the data gathered from the implementer teachers and students were promising and encouraging, in terms of the efficiency of the educational tools in classrooms the project partners decided to generate the new and authentic lesson plans and experiments with specially recorded experiment videos and simulations.

On May 2013, many educational meetings have been carried out by the experts of Fondazione Idis in the Scuola Primaria Parificata San Tarcisio of Ercolano (department of Naples, Italy). Indeed on May 6th and 20th two meetings focused on the main theme of nanoscience and nanoscale have been carried out. Moreover on May 27th 2013, an online video lesson was held between Scuola Primaria San Tarcisio and Bursa Doğa Anatolian High School (TR). This on line session was a trial session in order to get back feedback about the effects and the impact of an existing lesson plan and experiment from the Nano web sites about the nanoscale. The data gathered from this first were promising and encouraging, even if they weren't absolutely coherent with the contents of the mentioned lesson plan. Indeed the contents were partially changed and adapted to primary school classes. We remind here that the lesson plan have been ideated for a different target composed mainly by high school classes.

The Class Fifth of Scuola Primaria San Tarcisio has been also involved in another online lesson held on December 12th 2013 and involving on the other side Ioan Alexandru Bratescu Voinesti school in Romania. The lesson has been focused on the "Lotus Effects" and involved the pupils of both the involved school in several amazing and stimulating practical experiences.

Concerning the testing of the lesson plans developed in the framework of the project, we remind that four classes of four different high schools have been involved. Below some short descriptions of these implementations are listed and shortly described:

On June 6th 2013 at Liceo Scientifico Statale Labriola of Naples (IT) a lesson plan has been chosen among the ones available in the Virtual Lab of the project: "Lotus Effect", because the teacher considered it to be the most enjoyable, also as the one that offers experiments that can easily be suggested. A IV class (12th grade) of the school was involved in experimentation under the guidance of the science teacher, Prof. Silvia Maria Lippo. The class involved is characterized by the high average in level of skills of its members. This was proven by several tests taken in the course of students' studies. This class is already part of an experimental learning project included in a wider national program, aimed to the development of educational paths of excellence. An interesting assessment tool could be represented by a common debate involving the whole class and led by the teacher. It could stimulate students to recognize



connections between the experiences followed in the activity and scientific knowledge already done in the framework of formal school lessons and in an informal way in daily life. Moreover on June 27th 2013, an online video lesson was held between Liceo Scientifico Statale Labriola of Naples (IT) and Bursa Doğa Anatolian High School (TR). This on line session was a trial session in order to get back feedback about nanothemes and nanoscale. The exchange of view between the students of the two classes have been stimulating and interesting.

On October 8th 2013 a lesson plan have been implemented with the class IV Sezione B (12° Grade) of Liceo Statale "G. Mazzini", whose students attend a course of study in scientific area.

The intervention has been focused on a high school in Naples offering several kinds of course of studies. The work was carried out with the class concerned two issues: experiment a lesson plan chosen among the ones available in the Virtual Lab of the NTSE Project (Lotus Effect) and integrate the lesson plan with an activity (Creating a model of the Lotus Effect) proposed in the Nano Camp in Bahlchik (Bulgaria).

The activities were carried out by a science teacher, Prof. Chiara Schettini, who took part to the Nano Camp together with two students of the class, Riccardo Bordi and Davide Cagno, whose poster (Nano for diabetes mellitus) was one of the winners of the Nano Competition.

The class involved is characterized by the high average in level of scientific skills of its members (28 students) and in that period hosted a science teacher trainee, Dr. Sara Fiorentino, who was involved in the intervention.

On December 9th 2013 a 11th Degree of Istituto Superiore Carlo Cattaneo, Volla (NA), Italy - a vocational school providing its students mainly with technical skills. Due to the features of the school, the involved students were already skilled in electronics and such the under suggestion of their science teachers it has been chosen the lesson plan on LEDs among the other available in NTSE's Virtual Lab.

The main task of the activities has been to introduce the students to the properties and the features of LEDs through IBSE methodologies. Then the student will have to work in a cooperative way to solve a problem proposed by the teacher.

Students showed a great interest for the lesson plan even if they already dealt it topics in the curricular lessons. Anyway, practical experiences in laboratory result to be always captivating for students

Each group of student built a macroscopic model of surface's structure of lotus leaf. A video showing the different steps of this experience has been realized.