

Introducing Concepts of Physics into Primary School

Marinela Ruset and Mariana Mogos

High School “Stefan Odobleja”, Str. Dorneasca, Nr. 7A, Bucharest, Romania,

E-mail: rusetcristian@yahoo.co.uk

Abstract. A project was initiated with the aim to introduce some concepts of physics to schoolchildren of 8 to 10 years old. The experiments were made with three lessons: Matter; Substances and Bodies; and Transformations of Substances. It was tried to introduce not so easy to understand concepts such as: (i) Matter and the way to divide it, living bodies and lifeless ones, (ii) the difference between body and substance and (iii) the transformation of substances under heat. To make school children to understand them, diagrams, photos and experiments were used. The result was very encouraging

Keywords. concepts of physics, matter, substances, transformation of substances, primary school

1. Introduction

The year 2005 is a year dedicated to physics and to Albert Einstein. Taking this fact into consideration, a project aiming to introduce some elementary notions of physics, to the 8-year-old children was initiated. Three class lessons containing elements, which are usually more difficult to understand, have been selected. These were “The Matter“, “Substances and physical objects” and “Transformations of substances”.

Together with the schoolmistress, the teacher of physics has been involved in teaching these notions. For a better understanding, schemes, photographs and experiments have been used.

2. Project development

For the lesson “Matter”, the pupils were presented the scheme shown in Fig. 1. All categories of matter, together with their specific features, have been explained. Then the children have been asked to give examples from the surrounding reality. At the end of the lesson, they received a test where the task was

to arrange a number of words, like flower, horse, stone, water, book, car, butterfly, sun, cloud, boy, ice, apple, land, tiger, etc., into two columns: “living matter” and “lifeless matter”.

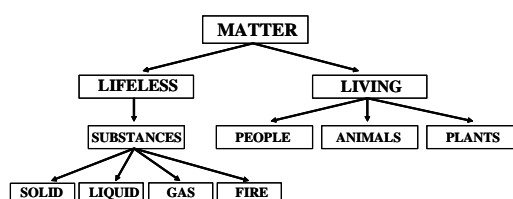


Fig. 1. Categories of matter

The result was the following:

- 20 pupils answered correctly
- 6 pupils answered partially correct
- 1 pupil incorrectly.

This result was considered to be quite good and demonstrated that the children understood the notion of matter with its main categories.

For the lesson “Transformations of substances” the pupils was presented the scheme shown in Fig. 2.

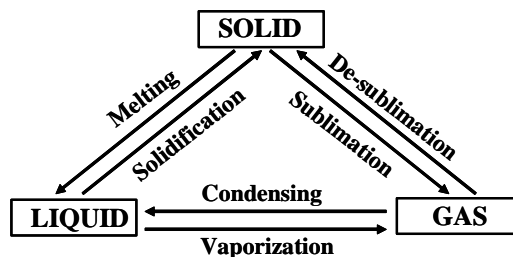


Fig. 2. Transformation of substances

The lesson was run as an experiment. The pupils made themselves heating sources using alcohol. They also brought test tubes, and mirrors (Fig.3). The aim of the experiment

was to demonstrate the transformation of the ice into water, then of the water into vapor by heating and finally of the vapor into water again by condensing.



Fig. 3. General view of the class room

The children have been given small pieces of ice. They introduced the ice into the test tubes and heated them. The ice melted and transformed into water. By continuing the heating the water transformed into vapor (Fig.4).



Fig. 4. Melting and vaporization

Then, they positioned the mirrors above the test tubes and observed the condensing of the vapor and its transformation into water (Fig.5). All these transformations have been explained using the diagram from Fig.2.

For evaluation, the pupils were asked to recognize the name of transformation in a multiple-choice test. For example: the transformation of a substance from a solid state into a liquid state is called: a) solidification, b) melting, c) condensing.

The result was the following:

- 21 pupils answered correctly
- 4 pupils answered incorrectly
- 2 pupils didn't answer at all



Fig. 5. Condensing of the water

Each lesson was followed by a test in order to verify the understanding level of the given notions. In addition, the pupils have been asked to make portfolios where they should identify from their environment (house, school, street, etc.) the notions they had just learnt.

2. Conclusions

- The result of this project was spectacular. The pupils were receptive and eager to participate in these lessons.

- The result analysis has shown that the age is not an impediment (a barrier) in understanding of more abstract and complex phenomena from our environment.

- This is the reason why the project will continue with lessons concerning explanations for other notions like energy, power and energy sources.