# MAGNET AND ITS APPLICATION. PHYSICS EDUCATION IN KINDERGARTEN

**Anna Klim-Klimaszewska**
University of Natural Sciences and Humanities in Siedlce, Poland
E-mail: klimanius@interia.pl

## Abstract

*It is generally accepted that education in the field of physics is possible only when one has received sufficient grounds for it. But physics is an attempt to understand the world around us. Everything one needs to study physics is an open mind and willingness to learn. It is also commonly thought that preschool-age children have a natural curiosity to figure out how the world functions. They focus not only on people but also on objects which they touch, taste, smell, throw into water, etc. Therefore, physics may be introduced as early as in kindergarten. Experiments in physics conducted together with a preschool group activate all analyzers, facilitate a more complete understanding of curricular contents, allow children to discover answers independently and to formulate conclusions. The research presents theoretical considerations regarding the nature of the class of physics conducted with preschool-age children and examples of practical solutions corresponding to physics-related activities performed in a group of 6-year-olds in the Self-Government Kindergarten at the School Complex in Łomazy.*
**Keywords:** *natural curiosity, physics education, preschool education, 6-year-old child*.

## Introduction

Physics seems very difficult to a number of people. Thus, it is generally accepted that education in the field of physics should be commenced when one has received sufficient grounds for it. As a regular class, physics is introduced in later years of the elementary school in Poland. But physics involves observation, conclusion drawing, model building, correcting incorrect conclusions drawn from observation, presenting phenomena which allow to notice the real picture of the physical world. Everything one needs to study physics is an open mind and willingness to learn. It is because physics is an attempt to understand the world around us. Therefore, physics may be introduced as early as in kindergarten.

## The Nature of Physics Education in Kindergarten

It is commonly thought that preschool-age children have a natural curiosity about the world around. The best way to satisfy child's curiosity is to study physics. Research in physics constitute the foundation for multidisciplinary child development. The development of critical thinking skills, cause and effect thinking, comparing and generalizing, contribute to the broadening of children's intellectual horizons.

Experiments in physics conducted together with a preschool group activate all analyzers, facilitate a more complete understanding of curricular contents, allow children to discover answers independently and to formulate conclusions (Gerstmann, 1986).

Even though, experiments in physics seem difficult, they do provide the child with an opportunity to explore and investigate thoroughly the fascinating world of nature and technology. Knowledge and skills acquired in early childhood will become an inspiration and a bridge to gain knowledge at further stages of education. They will lead to new experiences and sensations and new knowledge the child may refer to at later stages.

## Conducting Physics with Preschool-Age Children

Physics classes were conducted in the Self-Government Kindergarten at the School Complex in Łomazy by the students of Pedagogics specializing in early school education and preschool education.

Children completed the following topics: What do we need for the current to flow? What makes electric toys move? What are the features of a magnet? Can magnet attract through paper? How to use a compass? How to determine directions with the use of a compass? How to make a scales oneself?

The main aim of the activities was to stir children's interest in the world of nature and to teach them to conduct observations, draw correct conclusions from conducted experiments and physical phenomena.

General goals: To awaken an active interest and cognitive activity of the child. To develop technical interests. To pose and solve problems, see the cause and effect relations. To get to know simple physical phenomena by means of simple experiments. To initiate autonomous actions of children in the natural environment. To expand child's vocabulary by the addition of new terms. To follow the rules of cooperation during work.

Specific goals: To actively participate in scientific games (watch, seek, observe, compare, study, experiment). To wait patiently for one's turn to participate in research. To follow the set rules. To formulate reflections and conclusions. To use simple tools. To be able to correctly identify studied objects and phenomena. To be able to correctly identify technical equipment. To understand the reality in a cautious and open manner. To take care of the condition of the social and natural environment.

The research was related to a class focusing on a magnet and its application in a compass.

Experiment No. 1 What are the features of a magnet?

Aids: two magnets

Instructions for the child:

1. Bring the two magnets closer together with the poles colored blue. What can you feel? Do the magnets repel one another?
2. Bring the magnets closer together with the poles colored differently. What can you feel? Do the magnets attract one another?

Chat with the children: Every magnet, irrespective of its shape, has two poles, conventionally called the north and the south pole. The pole is the end of the magnet. It has been agreed that the north pole is to be colored blue. It is cold in the north and blue is the so-called cool color. The south pole is colored red. In the south, it is warm and red color is also "warm". The same poles (called unipolar) repel one another, different poles (opposite) attract one another.

Experiment No. 2 Can a magnet attract through paper?

Aids: cardboard box, paper clips (or other fine metal objects), magnet
Instructions for the child:

1. Put the paper clips or other fine metal objects into the carton box Note! A magnet does not attract coins.
2. Move the magnet underneath the carton box.
3. Watch what is happening to the clips in the carton box. Are they moving?

Chat with the children: Have you noted that clips are moving inside the carton box because of the magnet movements? Magnets can move metal objects and, as you have just seen, even the carton box cannot bother it. How can magnets be used in everyday life? (for example, magnetic boards, locks in the door, decorative magnets can be put on fridge doors, etc.)

At the end of the class the children took a test checking their knowledge of the way magnets work.

Experiment No. 3 How to use a compass?

Aid: compass
Instructions for the child:

1. Place the compass on a level surface.
2. Before you read the direction, move the compass shield around so that the north-south line is aligned with the needle. A specially marked north-pointing end shows the north.
3. Remember not to place the compass near any iron objects.

Chat with the children: Can a magnet show directions? The Earth is a giant magnet - it has a north and a south pole. Every magnet when freely hanging will point in the direction of the Earth's poles. This is used in compasses. Some compasses have a special clamp which locks the pointer (magnetic needle). You have to release the lock before using the compass for the needle to move freely.

Experiment No. 4 How to determine directions with the help of a compass?

Aids: compass, pencil, drawing pad
Instructions for the child:

1. Take a compass, a drawing pad and a pencil to the preschool yard.
2. Mark the place where you are on the drawing pad sheet, the way you see it on the picture.
3. With the help of the compass, determine where the north is and mark it on the sheet.
4. Now, draw what is to the north of your kindergarten.

## Conclusions

All in all, attention should be paid to the role of the teacher in providing children with opportunities to explore the world around through an active and direct contact with both the world and its phenomena. The task of the teacher is more than to create conditions which stimulate the child's research activities and allow him/her unrestrained decision making related to independent problem solving. It is about teaching the child the art of precise observation with the use of one's senses, to create conditions for such precise observation, to shape the child's attention span (focus, interest, correct behavior), to support one in making appropriate notes and to adjust one's knowledge to perceptive abilities of the child. Furthermore, the teacher is to arise child's interest in his/her surroundings, stimulate his/her activity, to learn, to observe a selected object, to draw attention to details, and to motivate to think. Thus, physics should be offered in kindergarten as often as possible, and even more bearing in mind that teachers have many opportunities to broaden curricular contents implemented in accordance with the preschool education core curriculum.

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