

Mathematics in the Knowledge Based Society

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Abstract. *In this paper I will exemplify the IntelTeach method of teaching mathematics through projects for the lesson "Integers". I participated in the training course "Intel Teach-Training in the Knowledge Based Society." This course helped me to make my lessons more attractive by integrating resources and IT tools in teaching mathematics. I present this lesson and in terms of a math teacher in a rural school. Children in this environment have many disadvantages compared to those from urban areas, in particular economic, social and technical. AEL laboratories recently broke into this environment. The project represents an alternative assessment method.*

Keywords. AEL, IntelTeach, Mathematics

1. Introduction

In this unit, students learn the concepts of:

- Integer, representing the number line, opposite, absolute
- Comparing and ordering integers
- Representation of a point with integer coordinates in a system of orthogonal axes
 - Assembly integers
 - Decrease integers
 - Multiplication of integers. Integer multiples of a
 - The division of integers when the divider is a multiple of the divisor
 - Divisors an integer
 - Integer power of a natural number with exponent
 - Rules for calculating with powers
 - using the order of operations and parentheses
 - Resolution of equations in $\mathbb{Z}$
 - Resolution of inequality in $\mathbb{Z}$.

Essential Question:

How math helps us in solving practical content?

Unit Questions:

Why we need to know the concept of integer?

How help us use these concepts in problem solving?

Content Questions:

How do we define an integer?

What is the opposite of an integer?

What is the absolute value of an integer?

What is the axis of integers?

How it compares and how orders are integers?

What are the operations with integers?

What is the order of operations in $\mathbb{Z}$?

How to solve problems that arise in operations with integers?

How to calculate the power of an integer?

What are the rules of computing power?

What are prime numbers?

What are irreducible fractions?

How to solve equations and inequalities in $\mathbb{Z}$?

Students will participate in solving individual and group applications, the degree of difficulty gradually differentiated learning styles and level of understanding focused on:

- Identification of issues involved;
- Find real-life problems solved with integers, the development of the graphical representation;
- Identify problem situations, which can be transcribed into mathematical language, using algebraic calculations to determine an unknown period of an equation in $\mathbb{Z}$.

2. Unit's Objectives

1. Use algebra to simplify computing elements calculations and for solving equations.

2. Identify-problem situations, to transpose them into mathematical language and effectively organize how to solve them.

3. Build problems, based on a model (graph or formula).

4. Consistently provide the solution to a problem, using various modes of expression (words, mathematical symbols, diagrams, tables, various construction materials).

5. Identify uses of mathematical concepts and methods studied in solving practical problems.

6. To assume different roles within a learning group, arguing ideas and mathematical methods, using different sources of information to verify and support opinions.

3. Operational Objectives

Students will be able to:

- To write, read, compare and represent whole numbers axis;
- Solve problems that arise in operations with whole numbers;
- To calculate the power of a whole number;
- To know the rules of computing power;
- Divisors-calculate an integer;
- To solve equations and inequality in Z.

4. Didactical Strategy

First hour:

To achieve the unit's portfolio, students must have theoretical knowledge on the concepts from this unit. Will divide students into three groups and will complete homogeneous KWL chart. Students seek information about the concept of individual integer which it saves a folder "Resources". It uses a brainstorm. It makes a whole number and note definition. Activity students will continue to search for information about the opposite concepts of integer, absolute value of an integer, representing the axis, comparing and ordering integers. For each concept will write the definition. Students in each group will be asked to complete their work schedule which will include exercises No.1 degree of difficulty gradually differentiated for each group. Within each group, students can work individually by distributing the workload. Each group will post on the forum worksheet to get an overview and to view and work groups and other forums will complete a checklist on progress. This activity begins in the classroom and will be continued at home. The teacher will continuously observe and work groups will help students when difficulties.

Examples:

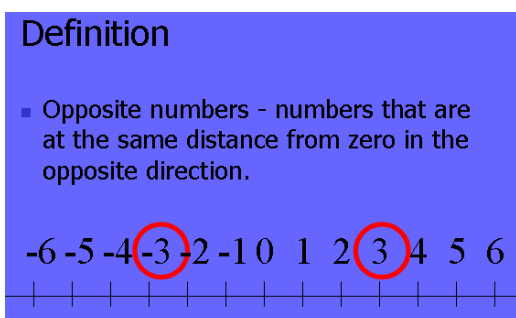


Figure 1. Opposite numbers definition

Definition

- Integers are all natural numbers starting from zero and their opposed.

Example: -7 is opposed to 7

Figure 2. Integer's definition

Second hour:

Students collect information about addition and subtraction of integers. Using examples of worksheet # 2, students will solve such operations. Students will be divided into three groups and the forum will publish results of their work. Examples:

Addition rules of integers

- 1 – If numbers signs are the same, we make the addition like there are no signs. Then, put the sign in front of the result.

$$\begin{aligned} 9 + 5 &= 14 \\ -9 + -5 &= -14 \end{aligned}$$

Figure 3. Integer's addition rule 1

Addition rules of integers

- 2 – If numbers signs are different, suppose again that there is no sign. We subtract the smaller number from the biggest and put the sign of the biggest number before the result.

higher absolute value

$$\begin{aligned} & \text{ } -9 + +5 = \\ 9 - 5 &= 4 \quad \text{Result} = -4 \end{aligned}$$

Figure 4. Integer's addition rule 2

Third hour:

Information is collected about multiplying and dividing integers. Using examples of worksheet # 3, students will solve such operations. Students will be divided into three groups and the forum will publish results of their work.

Fourth hour:

It collected information on operations with whole numbers and the order of their Z With examples No.4 worksheet, students solve exercises such operations. Students will be divided into three groups and the forum will publish results of their work.

Fifth hour:

It collected information about the power of an integer exponent and the natural rules of computing power. Using examples from the worksheet No. 5, students solve exercises. Students will be divided into three groups and the forum will publish results of their work.

Sixth hour:

Divisors information is collected about an integer, prime and irreducible fractions. Using examples from the worksheet No.6, students solve exercises such operations. Students will be divided into three groups and the forum will publish results of their work.

Seventh hour:

It collected information on equations and inequalities in Z. Using the worksheet examples 7, students solve exercises such operations. Students will be divided into three groups and the forum will publish results of their work.

Eighth hour:

Presentation of the final products of groups, carry out evaluation / self-presented product. After the presentation, teacher discuss with his students in order to analyze the extent to which students have acquired knowledge and developed skills of collaboration, communication, creativity.

5. Evaluation

Students will fill in a KWL chart to identify knowledge needs of students. The teacher will ask students to write in the first column what they know about integers and the second who want to know about it. Students will be divided into groups according to their level of understanding, will work differently from completing worksheets developed by teacher and will complete lists of progress. To communicate, exchange views or improving certain content, to view products, it will be used discussion method and the forum.

Analyzing portfolios will be as follows:

- Presentation - the key criteria for presentation
- Students will complete and the table-I know I know - I learned to appreciate progress.

- Each student will complete a feedback form on the forum for presentations colleagues.

Made on presentation of the valuation work has produced a guide to scoring. Each student will be assessed with a mark.

I used initial assessment, formative assessment and summative evaluation.

6. Conclusions

I noticed that students are very attracted to this type of learning, though I repeated some clips of the lessons because we obtained initial results. Things started hard, students of rural beneficiaries had not benefited from the advantages of urban students. KWL chart (I know, I know - I learned) and the stock has been very effective tools and highly appreciated by students. They have learned to express ideas, knowledge, learned to discuss, collaborate in teams, something new for them. It is difficult initially to make them think about themselves, take initiative and to express ideas, brainstorm method is to start very fun for them. To explain the concept of integer, I use many applications and examples from real life, because, as I only managed to attract attention and make him understand.

Examples:

Negative numbers are used to measure, especially in winter temperatures.

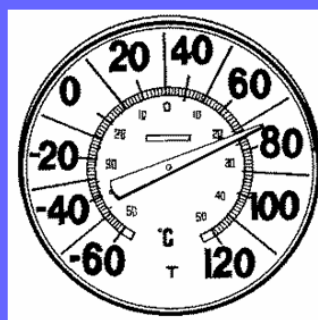


Figure 5. First application

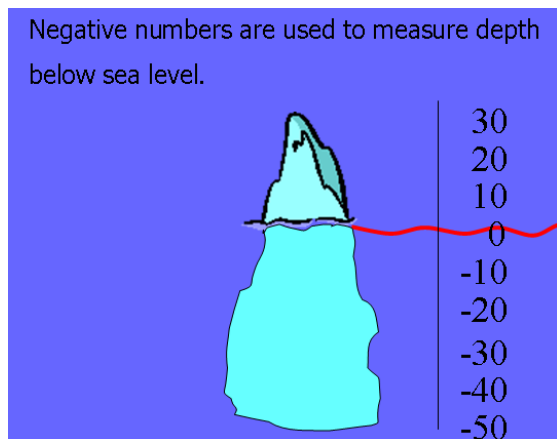


Figure 6. Second application

I concluded that only if you consistently apply this method to several materials and at least over a full cycle of four years, results can be achieved with these students. And to give children the same opportunities in the country to provide schools.

7. Acknowledgements

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8. References

- [1] <http://www.didactic.ro/index.php?cid=cautare&action=search&words=Numere+intregi&cat=10&cls%5B6%5D=true&disciplina=0>
[03/27/2010]
- [2] Textbook course Intelteach
- [3] Textbook for grade VI-th, Dana Radu, Eugen Radu-Editura Teora

