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Long-term projects at school

Abstract. I would like to answer the following questions during my presentation:

1. When to start setting long-term projects to students?
2. How to compose projects — problems?
3. How to help a student that works on a project?
4. How to mark such projects?

Deming's ideas of enterprise work provided a basis for designing many quality systems, for example:

ISO 9000 system connected to high quality;

TQM (Total Quality Management) the task of which is to improve quality.

Improving quality should also be applied to modern schools. In order to realize this task schools should:

- continue, in tune with tradition, to provide knowledge to pupils by organizing and supervising their learning process;
- prepare pupils to gain knowledge by themselves using activating methods.

Among many activating methods used in teaching the long-term projects method appears to be particularly promising. The idea of applying projects to teaching first appeared in 1900 in the USA. It concerned hand-work lessons mainly.

John Dewey and William Heard Kilpatrick gave a new meaning to the word "project". J. Dewey wanted to prepare pupils to solve problems connected with real life. By that time school's purpose was to provide for pupils cooperation and help in gaining practical skills. According to Kilpatrick's idea schools should support pupils' natural interests – teaching by action. The project method became the main way of forming progressive upbringing also at schools.

The project method was introduced in Poland in 1930 after John Alfred Stevenson's book about this method was published. The method allows us to develop pupils' abilities such as:

- thinking and acting by themselves;
- looking up and using many sources of information;
- cooperating within group;
- analyzing and concluding;
- presenting results of work.

Realization of a project consists of several stages:

- choosing a topic from ones suggested by the teacher or by the pupil himself;
- preparing a contract which involves rules of realizing the project;
- consultations at which the pupil receives advises and help from a teacher and informs teacher about progress while realizing the project;
- solving a problem;
- presentation, which shows the way of realization of the project with justification of its aims (written or displayed in any other way);
- marking the project.

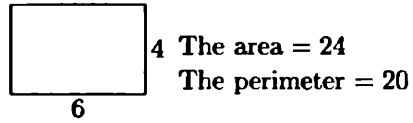
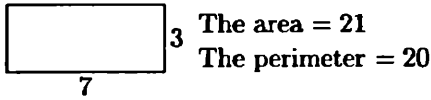
To work successfully over a project at mathematics lessons pupils should be well prepared. They should be able to:

- use computer, graphic calculator, audio-visual aids (e.g. video recorder);
- look for information in many sources;
- formulate and solve problems;
- analyze and define problems;
- select pieces of information connected with the problem;
- look for solutions and choose the best of them;
- evaluate solutions;
- cooperate with others.

I suggest to apply the project method already in the second educational stage. In my book "Interesting tasks - interesting ideas" I suggest to use long-term projects being very simple at the beginning but also very helpful in teaching how to solve problems.

Project 1.

Some rectangles have smaller values of perimeters than values of their areas (irrespective of physical dimensions).



Can you find rectangles, which have a bigger value of perimeter than that of area? Can you find rectangles which have the same values of perimeter and area? Think also about the square!

Project 2.

You have the square 10×10 and the following geometric figures: squares 1×1 and 2×2 , right-angled triangle 1×1 , rectangles 1×2 and 2×4 . Fill up the big square with those figures. In how many ways can you do it? Make a few projects and color them.

Project 3.

Make an album containing pictures and photos of things and plants, which have axis of symmetry.

Project 4.

Prepare a presentation of your class from the viewpoint of statistics, e.g. the average age, height, color of eyes, hair, the number of girls, boys, etc. Present those data using diagrams.

Project 5.

Prime numbers – what do we know about them, how can we find them (the sieve of Eratosthenes). Prepare a talk on this subject.

In full measure the project method can be used in higher education, where students' knowledge and technical preparation allow them to work by themselves.

Project 6.

Draw graphs showing the following functions:

- a) $f(x) = x^2 - 4x + 3$;
- b) $f(x) = x^2 - 2x + 3$;
- c) $f(x) = x^2 + 2x + 3$;
- d) $f(x) = x^2 - 6x + 3$;
- e) $f(x) = x^2 + 3$.

How does the graph $y = x^2 + bx + 3$ change? Which values can be set for the parameter b ?

Using the project method students are prepared to work without assistance, they also learn to plan their work, to work regularly, formulate hypotheses and

verify them, formulate conclusions and generalizations. Solving project problems teaches to correct the mathematical language and selection of commentaries. It is a new quality needed in solving every-day problems.

It is very important to suit the difficulty level to the age and knowledge of pupils. Marking projects a teacher should take care of:

- a contribution of every pupil to the project;
- the final result of the task;
- the way of presenting the solution;
- the use of other sources of information.

Advantages of using the project method:

- a chance for students to show their knowledge, ideas, to take the initiative;
- developing students' own ideas and work;
- teaching cooperation and responsibility;
- improving the quality of teaching.

The variety of structures and kinds of projects provide a wide use of the project method for various subjects at different school levels, however, this method demands training both the teacher and the pupil.

References

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