

Graphic Timetables and the Development of Functional Thinking

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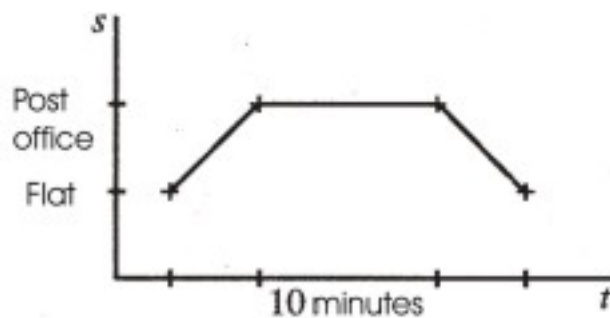
The concept of function is one of the most important concepts of school mathematics. The role of the primary school in its teaching lies, in my opinion, in its propaedeutic. Within Socrates Comenius Project IIATM (*Implementing Innovative Approaches to the Teaching of Mathematics*), we have proposed and trialled in the classroom a series of problems with the aim to develop pupils' functional thinking.

The basic method we use is the method of a genetic parallel. For our purposes, we can summarise the phylogenesis of functional thinking in the following way:

- a man notices, describes and records various dependences in the nature and learns to use them to his/her benefit and to predict some natural events,
- on the basis of a long-term observation some dependences are put into tables,
- various curves are investigated,
- scholasticism opens the question of functional relation as a mathematical-philosophical problem, laws of nature are investigated as regularities of a functional type, Oresme models motion geometrically,
- the conception of law as a dependence between variables becomes one of the basic conditions for the development of natural sciences (mathematics is understood as nearly the universal method for understanding reality),
- the concept of function becomes an object of an independent study (17th century).

The building of the concept of function in the student's knowledge structure must be very long. Moreover, problems we have proposed have marked connections to other subjects to strengthen the importance and use of functions in modelling different situations and phenomena which appear in pupils' world or which they will meet in their future life.

In my contribution, I will present one family of problems called "Graphic timetables". A graphic timetable describes a dependence of the distance on time (see the figure – journey from the flat to the post office and back), sometimes also the dependence of speed on time. Its advantage is that it is used in practice to make train itineraries (and thus links to real world can be made). Our experience shows that graphic timetables are quite easy to grasp and create many opportunities for teachers to discuss functional properties with pupils (in ordinary language at first and in higher grades in the mathematical language of functions).



The contribution will have a form of a poster with formulations of tasks and their presentation in a sequence actually used in the Czech schools (with grade 6 pupils). Original pupils' work collected from the trials will be used to illustrate the knowledge and abilities they gained.