



## Background

### General didactic background

Mathematics is also a language in physics (the other is mother tongue). But physics could offer some experiments in order to show the applicability of mathematical structures and connect them to real world. The horizontal launch is a cheap and accesive example. The mathematical approach toward this phenomenon leads us toward parabolas.

The lesson is intended to be used as showing the applicability of parabola. It will enhance the knowledge by a very obvious example of the use of parabola.

### Mathematical and physical background

Central topic is the parabola resp. quadratic function in the physical context of the horizontal launch. The horizontal launch consists of two independent movements: a vertical movement which is equal to a free fall  $y = \frac{gt^2}{2}$  and a horizontal movement.

### The idea of teaching implementation

Background idea is an interdisciplinary approach with science and cooperation between math and physics teacher. The physics teacher carries out all experiments needed. The results (see below) are then used by mathematics teacher and he/she enriches both subjects: physics and mathematics.

Before I designed this interrelated (physics-math) teaching sequences, I myself derived formula connecting x and y. Now I intentionally omit this in order to give a perfect combining starting point for the math teacher.