

## Determination of the Gain in Learning the Free-Fall Motion of Bodies by Applying the Resource of Previous Concepts

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**Abstract :** In this paper, we analyzed the different didactic proposals for teaching about the free fall motion of bodies available online. An important aspect was the interpretation of the direction and sense of the acceleration of gravity and of the falling velocity of a body, which is why we found different applications of the Cartesian reference system used and also different graphical presentations of the velocity as a function of time and of the distance traveled vertically by the body in the period of time that it was dropped from a height  $h_0$ . In this framework, a survey of previous concepts was applied to a voluntary group of first-year university students of an Engineering degree before and after the development of the class of the subject in question. Then, Hake's index (0.52) was determined, which resulted in an average learning gain from the meaningful use of the reference system and the respective graphs of  $v=f(t)$  and  $h=f(t)$ .

**Keywords :** didactic gain, free-fall, physics teaching, previous knowledge

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