

Proposal for a small-scale research project: the study of a specific misconception...



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Research Proposal: Study of “ Floating and Sinking” in Secondary Schools:

Introduction: tend to come with preformed conceptions about floating and sinking that are based on their years of observation (Yin, Tomita and Shavelson, 2008). Often, their intrinsic conceptions happen to be in conflict with the knowledge they are conveyed by their mentors in secondary schools. In order to make the process of delivery of concepts efficient, there is dire need to identify the assumptions that students commonly base their misconceptions about floating and sinking on.

This research will find answer to the following question:

1. What assumptions about “ floating and sinking” are common among secondary school students?

Besides, some sub-questions whose answers will be identified are:

2. What minimum scientific knowledge is required by secondary school teachers to adequately teach the phenomena of floating and sinking?

3. What practical experiments are fundamental to the adequate cognitive development about floating and sinking in the secondary school students?

The research aims at investigating possible ways to address the common concerns pertaining to “ floating and sinking” among the secondary school students before teaching them this topic. Having satisfied their preformed misconceptions before the start of lecture on “ floating and sinking”, teachers will be in a better position to convey their point.

Literature review:

Secondary school students fail to develop their competence in dealing with such phenomena as “ floating and sinking”. Much of this can be attributed to the lack of teachers’ own understanding of the fundamental concepts of science that are involved in the phenomena of floating and sinking.

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Students develop the conception that an object's ability to float or sink in a liquid depends on its shape, volume, mass and density (Skoumios, 2009, p. 383). Misconceptions about floating and sinking among students involved in the research of Libarkin, Crockett, and Sadler (2003, p. 48) revolved around objects' size, shape and material. Many students are usually quite familiar with scientific terms, though they can often not relate them in terms of floating and sinking (Moore & Harrison, n. d., p. 15).

Methodology:

Greenwood (1996) developed a “ three phase constructivist teaching sequence” to equip the teachers with the concepts of density. The teachers in elementary school found the model useful to teach floating and sinking phenomena. Thomson and Logue (2006, p. 554) interviewed 6 students between 6 and 15 years of age to identify their common misconceptions about floating and sinking and study the modification of concepts with age. In this research, data will be collected through focus groups to identify the common assumptions among students. Once identified, the level of impact of individual assumptions on the students' cognition will be determined through questionnaires using Likert Scale. Data will be analyzed using SPSS. Assumptions will be identified in order of priority and minimum knowledge level of scientific terms will be identified through interviews with educationalists.

Some ethical considerations can be to make sure that the students' self-formed assumptions about floating and sinking are respected. Also, teachers should be convinced to gain the minimum level of understanding about basic scientific terms without underestimating their prior knowledge of the same.

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