

## **PROBLEMS IN LEARNING GENERAL CHEMISTRY CONCEPTS AT SCHOOL LEVEL**

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Although a good understanding of general chemistry is essential, most A/L chemistry teachers consider teaching this section poses many problems. This study aimed at identifying problems of learners and assisting them in learning the unit on, "Chemical bond" in general chemistry section. In the Sri Lankan context the knowledge of some basic concepts in general chemistry is introduced at the junior secondary level of the school system.

To understand how the general chemistry concepts are taught at junior and senior secondary levels, two questionnaires were administered among O/L and A/L science teachers. 40% of them were interviewed. The answer scripts in term test papers of the GCE (O/L) students were also analyzed. Diagnostic tests were conducted to A/L students to identify problematic topics in the unit. Six classrooms were observed to identify problems in teaching and learning chemical bonds at GCE A/L. By doing a content analysis of the general chemistry sections in the O/L and A/L syllabuses, it was found that the content in the teacher guides and textbooks had created some problems in learning. Furthermore, it was found that there are several sections related to general chemistry in the O/L syllabus and the content has to be reorganized vertically as well as horizontally to ensure smooth flow of facts from lower grades to upper grades.

The students had difficulties in writing formulae, balancing chemical equations, drawing dot cross diagrams and, understanding molecular geometry, inter-molecular forces, polar and non-polar molecules. In writing chemical formulae, 81% of O/L students made mistakes. 20% of A/L students considered valency as the number of valence electrons. In balancing chemical equations, 71.5% of A/L students had difficulties in using oxidation number correctly. 96.6% of O/L students failed even to write an equation. O/L teachers stated that it is too much for the tenth graders to learn concepts involved in writing symbols, valency and, writing formulae in the same year. Fifty percent of teachers stated that it is difficult to teach balancing equations. 92.6% of O/L students failed to draw dot cross diagrams. Fifteen percent of A/L students drew structural formulae for them. About 32% of A/L students failed to put all valence electrons in atoms and charges of ions. None of the teachers noticed these common mistakes. In teaching chemical bonds, several defects of teachers such as presenting incomplete or irrelevant facts, making incorrect and incomplete explanations, problems in introducing lessons and managing time were identified. To overcome the identified difficulties and to facilitate the teaching learning process, a handbook was prepared on the unit on, "Chemical bond" in the GCE A/L chemistry. It is suggested to reorganize the content in general chemistry from junior to senior secondary level and to introduce new methodologies of teaching to assist students in their learning. In addition preparation of handbooks for each unit in general chemistry section in the GCE (A/L) syllabus is recommended.

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