

ABSTRACT

RIZKA FITRIANI HARAHAP : Analysis of Students' Learning Difficulties in Acid-Base Material Using Four-Tier Multiple Choice Diagnostic at SMA Negeri 1 Tanjungbalai.

This research aims to describe students' conceptual understanding and identify their misconceptions on the topic of acids and bases through the use of a Four-Tier Diagnostic Test. The study employed a qualitative descriptive approach. The subjects were eleventh-grade science students at SMA Negeri 1 Tanjungbalai during the even semester of the 2024/2025 academic year. The instrument consisted of 15 four-tier multiple-choice diagnostic items, covering answers, reasoning, as well as confidence levels for both answers and reasoning. The data were analyzed qualitatively by examining students' answer patterns, their reasoning choices, and the level of confidence indicated.

The findings revealed that most students still faced difficulties in understanding acid-base concepts. Only a small proportion of students demonstrated a proper conceptual understanding, while the majority fell into the categories of not understanding the concept or experiencing misconceptions. Common misconceptions included errors in identifying conjugate acid-base pairs, misunderstandings about acid and base strength, and difficulties in interpreting ionization reactions. These results highlight that students' conceptual mastery remains low and that previous learning strategies have not been fully effective in addressing misconceptions.

In conclusion, the Four-Tier Diagnostic Test proved useful in revealing students' misconceptions in greater depth. The results of this study are expected to provide valuable input for teachers in designing instructional strategies that emphasize conceptual understanding, thereby reducing errors in students' reasoning.

Keywords: Four-Tier Diagnostic Test, misconception, conceptual understanding, acids and bases