

What Works Clearinghouse



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WWC Quick Review of the Article “Teaching Science as a Language: A ‘Content-First’ Approach to Science Teaching”[†]

What is this study about?

This study examined whether teaching scientific concepts using everyday language before introducing scientific terminology improves the understanding of these concepts.

The study included 49 students—30 who spoke Spanish at home and 19 who spoke English at home—from one fifth-grade classroom in Oakland, California.

All students took a four-hour web-based lesson on photosynthesis developed by the study authors. Twenty-five students were randomly selected to take a version that explained scientific concepts using everyday language before introducing scientific terminology. The other 24 took a version that used scientific terminology from the outset.

At the end of the lesson, the study authors used a test they developed to assess students’ conceptual understanding of photosynthesis.

What Teaching Strategies Were Contrasted?

Both groups were taught through web-based lessons with no science instructor.

The content-first lesson began by explaining scientific concepts in everyday language, and then linked these concepts to scientific language using interactive quizzes and activities.

The control lesson began by defining scientific terms, and then provided activities similar to the content-first lesson but based only on scientific language.

WWC Rating

The research described in this article is consistent with WWC evidence standards

Strengths: The study is a well-implemented randomized controlled trial.

Cautions: The study did not use a standardized assessment tool. It is unclear how well this test captures understanding of the core concepts concerning photosynthesis. It is also unclear whether the content-first lesson improved students’ retention of this information, because this test was administered immediately after the lesson was completed.

What did the study authors report?

When tested immediately after the lesson on their understanding of photosynthesis using scientific language, students who received the content-first lesson had higher scores than students who received the lesson that introduced scientific terminology from the outset.

The difference in test scores was about three-fifths of a standard deviation, equivalent to moving a student from the 50th percentile to the 74th percentile.

[†] Brown, B. A., & Ryoo, K. (2008). “Teaching science as a language: A ‘content-first’ approach to science teaching.” *Journal of Research in Science Teaching*, 45(5): 529–553.