

Using Crossword Puzzles to Enhance Students' Learning of Technical Biological Terms

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ABSTRACT

The goal of this Quick Fix is to inform biology teachers about the availability of online crossword puzzles that can be used to engage students and help them learn technical biological terms.

Key Words: Engagement; online crossword puzzles; self-evaluation; vocabulary tests.

Students should understand the importance of learning scientific vocabulary (MacKenzie, 2007). Well-defined scientific terms are used for brevity and to avoid misunderstandings. These terms are required knowledge for understanding scientific papers. They are also helpful when preparing students' lab reports or writing assignments. They will be needed to understand local and state-wide tests. The use of online crossword puzzles to enhance learning of technical terms is a rather novel approach, akin to playing games, and thus might be likely to enhance student engagement with biology.

○ Assessments

There are several potential difficulties with assessments that involve explanations of biological structures and phenomena.

(1) The teacher must devote time to test preparation, administration, scoring, and posttest follow-up. (2) Students' answers may be only partly correct (incomplete). (3) Students' answers may be partly or totally wrong. Despite the difficulties, these kinds of tests are the gold standard for assessment of students' understanding and ability to express that understanding in oral and written communications (Cisterna et al., 2013).

Vocabulary tests that present definitions, and ask for the corresponding terms, are far easier to score than the reverse procedure. Teachers should know whether the textbook contains

all the terms they consider essential. Their lesson plans should contain any such terms that are lacking in the textbook. Teachers can provide helpful hints for each term in a test by providing (1) the number of letters in the term; (2) the first letter of the term; and (3) the number of words in the term, if more than one (e.g., Definition: Darwin's evolutionary mechanism [2 words]; Term: "natural selection").

○ Online Crossword Puzzle Examples

Online crossword puzzles can be assigned as homework to supplement or reinforce terms presented in class or textbook. Students can work at their own paces and collaborate with other students if they wish. There are many online sources of crossword puzzles devoted to biology or any of its disciplines. The one I found most useful is titled "Wayne's Word" (<http://waynesword.palomar.edu/crossword.htm>). Categories are cells and mitosis, DNA, cell structure and function, plant and animal life cycles, ecology, adaptations, supermarket botany, evolution, and more. These puzzles may contain terms unrelated to biology or terms too technical to be encountered in high school biology textbooks. Teachers could inform students of those terms that should be eliminated for the purposes of the course, to help avoid student discouragement from trying to answer questions for which they have insufficient

background. Answers to the puzzles are available online for self-evaluation (<http://waynesword.palomar.edu/crossword1.htm>). Wayne's Word contains numerous biological articles and full-color photographs that students and teachers may find very interesting and engaging. For example, students may be amazed by the topics under the heading Botanical Record-Breakers (<http://waynesword.palomar.edu/ww0601.htm>). Teachers should not miss

the opportunity to explain to students how solving crossword puzzles is analogous to solving scientific puzzles (Pavlova & Lewis, 2013).

Well-defined scientific terms are used for brevity and to avoid misunderstandings.

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the complex of a community of organisms and its environment functioning as an ecological unit.

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