Talk Like a Scientist!

Simple "Frames" to Scaffold the Language of Science

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Abstract:

This article shares a teaching strategy for science teachers to use when supporting language development among English language learners. Students from other language backgrounds who are learning English need to learn both grade-level academic content and the language necessary to express scientific concepts. However, most science teachers are not trained in strategies to support English language development. This article is designed to be used by teachers and professional development providers to demonstrate one way that language development can be embedded into a science class. Scaffolding language structures through "sentence frames" involves modeling appropriate use of common English sentence structures through the four language domains of speaking, listening, reading, and writing. The article provides examples of science-related sentence frames and step-by-step directions for their use during a science lesson. Modeling sentence frames is an effective way to demonstrate appropriate English sentence construction in a context-embedded setting without requiring explicit discussion of grammar or grammatical rules. No specialized language training is required to use this strategy successfully, and it may also be used just as easily by teachers in disciplines other than science. Students from intermediate elementary grades through high school and adult education can all benefit from this strategy. Sentences frames can also be helpful for teachers to use with native speakers of other English dialects who are not classified as English language learners.

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Grasping the concepts and processes of science requires understanding the language of science. Scientific literacy is particularly challenging for students who are still learning English—as well as for native English speakers who are not proficient in standard academic English. Learning science as a second language involves more than memorizing words, although focusing on vocabulary is essential (Wessels, 2013). Even once they learn target vocabulary, English language learners may not be able to *use* these terms to describe the scientific processes they observe (Carrasquillo & Rodríguez, 2005). **Science content often requires specific sentence structures** that differ from more common language functions. Knowing how to string together vocabulary to express scientific language functions is an extra challenge for language learners. **Language learners can often comprehend more than they can express in English**, making accurate assessment more challenging for educators.

One simple modification to scaffold students' language development is to provide "sentence frames" for commonly used scientific language functions. The following list of "sample scientific discourse patterns," developed by Fred Dobb for the California Science Project (2005), provides frames for sentence structures common in the language of science.

SCIENTIFIC LANGUAGE FUNCTIONS	SENTENCE STRUCTURE FRAMES
Sequence	We saw that first, _____, then, _____, and at the end, _____.
Hypothesize	If _____ had_____, then_____would have _____.
Identify relationships	This _____is necessary for _____ because it _____.
Compare	This _____ is similar to that _____because both _____.
Contrast	This _____ is different from that _____ because one has _____ and the other doesn't have _____.
Estimate	Looking at the _____, I think there are_____.
Disagree	I don't think the evidence supports_____because_____. I don't agree with that statement because _____.

Table adapted from Dobb (2005).

Using Sentence Frames Within a Science Lesson:

1. Choose 1-3 sentence frames you will use during the lesson.
2. Display the "empty" sentence frame(s) clearly in the classroom.
3. Refer explicitly to the posted sentence frames during the lesson. This can occur naturally while reading a nonfiction science text, observing an experiment or scientific process, or conferring with small groups of students.
4. Ask students to turn to a neighbor and make sentences aloud using the frames whenever relevant.

5. As appropriate, ask students to chorally repeat key sentences using the target frames.
6. Ask students to embed target vocabulary within the sentence frames as they take notes or complete other writing tasks.

For this modification to have maximum effect for language learners, **give students multiple opportunities to speak, hear, read, and write the proper language structures**. In the sample steps above, note the number of practice opportunities students have with the sentence frames. Merely posting a template on a board or digital whiteboard has only marginal effect. Practice makes perfect with new language patterns!

New sentence structures are most effectively learned gradually, lesson by lesson. As students learn key scientific concepts, they will also be developing their proficiency with key English language functions. How many ways can you think of to expose students to the sentence structures of science?

References

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