Talk Strategies

How to promote oral language development through science

By Lauren M. Shea and Therese B. Shanahan

If you have ever tried to learn a language, you might recall how difficult it was to get the new words to flow. After some exposure to a language, we can *understand* a great deal, but *producing* language seems like a daunting task. Teachers can remember these difficulties when thinking of the English learners in their own classrooms.

In science, our English learners (ELs) have the additional challenge of mastering a new language while navigating the content. In our ever-changing and diverse classrooms, it is important for teachers to remember that every science lesson provides an opportunity for language development for first- and second-language learners.

For many years, we—former teachers and current professional development providers—tried to write science lessons to include language learning opportunities. We wrote lessons in the 5E format, included hands-on experiences, and used specific language learning strategies such as scaffolding and sentence frames to support our ELs; still, there was an area we were missing. We have recently come to realize that it is important to pay more overt attention to students' oral language production because it is directly associated with early literacy skills

(August and Shanahan 2006; Snow 1999).

Many teachers—ourselves included—call on students one at a time. This means that students are fortunate to get one opportunity to speak and receive feedback during a typical lesson. From a language acquisition perspective, we now see that this is not enough to promote the type of learning students need to develop oral language skills.

This article will describe how we incorporate academic *talk strategies* into science lessons in a nonintrusive and meaningful manner.

These talk strategies are adapted from the *Avenues* (2007) curriculum for ELs, which gives examples of cooperative learning strategies for students of varying language proficiencies in content-rich activities. Each strategy supports concept development while providing opportunities for relevant academic talk. With student goals of self-expression, interaction skills, proper use of language structures, and vocabulary development, we find that these strategies naturally integrate with 5E learning cycle lessons. Although our focus is on ELs, these strategies could be used for any population of elementary language learners. Because these strategies place students in dyads

or trios, it is easy for teachers to check for understanding, assess progress, and appropriately adjust their level of instructional speech—something that might be difficult in a whole-class lesson. Figure 1, page 64, shows the various strategies discussed in this article.

Preparing Students

Before the teacher can implement the talk strategies suggested in this content lesson, students need opportunities to practice the strategies so that they understand their roles and the purposes in each one. Teachers and students can model and rehearse the strategy at any time before the lesson or right within the lesson as they are about to begin. Because these strategies can transfer to sharing times, daily routines, or other content areas, teachers can demonstrate and students can practice them whenever and wherever the teacher sees a talking opportunity. The more students rehearse these strategies, the better prepared they will be to practice new words and structures in the science lesson.

Modifying the Lesson

To guide the reader through our process of turning a typical science lesson into one that focuses more on academic student talk, we use the example of a second-grade lesson on sound.

In this 5E learning cycle lesson, students visit stations where they investigate vibrations with items such as tuning forks.

Student talk allows learners to practice, negotiate in, and learn about the language, so we add more opportunities for student talk to our science lesson to make this a more effective science and language lesson.

We replace sections in which the lesson previously had the teacher asking whole-class questions—"teacher questions"—with a small-group talk. Students actively share, discuss, and debrief with partners at various stages in the lesson. Not only does this new model give all students the opportunity to use the language, but it also provides the teacher with knowledge about each child's understanding so she can decide what to do next in the lesson. To view the lesson in its entirety, see NSTA Connection.

Engage

In the *Engage* section of the lesson, a "Three-way Interview" (Figure 1, p. 64) replaces whole-class questioning. Here, each student shares his or her responses to the teacher's question with a partner. Either the student or the partner reports back to the class, allowing the student to use speaking and listening skills.

In addition, more language and different exploratory ideas orginate from the students. Because each student responds, the teacher can assess conceptual understanding through use of the home or target language.

In this section alone, we now have every student talking, using and listening directly to the language and vocabulary two times, whereas in the previous lesson, only two selected students were called on to speak. The teacher, who walks around to listen to the conver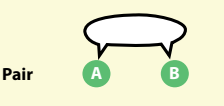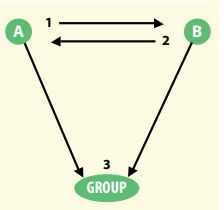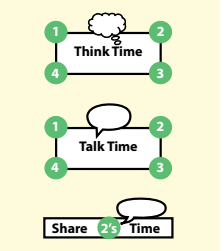s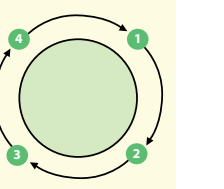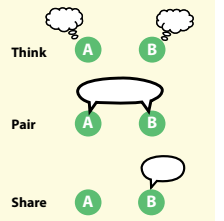ation, now can formatively assess many more of her students' language use and content comprehension. Teachers in our modified professional development find that these quick pairing and sharing techniques increase their students' vocabulary, confidence, and willingness to share aloud. According to one teacher-participant, "It allows them the confidence to speak English with their peers and the teacher." Another teacher states, "Using language as a means to instruct reduces the affective filter and allows the students to feel safe in their learning environment. When students see, hear, and produce the content, their ability to retain the information being taught increases."

Explore

In the *Explore* section, we included "Numbered Heads" (Figure 1) to provide an opportunity for students to make sense of their own thinking, talk about science with other students and with the teacher, listen to the ideas of others, become aware of multiple perspectives, rethink their own ideas, evaluate another's ideas, and frame their own ideas before writing while in the hands-on learning portion of the lesson (Worth 2008). Here, the teacher pauses briefly to give various students the opportunity to share their group's thoughts and discussions. By calling on numbers, rather than students' names, the teacher expects every student to be ready to formulate his or her words. We suggest having the main questions and key vocabulary posted at the stations to provide scaffolding for student thinking and comments.

Figure 1.

A sample of talk strategies.

Design	Description	Benefits and Purposes
Report to a Partner Pair	• Each student reports his/her own answer to a peer. • The students listen to their partner's response. ("Turn to a partner on your left." "Now turn to a partner on your right.")	• This allows students to talk to different students in the class and gives each student an opportunity to share and listen to various answers and language structures. • Talking one-on-one with a variety of partners gives risk-free fluency practice.
Three-Way Interview 	• Students form pairs. • Student A interviews student B about a topic. • Partners reverse roles. • Student A shares with the class information from student B; then student B shares information from student A.	• Interviewing supports language development in question formation. • Students participate in speaking and active listening. • This ensures participation by all students.
Numbered Heads 	• Students number off within each group. • Teacher prompts or gives a directive. • Students think individually about the topic. • Groups discuss the topic so that any member of the group can report for the group. • Teacher calls a number and the student from each group with that number reports for the group.	• Group discussion of topics provides each student with language and concept understanding. • Random recitation provides an opportunity for evaluation of both individual and group progress.
Roundtable 	• Teacher seats students in small groups around tables. • Teacher asks a question with many possible answers. • Each student around the table answers the question a different way.	• Encouraging elaboration creates appreciation for diversity of opinion and thought. • Eliciting multiple answers enhances language fluency.
Think, Pair, Share Think Pair Share	• Students think about a topic suggested by the teacher. • Pairs discuss the topic. • Teacher strategically chooses certain students to individually share information from their discussion with the class.	• The opportunity for self-talk during the individual think time allows for the student to formulate thoughts before speaking. • Think time allows students to think about the concepts and the language before producing. • Discussion with a partner reduces performance anxiety and enhances understanding.

Adapted from *Avenues Hampton-Brown* (2007).

This small-group discussion allows exploration and practice of language. Peers discuss, navigate, negotiate, and validate language. Students will feel more prepared to present to the whole class after rehearsing with a group of peers.

Explain

In the *Explain* component of the lesson, a "Roundtable Discussion" gives students one last opportunity to practice their words before reporting to the class. This strategy requires students to report differently from anyone in their small group. This involves listening and speaking skills for successful completion. This strategy provides a unique opportunity for the teacher as well. By listening to many diverse conversations about the topic, she uncovers who fully understands the material. Then, she determines who will report to the class.

One teacher tells us that these strategies helped her assess in the Explain component because, "when children explain and talk through an idea, it provides the teacher with an assessment opportunity as well. The teacher can analyze how the students are thinking through the problems."

Elaborate

By including a "Think, Pair, Share" in the *Elaborate* component of the lesson, teachers give all students an opportunity to practice their literacy skills of predicting and connecting to text. This allows students to actively use words that focus not only on content but also on applying vocabulary to other

domains (Fathman and Crowther 2006). In addition, these strategies extend to real-world application as one teacher explained to us: "I realize how much more valuable it is to have them bouncing ideas off each other …I could see it in the way they talked to each other. They're getting along better and speaking to each other kindly and in other areas."

Evaluate

In evaluating student learning of the lesson objectives, another "Think, Pair, Share" can be included to promote continued and active thinking and sharing among partners. During this time, the teacher listens and assesses student conceptual understanding and their language proficiency. A teacher reports, "I find [student talk strategies] very beneficial especially when doing an informal assessment. I can tell by what they are saying whether or not they actually understood the content."

After the student talk opportunities during the investigation of sound, students complete sentence frames to show what they have learned from their experiences. The teacher asks "What causes high-pitched sounds?" and the students reply by writing the sentence frame: "_____ vibrations cause _____ sounds." By using the frame to reply to the teacher's question, students are able to use the academic vocabulary they practiced during the investigation. The teacher can then assess student learning. The teacher then asks

"What causes low-pitched sounds?" and the students reply by writing the same sentence frame, "_____ vibrations cause _____ sounds," this time using other appropriate vocabulary words. Teachers have found this sharing time to help dramatically in assessing their students.

Diverse Groupings

One last point is that partnerships and groupings can be made in a number of ways. At times, you might want groups of students with the same proficiency level to have students comfortably practice language with others who are at a similar acquisition point. This grouping creates a safe and nonthreatening environment for students to take risk in producing language. Other times, students at higher language levels can be grouped with less proficient students to serve as language models for their peers.

Encouraging Results

These added talk strategies increase student talk levels by affording all children multiple and varied opportunities to use language. Throughout this model lesson, students think, share thoughts, rethink their own conceptual knowledge, evaluate others' ideas, and reframe their perceptions based on peer conversation. As teachers in our modified professional development attempt talk-infused lessons in their own classrooms, they perceive positive results in their students, including improvements in their students' language, increased production of complete sentences, incorporation

of academic vocabulary, positive changes in social interactions, and increased confidence in speaking. One teacher who recently infused all of her science lessons with student-talk strategies states, "Allowing them to have discussions with other students enriched their ability to listen to the vocabulary and use the vocabulary with other kids. And before, if I would have taught the old way, those kids would have stayed quiet the whole year and they wouldn't have gotten as much vocabulary and content."

Of course this sample lesson's modification does not have all possibilities included, but shows one potential way to incorporate oral language learning strategies. These strategies do not make the lesson longer, nor do they require much additional planning or preparation. They do not entail significant release of control, nor necessitate a change in classroom structure. Yet, these simple changes enhance the lesson tremendously by giving every child a chance to produce language many times. These additional oral language strategies are beneficial to students by providing significant opportunities to practice the target language and by allowing for the incorporation of structures and vocabulary into their language. ■

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NSTA Connection

Download the "Sound Song," activity station descriptions, and the complete science lesson at *www.nsta.org/SC1111.*

Connecting to the Standards

This article relates to the following *National Science Education Standards* (NRC 1996):

Content Standards
Grades K–4

Standard A: Science as Inquiry
- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry

Standard B: Physical Science
- Properties of objects and materials

National Research Council (NRC). 1996. *National science education standards.* Washington, DC: National Academies Press.