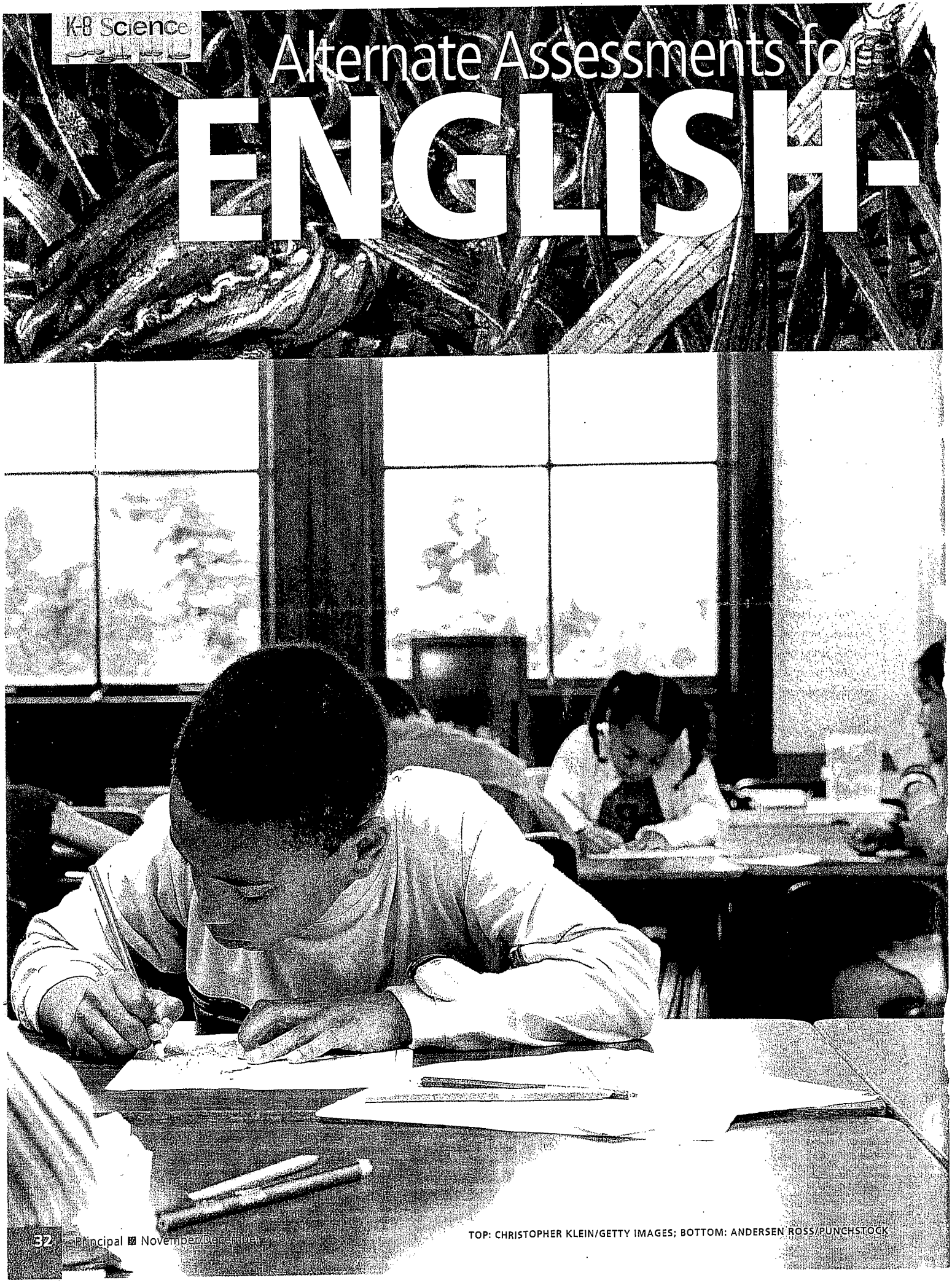
K-8 Science

Alternate Assessments for ENGLISH-



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LANGUAGE LEARNERS

Using drawings and interviews to measure student learning in science.

Anne Cox-Petersen and Joanne K. Olson

English-language learners (ELL) are capable of high levels of conceptual understanding related to science. However, traditional means of assessment do not typically reflect their understanding of science content. During a study at the Foshay Learning Center in Los Angeles, we found through classroom observation and analysis of student products that while ELL students have difficulty writing in English, they can speak about science with a level of sophistication not reflected on written assignments. This mismatch between assessment practices and student understanding is what motivated us as teacher researchers to assess fourth- and fifth-grade understanding of marine environments through drawings.

IN BRIEF

The authors find that "a picture is worth a thousand words" in a non-traditional method of assessing English-language learners in science by using student drawings and interviews.

Background of the Study

We co-taught science and mathematics to a multiage class of third-, fourth-, and fifth-grade elementary students, 60 percent of which identified themselves as Latino or Latina (from El Salvador, Guatemala, Nicaragua, and Mexico) with limited English proficiency. We sought to gain information about our students, their lives, and their cultures; integrate students' culture and experiences into formal science instruction; and provide experiences for students to help them connect science content with personal experiences. We had given many traditional paper-and-pencil tests and found that many students failed the tests. When we talked with our students, we realized that they knew much more than was measured through a textbook-created test or even our own teacher-created test, so we chose to assess their learning through drawings.

Student drawings have been advocated as a means to assess conceptual understanding in science (Hein & Price, 1994). Based on the maxim that "a picture is worth a thousand words," drawings often reveal more than written responses. Because drawings do not require mastery of the English language, they likely have fewer barriers than other written assessments for ELL students.

Drawings Over Time

One of the strengths of using student drawings as an assessment tool is that teachers can compare and contrast understanding over time. We assessed students' understanding of the ocean over a period of eight months. We decided to use the ocean as a theme during the entire school year because the center is located about 10 miles from the beach. We used state standards to guide our teaching of the ocean within physical science, life science, and earth science standards.

Drawings about the ocean were coupled with specific science experiences during interactive, inquiry-based instruction. Experiences included two field trips to the beach, a field trip to an aquarium, development and maintenance of a saltwater aquarium in our classroom, and opportunities to communicate with marine biologists at a local university.

These experiences, in addition to classroom instruction, prepared

students to complete drawings four times throughout the school year: September, November, March, and June. On each occasion, we gave students plain white paper with the same verbal prompt: "Draw a picture of what is in the ocean, using as much detail as possible." We allowed approximately 45 minutes for each drawing session.

Assessing the Drawings

Scoring drawings can be challenging. Therefore, we decided to give each drawing four different scores, and both of us scored each drawing individually. The first score reflected the total number of unique animals present in the drawing. The second score included the total number of unique plants. The third score included the total number of unique nonliving features, such as seamounts, volcanoes, trenches, and ocean ridges. A fourth score reflected the level of sophistication of the drawing, using a rubric ranging from 0 to 5. Our use of the term "sophistication" refers to the accuracy of the placement of living organisms and how well the drawing reflected an understanding of major marine science concepts. We used the following rubric to determine sophistication scores:

- 0 = No drawing or a drawing of one organism and the water surface;
- 1 = Two or more animals, water surface;
- 2 = Plants or the ocean floor, two or more animals;
- 3 = Swimming and stationary animals, plants, and ocean floor;
- 4 = Ocean floor with features, swimming and stationary animals, plants, most are accurately placed; and
- 5 = Extensive ocean floor features with appropriate organisms, many animals and plants, accurate placement, shows some relationships between organisms (*e.g.*, a baleen whale eating krill).

The four different scores allowed both of us to look at the depth and breadth of understanding related to plants, animals, ocean features, and the interaction of organisms within their marine environment. Overall, students showed improvement in their scores over time, with the mean sophistication score increasing from 1.72 in September to 3.68 in June. The number of unique animals drawn increased from 4.37 in September to 9.45 in June. Plants were typically nonexistent in the September drawings, with a mean of 0.60 plants drawn by students. This increased to a mean of 1.19 in June. Nonliving features showed similar gains, with a mean of 0.65 in September and 2.32 in June. We recommend that teachers provide a rubric in advance of any assignments or allow students to help create the rubric. If students help define the rubric, teachers may want to post specific science standards that relate to it and have students assist in translating learning expectations into a rubric. This will take some time, but encouraging student participation allows them to take ownership in the learning and assessment process.

"Draw Talk" Interviews

Using drawings in conjunction with a short interview called "draw talk" allowed students to further express ideas using English. Students conducted their draw talk with other students first before discussing their drawings with us, the teachers. Sharing with peers allowed them to "try out" their explanations in English, which provided a safer and more supportive atmosphere for assessment later.

Following the drawings and draw talk, we asked students to write about their drawings in their journals. This was an effective exercise because students had accrued background knowledge and vocabulary before expressing their ideas in English. Some students integrated Spanish words within their journals but replaced many of their Spanish words with English words over time. The journals were not graded but were used to determine their interests in particular areas of marine science and to see that they were expressing their ideas on a daily basis. The ELL students in our class usually needed substantial time to write and revise their ideas. When they knew they had enough time to write and revise multiple drafts of their work, they completed the task and did quite well. Traditional assessment situations rarely provided the extensive time ELL students needed, and these students struggled as a result.

Science Learning For All

Although ELL students need to develop English literacy to succeed academically, assessing conceptual understanding in science using only traditional assessments can misrepresent students' understanding. Using drawings and other alternative forms of assessment is consistent with the National Science Education Standards (National Research Council, 1996), which encourages teachers to "use multiple methods and systematically gather data about student understanding and ability." Further, "each mode of assessment serves particular purposes and particular students. Each has particular strengths and weaknesses and is used to gather different kinds of information about student understanding and ability" (National Research Council, 1996). As schools become more ethnically and linguistically diverse, science teachers and science teacher educators need to determine ways to teach and assess science more effectively.

References

Hein, G. E., & Price, S. (1994). *Active assessment for active science.* Portsmouth, NH: Heinemann.

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

Anne Cox-Petersen is an associate professor at California State University, Fullerton. Her e-mail address is **acox@fullerton.edu**.

Joanne K. Olson is an associate professor at Iowa State University. Her e-mail address is **jkolson@iastate.edu**.

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JOHN H. WHERRY

Getting Parent Support for Standardized Test Success

How involved are the parents at your school in supporting your efforts to achieve adequate yearly progress (AYP) on standardized tests required by No Child Left Behind (NCLB)?

Our latest Parent Institute survey of more than 15,000 education leaders reveals that schools have developed a wide range of ways that parents can help ensure standardized test success. We are using the survey findings and related research to prepare a kit that schools can use to assist busy parents in helping their children succeed on standardized tests. Here are highlights from hundreds of promising practices we identified in our research:

Inform parents early in the school year about the purpose of standardized tests, how test scores are used, and what parents can do to help their children. Although most parents have heard of NCLB and know that annual standardized tests are required, a surprising number do not know why the tests are given, what subjects they cover, or why the tests are important to the school and to their children. Research has repeatedly shown that parents want to help their children be successful but often feel that they are not qualified to help. Parents say that if they had specific information about what to do, they would help their children prepare for tests and help their children's school boost test scores.

Hold meetings and workshops for parents about standardized test success. One school stages a "parent university night" that includes general and concurrent sessions on test-related topics that are presented by local teachers, counselors, or other staff. Other schools offer a series of single-topic programs on testing throughout the year, often reviewing sample test materials provided by their own state board of education.

Many schools report holding "get ready for the test" meetings in the weeks just prior to actual testing dates to urge parents to review test-taking skills with their children; to remind parents to avoid scheduling appointments for children during test days; to make sure children get plenty of sleep in the days preceding the test; and to provide a good breakfast on the day of the test. One school even encourages parents to maintain peace at home during test time so that children will not come to school upset and unable to do their best.

Make print and online information about testing available to parents throughout the year. Also provide an information blitz about three weeks before the testing period. Schools report that distributing notes, letters, newsletters, fliers, booklets, and pamphlets on test-related topics is essential to an overall communication plan on testing. Making test success materials available, for example, through a parent resource center is an effective strategy.

Many schools publish a testing calendar nine months ahead so that parents don't schedule appointments and vacations during the testing period. School newsletters regularly print the testing calendar and parent newsletters feature testing tips and strategies to help students do their best.

Provide parents with specific duties to help their children succeed on standardized tests. While many schools supply parents with information about testing, like schedules and general tips, some schools provide parents with training and materials to help their children at home with math and reading skills. Other schools promote parental buy-in by establishing accountability contracts between parents, teachers, and students that outline what parents need to do at home to help their child succeed.

One principal charges parents to motivate their children by reinforcing how smart they are, and telling them "their teacher knows it, their parents know it, and now they just need to let the state know it."

"Research has repeatedly shown that parents want to help their children be successful but often feel that they are not qualified to help."

Although the lion's share of most schools' efforts to achieve AYP on standardized tests is focused internally on teachers and students, there is evidence that powerful help is available from parents, simply for the asking. Enlisting parent support for students to do their best on standardized tests seems to be one of the most powerful appeals schools can make to parents, especially as test time draws near—and there's still time this school year to tap into that power!

John H. Wherry is president of The Parent Institute in Fairfax, Virginia. His e-mail address is jhw@parent-institute.com.

FOR MORE INFORMATION

To request a free summary of "25 Top Ideas to Involve Parents in Boosting Standardized Test Performance," contact John Wherry at jhw@parent-institute.com. For information about other materials to involve parents in test success, visit www.parentinstitute.com.