

Chapter 6 — Assessing English Learners from Making Science Accessible to English Learners: A Guidebook for Teachers, Updated Edition

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CHAPTER 6

Assessing English Learners

Science teachers who focus on giving English learners equal access to the curriculum will also want to make sure that these students have a reasonable way to communicate what they are learning. Equal assessment opportunity for English learners means lowering language barriers in the testing process so that the focus is on science learning, not mastery of English.

This chapter discusses how to select, modify, and administer good classroom assessments that inform a teacher about English learners' true understanding of science content. The heart of this chapter describes a variety of accommodations that can make classroom assessments fair for English learners. These accommodations maintain a focus on the same content standards for all students while offering students different ways of performing on the assessment that respect their differences and yield accurate results for all students.

THE “SCIENCE” OF ASSESSMENT

Assessing students at the end of each study unit or chapter — summative assessment — informs the teacher and student of final levels of accomplishment and allows the teacher to analyze results for groups of students (e.g., girls, English learners) as well as for individuals. Information about who struggled to understand and what they failed to understand informs the teacher's decisions about how to modify the teaching strategies and activities for the next lesson or to offer program interventions such as tutoring. But how can the teacher greatly reduce the number of students who fail to understand by the end of the unit? Summative assessment is not enough. In support of summative assessment, formative assessment, particularly informal techniques to check for understanding before the start of a lesson and repeatedly during a lesson, is the key to effective teaching and learning.

The National Research Council frames such assessment as the process of teaching scientifically:

Teachers collect information about students' understanding almost continuously and make adjustments to their teaching on the basis of their interpretation of that information. They observe critical incidents in the classroom, formulate hypotheses about the causes of those incidents, question students to test their hypotheses, interpret students' responses, and adjust their teaching plans.¹

In these terms, assessment allows the teacher to treat each lesson as an experiment, predicting that certain strategies and activities will help students learn rigorous content, monitoring the effects of the lesson on student engagement and achievement, and analyzing the assessment data to make conclusions about teaching practices and materials.

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Formative assessment can be a powerful teaching tool when teachers use the results to adjust their instructional strategies to reach all students in the classroom.² As Benjamin Bloom found, teachers using formative assessment dramatically narrowed the range of student achievement (test scores) and the average student outperformed 84 percent (instead of the expected 50 percent) of students in traditional classrooms where the teachers did not make instructional adjustments.³ In other words, when teachers take the time to assess as they teach, and use the feedback, the process can result in more students mastering the lesson content.

The effective teacher uses a few quick and easy methods to survey what students do and do not understand during the course of a lesson and then tries different approaches as needed. Just as an ounce of prevention is worth a pound of cure, noticing early failures to comprehend key ideas and adjusting a lesson to fit student needs can prevent many failures at the end of the unit of study.

Three techniques to check for understanding during a lesson are gaining in popularity among elementary, middle school, and high school teachers:

- » hand gestures such as thumbs up (I agree, yes), thumbs to the side (I politely disagree, no), and flat hand over the head (I do not understand the question or comment);
- » color-coded cards — agree, disagree, don't understand; and
- » white boards on which each student quickly illustrates or writes a brief answer and holds it up for the teacher to see.

These techniques can be used to respond to what the teacher or another student says. Asking all students to quickly show agreement or disagreement with another student's answer or comment engages all students in listening critically to one another and widens the conversation from teacher–student to teacher–student–students. Students easily adapt to these techniques, and the process is both fast and comfortable. And the teacher can take immediate action based on what the students reveal. For example, a concept about which many students signal confusion indicates to the teacher the need to take a different approach; if a smaller group of students signal that they do not understand, the teacher may convene them for reteaching while other students move into an independent activity.

Monitoring students while they are working individually or in small groups can be considered checking for understanding. The teacher is able to observe many students and provide cues or other teaching techniques to guide individual students in their learning activities. When many students are confused, the teacher may stop the independent work and conduct direct instruction to clarify concepts or the learning activity itself. This is what makes a good teacher really effective — planning a good lesson and then making it better during instruction so all students can be successful.

ASSESSMENT ACCOMMODATIONS FOR ENGLISH LEARNERS

Accommodations are meant to elicit the most accurate information about what students know and can do without giving them an unfair advantage over students who do not receive the accommodations. All students are diverse test-takers as well as diverse learners. Some may have pronounced learning

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strengths in certain modalities, such as visual or aural, or they may have assessment preferences that influence their ability to show what they truly know. For English learners, an additional consideration is the challenge they face to perform in English. The more alternatives an assessment includes, the more accurate the test results are likely to be for a range of students.

Figure 6.1 describes common testing accommodations that teachers may use in their classrooms with English learners. It is assumed that testing is in English only. Some accommodations address how a test is administered; others address the test instrument and task options. The closer an English learner is to the beginning ELD level, the more scaffolding of the student's interaction with the test will be required.

ACCOMMODATIONS BY TYPE OF ASSESSMENT

The particular accommodations the teacher decides to use with English learners will vary by the type of assessment as well as by the student's level of English proficiency. Several kinds of assessments that teachers commonly use are described below, along with suggestions to accommodate English learners.

Cloze Test

Cloze tests are similar to sentence frames. They require students to fill in the blanks in sentences with key words. Sometimes a word bank may be provided but, if so, it should include extra words and/or allow for words to be used more than once. The point is to reduce student guessing; the teacher needs to be fairly certain what students do and do not know to confidently plan what to teach next.

- » Ensure that all words in a sentence are familiar to English learners so that the assessment is testing only students' knowledge of the intended terms — those represented with blanks.
- » For beginning and early intermediate students, modify sentences to be as simple as possible and to help students with the reading.

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FIGURE 6.1. **Test Accommodations for Use With English Learners**

Test Accommodation	Purpose or Use
Extra Time	Provide extra time for English learners to read and understand test questions. They have extra thinking to do simply to understand and respond to a question in English.
Word Walls, Glossaries, Dictionaries	Provide word walls created during instruction for reference during assessment so English learners can more easily communicate conceptual thinking. Allow English learners at appropriate ELD levels to use glossaries and English and/or bilingual dictionaries (except when testing vocabulary, naturally).
Notes in Primary Language	When students are allowed to use notes during an assessment, allow English learners to refer to notes they made in their primary language. In this way the teacher makes it more likely that students can produce, in English, answers that they know in their primary language.
Models and Rubrics	Provide models of expected student work, particularly for students who have not previously produced this kind of product. Preview the scoring guide or rubric that will be used to judge the work. Previewing models and explaining rubrics before or during instruction helps students understand lesson and assessment objectives.
Enhanced Test Directions	Some test directions can be much more difficult to understand than the concepts measured. Read directions aloud and rephrase them as necessary to be sure English learners know what they are expected to do. Simplify test directions as much as possible. For example, segment multi-step directions if possible, stating one step at a time and allowing for student response between steps. When responses cannot be segmented, have students use the directions as a checklist for reviewing that they have completed all parts of the task.
Enhanced Test Items	Ensure that English learners encounter in a test the same key words and phrases that were used during instruction. Increase students' opportunity to understand the questions by providing synonyms or additional context for key ideas.
Oral Responses	Communicating through writing can be very challenging for English learners, especially when anxiety is high during an assessment. Allow novice English learners to give oral responses while the rest of the class completes a written test. (Out of range of the rest of the class, prompt students individually and scaffold the conversation as necessary to elicit meaningful responses.) Provide English learners who need support with sentence frames for open-ended questions and ask them to attempt written answers; then prompt students orally to give them an opportunity to clarify written answers that are ambiguous or confusing.
Illustrations, Graphic Organizers	Allow students to express ideas with labeled drawings, diagrams, or graphic organizers. Follow up by asking students to give oral explanations, written open-ended responses, or demonstrations.
Hands-on Activities	Have students perform a demonstration, activity, or experiment, and describe or explain their actions and thinking processes. For example, students might cycle through various assessment task stations in the lab, responding to the problem or question posed at each station. Have students who can write brief answers do so, and orally prompt English learners as needed.
Language Conventions	Ignore errors in language conventions in order to focus on students' understanding of science content. The time for corrective feedback of oral or written responses is during instruction. Expect beginning and early intermediate English learners to make many errors as they struggle to communicate meaning.
Small Groups	Administer a test separately to a small group of English learners if it helps to lower their anxiety (students still individually complete the test). Use prompts and scaffolds with individuals in the group and allow oral responses as appropriate to elicit students' best performance.

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Multiple-Choice Test

Multiple-choice tests can be very difficult for English learners since the test items are typically very succinct — with little context to help English learners figure out what an item means. Teachers may need to support English learners by rephrasing and providing context clues for certain test items.

- » Spend a little time teaching test-taking skills, particularly related to science. If some test items require students to pick the “best” answer, ensure that English learners understand and have had experience with this type of item. Let them know that there may be answers that are partially correct but just not as good as the “most correct” or “best” answer.
- » Limit the number of items, especially items with long statements, to avoid student fatigue.
- » Eliminate items with answer choices such as “None of the above” and “A and B” to avoid confusion and cognitive overload.
- » Make sure item stems and answer choices are written in the simplest, most straightforward wording possible. Highlight key words (in bold, underline, or all capital letters), particularly negatives such as “not,” so English learners do not miss them.

For multiple-choice tests that base items on illustrations, graphs, or tables, the following tips are helpful for all learners and are especially important to avoid confusing English learners.⁴

- » Make sure illustrations are accurate and clear and include appropriate scales when relevant.
- » Use the illustration as a reference for multiple questions. English learners will benefit from the familiar context.
- » Be sure the labels on the illustration match those embedded in item prompts.
- » Limit the steps necessary to interpret information from an illustration, graph, or table.
- » When possible, select contexts that are familiar to students or that relate to their backgrounds and experiences.

Short-Answer Test

Students can respond orally or in writing to test items calling for a phrase or up to a few sentences. When applicable, students may be encouraged to draw illustrations or to create or fill in simple graphic organizers (e.g., to show a cause–effect relationship), organizing their thoughts before answering aloud or in writing. Short-answer tests can be structured to provide sentence starters and function words to connect ideas, with the amount of support matching students’ ELD levels.

- » For beginning English learners, conduct the test orally, individually, and out of range of the rest of the class. Use visual supports without “giving away” answers, particularly for English learners whose strong modality is visual or spatial.

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- » For early intermediate English learners, conduct the test orally or orally prompt for certain items that students may have had trouble answering in writing. Word walls and sentence frames support students to communicate what they know.
- » Intermediate English learners can answer in writing but may need supports such as word walls and sentence frames.

Written Performance Tasks

The writing students do in science varies across types, purposes, and products. For example, students write expository, descriptive, analytic, and technical forms. They write for purposes such as exemplifying, describing phenomena, raising questions, clarifying, and supporting ideas. And they create different types of products such as notes, portfolios, data charts, reports, essays, and scientific logs.

Students need explicit teaching about the purpose and form of each type of writing. Such instruction by the science teacher can be supported with collaboration from the English language arts or ELD teacher. For all students, models should be a key feature of science writing instruction. Models should be discussed with students and available for them to investigate and refer to. Graphic organizers can be used with students to get their thinking organized. Word walls, of course, should be readily available to English learners.

The teacher should elicit student writing at all ELD levels but with different expectations depending on a student's English proficiency.

- » Beginning level English learners may give brief oral answers and perhaps also attempt to write a few simple phrases or sentences.
- » Early intermediate level English learners may write a few simple sentences followed by oral responses prompted by the teacher.
- » Intermediate level English learners may write sentences and short paragraphs and then clarify them orally as prompted by the teacher.
- » Early advanced and advanced English learners should be expected to produce paragraphs and compositions; the teacher is aware that language convention errors are still natural as students continue learning English grammar and idioms.

Figure 6.2 is an example of a written science assessment that gives English learners an opportunity to express their understanding at varying levels of language development. The assessment content is aligned with content standards relating to properties of matter and changes in the state of matter. Students approach the topic through three scaffolded items: explaining processes in an illustration, selecting academic language from key vocabulary on the word wall or test form to describe these processes, and applying knowledge of the processes in an open-ended writing task.⁵

The first part of the assessment includes the following components:

1. an illustration with labels to serve as reference for the entire assessment;

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2. two example responses; and
3. Cloze-response prompts in the form of sentence frames with key vocabulary highlighted in bold letters.

The next part of the assessment example includes a diagram that identifies components in the system and their relationship to one another through the use of arrows. It also provides scaffolds for English learners as follows:

4. a vocabulary key to be applied in this new context;
5. an embedded example response; and
6. a graphic organizer with missing information to be completed.

The final part of the assessment is an open-ended question. To differentiate for English learners at early intermediate/intermediate levels, more support would be added by rephrasing the directions and providing a sentence starter.

7. an open-ended question or sentence starter.

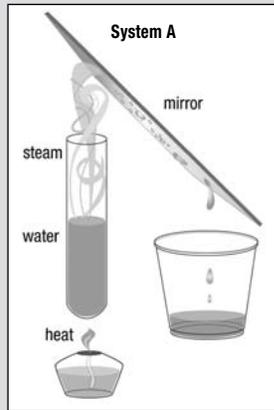
Oral Presentations

Beginning or early intermediate English learners should not be required to present formal oral reports in mainstream classrooms; modified presentations might be appropriate in sheltered classrooms (where all students are English learners). Intermediate students might give presentations if modified to fit their communication levels, the students agree, and classroom conditions are risk-free and supportive. Multimedia and use of technology such as PowerPoint, where visuals are blended with brief text, can support English learners as they orally present their reports.

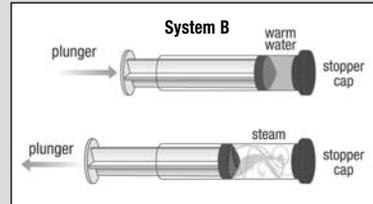
When English learners work in cooperative groups on a task culminating in an oral presentation, reporting in front of the class should be assigned to other students, while English learners are gradually prepared to participate more fully in oral presentations.

FIGURE 6.2. Sample Scaffolded Assessment

1 The illustrations below show two different systems, A and B.



System A



System B

2 Heat is **increasing** the energy of the water.

The heated water *molecules* increase their *motion*.

3 The **increased motion** allows molecules to *escape/go out/become a gas*.

The water changes from a *liquid state* to *gas/steam/a gaseous state*.

This process is called *evaporation*.

If a cold mirror catches the steam, it will *slow down* the molecules' motion.

This changes the steam back into *water*.

This process is called *condensation*.

The plunger applies **pressure** to the warm water.

The warm water *molecules* under pressure decrease their *motion*.

The **decreased pressure** allows molecules to *escape/become a gas*.

The warm water changes from a *liquid state* to *gas/steam/a gaseous state*.

This process is called *evaporation*.

If the plunger is pushed back in, it will *slow down* the molecules' motion.

This changes the steam back into *water*.

This process is called *condensation*.

Key Vocabulary

- | | |
|--------------|---------------|
| Pressure | Heat |
| Increase | Decrease |
| Evaporation | Condensation |
| Liquid state | Gaseous state |

4



5

System A: liquid cold water → → → gas / steam

Reverse A: steam / gaseous water → → →

6

System B: → → →

System B: → → →

(For EA/A and native English speakers)

Using the previous information, explain why a cup of water boils faster at higher altitudes than at sea level.

7

(For EI /I)

Explain how to boil a cup of water **faster**.

Suppose a cup of water takes three minutes to boil at sea level. In the mountains, it takes (less/more) time to boil because the higher you go, the _____ decreases.

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Performance Assessments

Performing standards-based scientific investigations and experiments is a central strand of the National Science Education Standards. The use of investigations and experiments as assessment tools is a prime example of how assessment and instruction can blend together.⁶ In performing an investigation as an assessment, students are asked to analyze a problem and generate a series of questions to be investigated. Then students design and conduct their investigation and organize and write a report.

INTEGRATING INSTRUCTION AND ASSESSMENT

In standards-based lesson planning, also called backwards mapping, the teacher first selects specific content standards as the lesson objectives, choosing a few of the most important or essential standards to discuss with students so they know to focus on these. The teacher, meanwhile, remains aware of the full complement of standards so as to make connections to them as appropriate.

Second, the teacher selects a good summative assessment that emphasizes those essential standards and then builds in accommodations for English learners. The teacher is aware of the test format and the vocabulary, knowledge, and skills required to answer the questions and follow the test directions. If possible, the teacher offers alternatives, knowing that diverse learners also prefer diverse ways to show what they have learned. The teacher asks several questions in evaluating an assessment:

- » Does the assessment truly measure (at least) the essential standards?
- » What will proficient performance on this assessment look like?
- » Do the accommodations for English learners really measure the science content standards at a reasonable rigor, as for other students?

Third, the teacher plans learning activities so that all students have equal opportunity to learn the content and practice the skills. Equal opportunity means that diverse learning activities are presented to students because they have diverse styles, interests, and levels of learning. Visual learners, for example, have graphic organizers and other visual means to access content, but they also experience other modalities to become well-rounded learners and appreciate a variety of styles within the classroom. Reading materials are geared to students' various reading levels. Students are able to choose from alternative tasks, which leads them to become more responsible for their own learning. In selecting the learning activities, the teacher reflects on each and asks whether it helps students understand the essential standards and prepares them for the assessment.

Fourth, the teacher plans instructional strategies and builds in differentiation, or scaffolds, for English learners at different ELD levels. Instruction is multimodal, perhaps focusing on a particular mode at one time and reviewing what was learned by focusing on another mode. Accommodations such as use of graphic organizers that appear in the assessment are part of the instructional strategies. The teacher evaluates the instructional strategies in light of whether they try to reach and respect the diversity of learners in the classroom and are linked to the assessment strategies.

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Last, the teacher connects the dots by reviewing the entire unit lesson plan. What is taught is assessed. There must be a clear connection among the standards, assessment, student activities, and teaching strategies. If not, the teacher amends the lesson plan. During instruction, the teacher uses frequent formative assessments, checking for understanding and using the feedback to quickly adjust the lesson and try other strategies.

SHARING RESULTS AND IDEAS

A teacher can learn much from assessments or test results but still miss some things or not know how to help some students who are struggling. Collaborating with other teachers to evaluate student work or analyze test results can enhance both student and teacher learning.

The shared evaluation of student work might start with a trusted colleague and expand to departmental study teams. These sessions enable teachers to become more skilled at evaluating student work by giving them the opportunity to review and analyze a larger sample of work than that of their own students. By sharing results, teachers can also evaluate their individual programs and instructional practices in comparison with those of their peers.

While analyzing student results together, collaborating teachers also consider what they might do better the next time. They take a hard look at the results for lower-scoring students to determine whether the test was accurate and fair for these students. They also explore different teaching strategies and learning activities that might better help these students as a group, and they share insights about individual students. This kind of embedded professional development is highly relevant to teachers and can produce valuable results for students.

ENDNOTES FOR CHAPTER 6

¹ National Research Council (1996). *National Science Education Standards* (p. 87). Washington, DC: National Academy Press. Retrieved February 26, 2006, from <http://www.nap.edu/catalog/4962.html>.

² Black, P., & Wiliam, D. (1998). Inside the black box: Raising standards through classroom assessment. *Phi Delta Kappan*, 80(2), 139–149.

³ Bloom, B. (1984). The search for methods of group instruction as effective as one-to-one tutoring. *Educational Leadership*, 41(8), 4–17.

⁴ Sexton, U., & Solano-Flores, G. (2002, April). *Cultural validity in assessment: A cross-cultural study of the interpretation of mathematics and science test items*. Paper presented at the annual meeting of the American Educational Research Association, New Orleans.

⁵ Ibid.

⁶ Two publications give practical advice and examples about using investigations and experiments as performance assessments:

Fathman, A.K., & Crowther, D.T. (Eds.). (2005). *Science for English language learners: K–12 classroom strategies*. Arlington, VA: National Science Teachers Association Press.

Olson, S., & Loucks-Horsley, S. (Eds.) (2000). *Inquiry and the National Science Education Standards: A guide for teaching and learning*. Washington, DC: National Academies Press.