Chapter 13

Embracing Diverse and English Language Learners in Chemistry

by Doris Kimbrough and Susan Cooper

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Introduction

The *National Science Education Standards* (1996) stipulate that science education policies must be equitable for *all* students. Chemistry teachers should be preparing their students for a multicultural world by celebrating diversity in an inclusive classroom environment, but this is not as easy as it sounds. Four decades after the initiation of equal rights and protection legislation, the number of baccalaureate degrees awarded to women in science and engineering has finally reached parity with that awarded to men; however, the number of female students proceeding on to graduate school and getting post-baccalaureate degrees, while increasing, still lags behind the number of men (NSF, 2004). Moreover, the percentage of science and engineering degrees awarded to minority students is less than that for the general population, and this difference is greatest in the physical sciences, the category that includes chemistry (NSF, 2004). This divergence increases as one looks beyond the bachelor's degree to the percentage continuing on to graduate school. The reasons for these differences are complex, debatable, often contentious, and not easily solved by a single classroom teacher struggling to help her students understand stoichiometry and chemical bonds.

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Equity of access to challenging curriculum in mathematics and science can often serve as a kind of negative feedback loop. Students who are members of racial or ethnic groups that are traditionally underrepresented in the sciences are often not encouraged to pursue those sciences, which results in those groups continuing to be disproportionately underrepresented. There are many advantages to including all students in instruction, beyond the fact that all students need a basic knowledge of chemistry to make personal and community decisions in our technological society. These advantages include the accommodations that help all students learn chemistry and the unique perspectives that diverse individuals can provide in classroom discussions (Miner et al., 2001). As teachers, we must ensure that students who choose not to pursue science are doing so because they lack interest and enthusiasm for those disciplines, ***not*** **because they are discouraged**. Often, lack of encouragement can be as detrimental as outright discouragement. We must actively promote gender equity, and we must actively promote cultural equity in the examples and materials we use in our classrooms. According to the *National Science Education Standards* (National Research Council, 1996), how we teach and our relationships with our students greatly influence what our students learn.

This chapter can only scratch the surface of what are deep and complicated issues around increasing population diversity, access, retention, the achievement gap, and the pressures on school systems to accomplish more and more with ever diminishing support. This chapter offers an introduction to the multitude of strategies that have proven effective in the teaching and encouragement of diverse populations. Readers are encouraged to go beyond this chapter to explore the vast literature that is available, more directly focused on these challenges, and far more thorough than this simple treatment. Chapter 15 in this volume is an excellent resource for more information about how all students learn.

Teaching Chemistry to English Language Learners

The 2000 U.S. Census reported that over 18% of our population speaks a language other than English in their home, and in some states, the percentage is far higher. School age children comprise a large number of these English Language Learners, putting a strain on many state and local school districts as they struggle to meet the needs of this ever-growing population. In this chapter, we choose to use the term English Language Learner (ELL), as it is a more accurate designation than the expression, English as a Second Language (ESL), as many of these students already speak more than one language and are acquiring English as their third, fourth, or even fifth language. ELL students hail from around the world, and educators can no longer rely solely on bilingual Spanish or Asian language speakers to accommodate ELL students. Achievement efforts of ELL students are often additionally hampered by limited literacy in their native language, which makes achieving fluency and literacy in an acquired language far more difficult.

Certainly, this chapter will address working with ELL students from a science/chemistry perspective; however, it should be stressed that what constitutes good instruction for ELL students is really good instruction for *all* students, even native English speakers. All students can benefit from strategies such as concept maps, breaking complex concepts into smaller, more comprehensible ideas, or providing more than a single explanation or illustration of a concept. Structuring lessons to support ELL students also supports students with mild learning disabilities, alternative learning styles, different content backgrounds, or different cognitive levels. Science and mathematics in general, and chemistry, in particular, offer a unique opportunity to further the knowledge and understanding of ELL students because of our heavy reliance upon symbolic rather than verbal representations. This, coupled with the technical vocabulary that accompanies the study of chemistry—new for *all* students—provides ELL students a more level playing field for learning alongside their native English speaking peers. Unfortunately, in many school settings the opportunity to collaborate for teachers of science and ELL specialists does not exist, so it is not surprising that most chemistry teachers are a bit mystified about how to teach chemistry to a student with limited or no English skills. We offer some suggestions here, but we also strongly encourage teachers with access to ELL specialists within or outside of their school districts to avail themselves of this resource through professional development activities. Most of the instructional strategies used to teach ELL students can be adapted for use in all content areas, including chemistry. In addition, beginning chemistry teachers should seek out other science, mathematics, and technology teachers with experience teaching science to ELL students. Coordinating your colleagues' experience with advice from ELL specialists will empower you to meet all of your students' needs.

Engaging All Students

Structuring a lesson or a curriculum to make it more accessible to ELL students is often referred to as "sheltering" or "scaffolding" (Echevarria and Graves, 2007). Sheltered instruction in this context no longer suggests that students are protected from the higher-level content their native English-speaking peers' experience, just that the content is presented in a way where the learner feels safe and able to connect the content to previous conceptual understanding. Teachers must explicitly demonstrate their expectations and frequently, informally assess students so that the scaffolding can be adjusted to help the students become successful learners (Galguera, 2003).


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After a professional learning session regarding proven strategies for teaching ELL students, a colleague made the comment that, "This isn't about sheltered instruction; it's just *good* instruction!" Indeed, many of the strategies that help the struggling ELL student will also work for native English speakers, particularly those that are nonverbal learners, struggle with learning disabilities, or have poor backgrounds in science or mathematics. In spite of the fact that it is the preferred mode of delivery for many of our colleagues, lecturing over content is not the best way to connect with many of our students, particularly students with limited English proficiency. Varying how students can access content will help to engage all of your students, regardless of language or other barriers. Mixing in lab or demonstration activities, group discussions, problem-solving activities, and other nonlecture forms of presenting content will provide the best venue for all learners. The annotated list below contains suggested strategies that literature has shown to be effective in teaching ELL students; there is also literature that supports many of these strategies for students who are visual or kinesthetic learners and for students who have particular learning disabilities (e.g. sensory integration disorders, attention deficit disorders, or several of the autism spectrum disorders). It is by no means a complete list of all possible strategies, nor are we suggesting that every teacher incorporate every strategy. It is best to find strategies that fit one's personal style and student population. These approaches are supported by Teaching Standard B in the NSES: Teachers of science guide and facilitate learning (National Research Council, 1996).

- **Organize instruction.** Establish routines for bell work, lab activities, reading and note taking, and class participation. Explicitly model and communicate your expectations and practice the routines with your students.

- **Plan ahead.** Provide a syllabus and due dates for assignments, then stick to your plan. Use technology to post information on the Internet. Include class notes and extra information such as links to videos and useful Web sites.

- **Cues to verbal information.** If you have ever had the experience of conversing in a language in which you are not 100% fluent, you will know that it can be exhausting. The words fly by at an alarming rate and often seem to run together into meaningless gibberish. A good teacher trying to help her ELL students access her explanations will speak clearly, avoiding too much slang (or at least explaining it!), and accompany her words with additional cues. These cues can be motions that act out particular words or phrases: e.g., using your hand to make a talking motion if you want your students to engage in discussion; writing motion in the air when you want them to record information, or using index and middle finger to point to your eyes and then moving outward to indicate the act of making observations. Cues can also be actual props or pictures that support vocabulary. Hold up the beaker as you discuss it. Point to the 50-ml mark on the side as you instruct them to fill it with 50 ml of water. Show a picture or a model of whatever concept you are trying to explain. Face students as you speak. Stick to the topic. Repeat questions asked by other students to make sure everyone heard and understood the question. Minimize distractions, especially extraneous noise in the classroom.

- **Idioms and analogies.** Avoiding slang, as ELL specialists advise, is a particular challenge, particularly since slang and phrases that have pop-cultural pertinence will help you connect to teens and preteens and will make science and chemistry relevant to your students. Being aware of your slang use and calling attention to it will help your ELL students: *What do I mean when I say "in the ballpark"? What does 24/7 mean? If we are "not on the same wavelength", are we communicating or not communicating?* Similarly be aware that analogies that make sense to us as Americans may be nonsensical to those who are raised in different cultures. For example, using a ham sandwich analogy to illustrate limiting reagents will not make sense to a student raised on rice and noodle dishes. Analogies can be very helpful in helping students connect to conceptually difficult or abstract material, but research cautions instructors not to rely too heavily on analogies and to point out to students the limits of utility of an analogy (Orgill and Bodner, 2004). Using a staircase model to illustrate quantum levels for electrons may lead to the misconception that the energy separating different levels is constant.

- **Multiply your explanations.** By "multiply," we mean both the act of explaining a concept more than once and elaborating the explanation to include multiple modes. For example, an explanation of an ionic substance dissociating as it dissolves in water could include a verbal explanation of what is happening, representational descriptions of ions and molecules (Na^+ and Cl^- ions scattered among H_2O molecules), circular or spherical models of ions surrounded by the "Mickey Mouse" depictions of water molecules, and a reiteration of the entire explanation using each mode again. Try to reach all modalities (kinesthetic, visual, oral) of learners in your classroom.

- **Vocabulary.** Many "best teaching practices" proponents disparage the use of vocabulary lists as being part of the "science as disconnected facts" approach rather than the more inquiry-focused approaches favored today. However, as students move through their study of chemistry, the vocabulary gets more complex and demanding, particularly for the ELL student. Lists of vocabulary words have their place in instruction. Going through the list and having your students repeat the words after you may seem like a pointless exercise, but even native English speakers will pronounce *cation* "CAY-shun" and struggle with the pronunciation of *protactinium* when encountering it for the first time. Many teachers ranging from kindergarten upward have had success with "word walls," which have new vocabulary posted on walls or bulletin boards in the classroom, typically with pictures. Review the words often with your students and encourage them to use them in their conversations and writing. Chemistry teachers should encourage their ELL students to look for cognates, especially those words that have roots in European languages. For example, "aqueous" is related to the Spanish word "agua." However, we caution that many false cognates also exist, so teachers must help students recognize those as well. One source of confusion that students newly arrived from a "metric"-speaking country might experience relates to our use of two measuring systems, English and metric. Furthermore in many countries that have Romance language roots, the cold water faucets are marked *F* (i.e., *frio* or *froid*) and hot water is labeled *C* (i.e., *caliente* or *chaud*).

- **Group work.** Chemistry is a collaborative discipline, and all students can benefit from peer interaction as they struggle with chemical concepts. Teaching Standard E (NSES, 1996) supports developing communities of science learners who collaborate in scientific inquiry. It is best to group students in varying and creative patterns. ELL students that share a common language can at times be grouped together for mutual support. Other times you may want to group or pair struggling students (ELL or otherwise) with their more successful counterparts. Similarly, students within groups should rotate tasks so that, for example, the girls are not always the recorders and that the ELL students are compelled to record data or write sentences. Group work can also build confidence and allow time for understanding: posing a question and then allowing time for group discussion before asking for responses from individuals or groups will foster participation among students who tend to be shyer, whether for linguistic or cultural reasons.

- **Evidence for claims.** To a student struggling both with the subject of chemistry and with a new language, how knowledge is acquired can be very mysterious and sometimes almost magical. Constantly revisiting how or why we know what we know is a useful way to illustrate the process of science. This can range from the mundane and straightforward (*and how do we know that HCl is a strong acid? Because we memorized the six strong acids!*) to the more esoteric (*why does ice float on liquid water? Because it's less dense. And why is it less dense? Because the crystalline form has empty spaces. And why are there empty spaces? etc.*) Teachers should also be sensitive to the differences between what is considered "good authority" in a scientific context as compared to other aspects of society. A discussion of the terms "law" and "theory" in a scientific context versus a societal context is a useful way of approaching this difference.

- **Literacy strategies.** Pick up a magazine or newspaper in another language. If you are familiar with that language, reading large chunks of text is challenging, even if there are pictures or diagrams to guide understanding. The annotated readings and Web sites at the end of this chapter contain dozens of literacy strategies that teachers can use to help guide students through nonfiction reading (graphic organizers, word searches, concept mapping, etc.). Many of these strategies will assist both ELL and native English speakers alike. Both beginning and experienced teachers can benefit from regular conversations with their colleagues who specialize in literacy. Reading science text requires students to recognize how graphs, charts, photographs, and other visual cues are used to convey scientific information. Making the connections between what is in the book and how students can improve their science skills requires explicit modeling by the teacher. *ChemMatters* magazine provides reading strategies in the online teaching guide for each issue. Most high school textbooks also provide reading strategies with the ancillary materials for teachers. Teachers should always give students a purpose for reading, such as a discussion to pique student interest in the topic, a written anticipation guide to complete prior to reading, or simply asking students to make predictions about what will be in the reading. Chemistry teachers should be encouraged to explore literacy strategies with language arts specialists who can offer a variety of tactics to foster effective nonfiction reading.

- **Technology.** For many students, access to technology is highly motivating. Teaching Standard D (NSES, 1996) supports the use of technology in teaching. Many technology devices, such as laboratory probes and computer programs, require minimal reading or prior instruction while allowing students to learn about scientific processes. (See chapter 7 for additional discussion on the use of technology in the chemistry classroom.) Use of technology also allows for differentiated instruction, offering multiple forms of representation, so that students can be given assignments that meet their diverse needs. For example, teachers can develop alternative assessments and allow students to choose how they would like to demonstrate understanding.

- **Make learning personal.** Look for ways to make chemistry relevant and meaningful to students' lives. In addition to career exploration, encourage students to find scientific contributions made by students like them, such as Alice A. Ball, an African-American woman whose research was instrumental in developing a drug to treat Hansen's disease. (See the February 2007 issue of *ChemMatters* for an excellent article describing her work.) Mario José Molina Henríquez, a chemist at the University of California at Irvine, is a native of Mexico and won the 1995 Nobel Prize in chemistry for his work in linking chlorofluorocarbons (CFCs) to the destruction of the earth's ozone layer. The Chemical Heritage Foundation has an excellent online exhibit about women in chemistry, "Her Lab in Your Life." In the ACS publication *Teaching Chemistry to Students With Disabilities*, you can find a periodic table describing the disabilities of several scientists who discovered elements. Even learning a few words in students' languages can make a huge difference in the accepting culture of the classroom. Teachers should plan to celebrate the achievements of chemists from diverse backgrounds throughout the school year so that students will see that there are no barriers to their own achievement. Students could research these achievements and share their newfound knowledge with the class through Power Point presentations or posters. In the process, they will learn about the history and nature of science (Content Standard G, NSES, 1996).

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- **Talk to your students.** Ask them how you can help them learn chemistry, and don't be afraid of what they might tell you. Acting upon their advice (within reason!) will empower and motivate their learning.

Assessment of Student Learning

No Child Left Behind (NCLB) requires that all cohorts, including ELL students and those with disabilities, improve their performance on math, reading, and science tests. ELL students are required to take the math test the first year they are in the United States, but they may be excluded from the reading/language arts test the first year (Fact Sheet, 2007). Accommodation policies for the ELL subgroup vary from state to state, with some states providing bilingual dictionaries for students and others providing limited translation on math tests. Since science tests are required nationwide beginning in the 2007–2008 school year, the different state accommodation policies are in flux. Also, adequate yearly progress (AYP) requirements vary from state to state. Because each state has developed its own science standards, teachers must familiarize themselves with their states' requirements. (Chapter 11 in this volume offers more information about assessment resources for chemistry.)

Teaching Standard C in the NSES (National Research Council, 1996) requires that teachers engage in ongoing assessment to evaluate their teaching, as well as student learning. Although classroom assessment should align with curriculum standards, that does not mean that all assessments must be objective tests. In fact, higher-level cognitive skills such as planning investigations, analyzing and synthesizing information, and critical thinking are often difficult to measure on these tests. In addition, there is no opportunity for students to communicate their ideas and lab results on objective tests. Teaching Standard C also calls for teachers to guide students in self-assessment, which can promote metacognition while motivating students to achieve at a higher level. Chemistry teachers should have high expectations for all students, even though they are given different opportunities to demonstrate conceptual understanding through authentic tasks such as projects, presentations, and portfolios. On their way to comprehension, students need frequent formative feedback from their teachers. This feedback can take the form of interviews, observations, and checklists. However, performance assessment in chemistry should not be done to the exclusion of reading and writing assessment because students must learn to be successful at both types of assessment to demonstrate scientific understanding (Kamil and Bernhardt, 2004). Consider making at least some classroom assessments visually, linguistically, and culturally organized to resemble the high stakes tests required by NCLB to lessen the confusion for students and to ensure that the assessments more accurately reflect the scientific knowledge of students (Luykx et al., 2007).

Parental Involvement

The involvement of parents in supporting student learning is essential to the educational success of diverse learners. Chemistry teachers should explicitly define how all parents can help their children learn chemistry. For example, teachers can provide information regarding the frequency and type of homework assignments and how to study chemistry. If you use rubrics, explain them to parents. If possible, books in Spanish should be provided to parents. When students know that their parents are supportive of what they are learning in chemistry, they will perform better. Even parents who have a limited education can motivate their children by providing an environment free of distractions and coping skills to help when their children become discouraged. Homework should be purposeful, encouraging family involvement whenever possible. Authentic learning experiences such as those provided in *Chemistry in the Community* (*ChemCom*) offer opportunities for students to relate what they are learning in chemistry to their particular circumstances. (See chapter 8 for a detailed discussion of how *ChemCom* is being used in inner city schools.)

If you teach students with learning disabilities, including those with ADHD (Attention Deficit Hyperactivity Disorder), they will have an IEP (Individualized Education Plan) that is developed by the teachers and the parents. The IEP will delineate accommodations that will help the student learn all subjects. Before an IEP meeting with parents, you should outline strategies that will facilitate student understanding in chemistry. Teachers should communicate to parents their high expectations for all students, including girls, minorities, and disabled students. Parents of all students should be made to feel welcome at the school. This can be accomplished through activities such as parent nights and parent workshops, where information regarding what students are learning in chemistry is shared with parents. Parents also want frequent communication with teachers, even if that means calling in translators. Schools with high numbers of ELL students ought to have translators on staff who can be called upon for parent/teacher conferences, as well as community liaisons who can aid dialogue between the school and home. Bilingual teachers, paraprofessionals, or community members can translate letters, posters, and other written materials that have information about chemistry courses and the importance of learning chemistry. When parents feel welcome at the school, they can come to events and their children can translate when necessary.

Finally, the NSES Teaching Standard C (National Research Council, 1996) calls on teachers to use student data to communicate with parents regarding both student achievement and the *opportunities* they have to learn science. Although we routinely report student achievement to parents, parents of students traditionally underrepresented in the sciences may not realize that their students have the opportunity to take chemistry. Therefore, it is our task to ensure that parents understand that their children have the ability to succeed in chemistry. By sharing success stories of diverse students and clearly communicating expectations for chemistry courses with parents, teachers can gain support and reach more students.

Community Involvement

The community is another rich source of support for diverse learners that should be included in the school science program (Teaching Standard D, NSES, 1996). Chemistry teachers should find opportunities to use community examples that demonstrate the importance of chemistry in our everyday lives. Most students know that they need chemistry to work in the health care industry, but they may not realize that they also need knowledge of some basic chemistry to work as cosmetologists, mechanics, cooks, artists, and more. Business owners are potential employers who can emphasize the science requirements to work for their companies. Many rural communities with diverse learners have an agricultural focus. Agricultural communities, in particular, need high school graduates who have a rudimentary understanding of chemistry in order to make basic decisions regarding safety and efficacy when using chemicals on crops. Chemistry teachers and agriculture teachers can work together to promote student understanding. For many jobs that students might consider after high school, being a member of a diverse population may be an advantage. For example, knowledge of two or more languages helps health care workers in diverse communities relate to their patients.

Encouraging traditionally underrepresented students to pursue careers in scientific and technological fields can take a number of different forms in a classroom setting. Job markets are traditionally good in most of these fields, so students can see their education dollars efficiently converted into earning dollars. Many chemical careers relate to fields that have an altruistic component, such as medicine or the environment. Students interested in “making a difference” or “helping their fellow man” may be drawn to these careers, especially when examples are tied directly to those cultural communities where the student feels most at home. Even though many chemists are white males, diversity of race, gender, and ethnicity can be found among our ranks, and as teachers of diverse student populations, we should be particularly proactive at promoting chemists who are women, Black, Latino, Asian, Native American, and/or physically disabled.

Field trips, guest speakers, and mentors can help students see that chemistry is practiced by many different people, including women and minorities. Guest speakers might include college students majoring in chemical fields who can offer new perspectives. Service learning tied to what they are learning in chemistry is another avenue that chemistry students could explore in their communities. Students could set up recycling centers, organize after school science programs for elementary students, or perform water quality testing in their communities. Through programs such as this, students learn that chemistry is relevant to their lives (Content Standard F, NSES, 1996).

Field trips can also help to provide all students with the same background knowledge, including students newly arrived in the community. When studying energy use, for example, visiting a local museum to learn more about energy use in the community 50 or even 100 years ago gives all students the same setting to refer to for comparison to today’s energy use. Field trips do not necessarily require that students travel long distances. Some excellent resources for learning about chemistry may be right in the community, such as water treatment plants, bodies of water where water quality can be studied, or health care facilities. While on field trips, make the learning personal by asking students how the activity impacts their lives (other than getting them out of the classroom!).

At the school and district levels, the *National Science Education Standards* (1996) includes program standards that describe conditions that must be in place for a comprehensive program that provides all students access to learning science. In particular, Program Standards D and E stipulate that all students have adequate, safe space to conduct scientific inquiry both inside and outside the school building. As teachers, we should advocate for our students to ensure that necessary accommodations are made to provide the opportunity for *all* students to learn chemistry.

Conclusion

In order to meet the goals of the *National Science Education Standards* (1996) regarding equitable science education policies for all students, chemistry teachers should be open-minded and flexible and act as advocates for their students (Cline and Necochea, 2006). Teachers can become reflective practitioners that affirm diversity. Most importantly, science teachers should have high, yet realistic, expectations for all of their students. Through these practices, we can begin to reach the goal of educating a scientifically literate society in which all students have the opportunity to learn science and contribute to our understanding of the world.

Recommended Readings

Keeley, P.; Eberle, F.; Farrin, L. *Uncovering Student Ideas in Science: 25 Formative Assessment Probes*. NSTA Press: Arlington, VA, 2005. The authors describe formative assessments, how to use the probes, and links to the *NSES* and *Benchmarks for Scientific Literacy*. Many of the probes provided are directly related to chemistry.

The Science Teacher (March 2007 and March 2008). Both of these issues are focused on teaching diverse students. They include many practical examples, as well as references.

Thier, M. *The New Science Literacy: Using Language Skills to Help Students Learn Science;* Heinemann: Portsmouth, NH, 2002. This book provides many examples and reproducible pages that combine science, language, and guided inquiry in order to facilitate students' growth as independent learners.

Recommended Web Sites

Chemical Heritage Foundation Home Page. http://www.chemheritage.org (accessed March 16, 2008). From the home page, you can find many excellent classroom resources related to the contributions of many diverse chemists, including the online exhibit "Her Lab in Your Life."

Fact Sheet: NCLB Provisions Ensure Flexibility and Accountability for Limited English Proficient Students. http://www.ed.gov/print/nclb/accountability/schools/factsheet-english.html (accessed April 10, 2008). Questions regarding the testing of limited English-proficient students in language arts and mathematics are answered at this Web site.

Helping English Language Learners in the Science Classroom. http://teachingtoday.glencoe.com/howtoarticles/english-language-learner-teaching-strategies-that-work (accessed March 16, 2008). This commercial Web site has many specific strategies for helping all students, not only English language learners (ELL) students, learn science.

Science and Technology Literacy. http://www.ncela.gwu.edu/resabout/literacy/3_content/3_science.htm. (accessed March 16, 2008). This Web site of the National Clearinghouse for English Language Acquisition lists many resources for helping ELL students learn science and technology.

SDAIE Strategies: A Glossary of Instructional Strategies. http://www.suhsd.k12.ca.us/suh/---suhionline/SDAIE/glossary.html. (accessed March 16, 2008). *SDAIE* is an acronym for *S*pecially *D*esigned *A*cademic *I*nstruction in *E*nglish, so this is a list of instructional strategies to use with ELL and other students.

Teaching Chemistry to Students With Disabilities: A Manual for High Schools, Colleges, and Graduate Programs. Available online at http://membership.acs.org/C/CWD/TeachChem4.pdf (accessed April 10, 2008). This booklet, also available free of charge from the American Chemical Society at 1-800-227-5558, includes excellent information for teaching students with physical and learning disabilities. There is a chapter devoted to lab accommodations, as well as an extensive resource list for more information regarding specific disabilities.

Resources for Teaching ELL Students

Echevarria J.; Vogt, M.; Short, D. *Making Content Comprehensible for English Language Learners: The SIOP Model*, 2nd Ed.; Pearson Publishing: Boston; 2004.

Echevarria J.; Graves, A. *Sheltered Content Instruction: Teaching English Language Learners With Diverse Abilities*, 3rd ed.; Allyn & Bacon: Boston, 2007.

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